1 Introduction

ERM Power Pty Ltd (ERM Power) proposes to construct a 218km natural gas pipeline from the Young gas hub centre on the Moomba to Sydney gas pipeline to a gas turbine power station at Wellington.

This document forms part of the Environmental Assessment, which assesses presence and significance of Indigenous cultural heritage within a 100m corridor containing the proposed alignment.

The purpose of this document is to identify potential impacts on Aboriginal cultural heritage that may occur from the proposed construction and operation of the gas pipeline. A ground survey has been carried out to determine the nature and extent of sites, features and objects within the corridor (Section 9). Recommended measures to mitigate possible impacts are outlined (Section 10) as well as contingency measures (Section 11).

The heritage requirements for this study are:

- To identify and consult with Aboriginal stakeholders, in line with the DECC Interim Community Consultation Guidelines (DEC 2004).
- Determine the location and significance of Aboriginal heritage sites and places within the Study Area;
- Determine cultural significance of the Study Area by integrating the results of the archaeological survey and consultation with relevant Aboriginal groups;
- Provide advice on possible re-alignment of the proposed pipeline should sites, features or objects be located and recorded.

1.1 Description of the Activity

The proposed activity is construction and operation of a gas pipeline approximately 218km in length. Associated material storage sites, laydown yards, site offices and construction camps will be constructed within the 100m corridor.

Within the pipeline construction corridor, earthwork activity will consist of clearing and grading, stockpiling of topsoil; trenching for pipe laying, laying of pipe backfil, of trenches and reinstatement. For construction and maintenance of the gas pipeline, vehicles will be driving along existing formed roads, with a provision for access to the work area from crosscutting roads.

Construction of the pipeline network is to be carried out in the following manner:

- Set up work areas within the construction corridor;
- Grade top soil off lay-down areas for materials (mainly pipe) within the construction corridor;
- The proposed construction alignment is 30m wide. A line varying in width between 25m and 30m is to be graded, centred on the pipeline, in order to clear and windrow vegetation and topsoil (approximately 10cm), which will then be re-graded back for rehabilitation;
- A trench for the pipeline is to be cut approximately 1.0m wide and mainly to depths of 0.75m – 1.2m. The trenches are dug with trenching machinery that moves along the graded right of way; (RoW)
- 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;

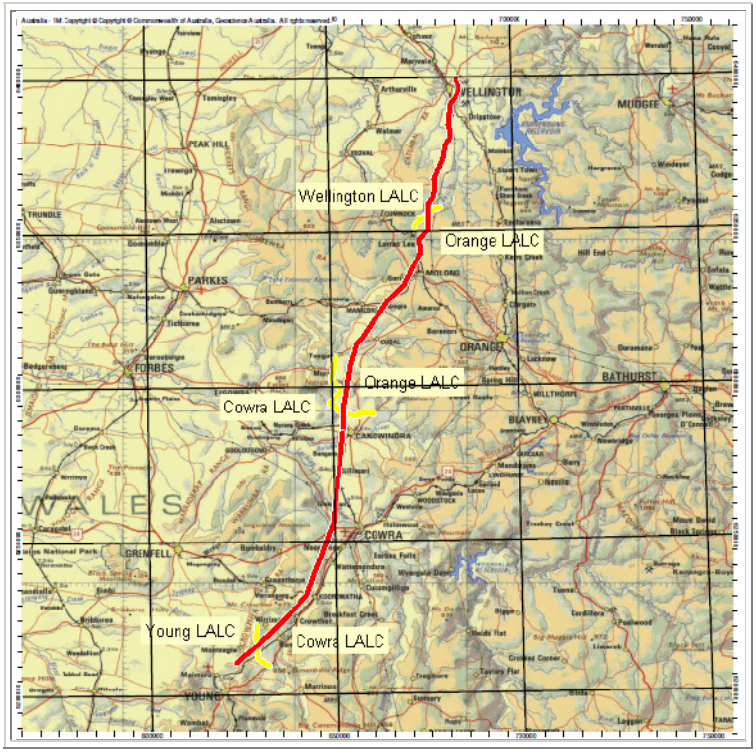
- Minor watercourses, ephemeral streams and gullies will be crossed using an open cut construction method.
- Watercourses with standing or flowing water will be crossed by horizontal directional drilling, or if possible by an open cut method with water flow controls.
- In addition to pipe laying, temporary vehicle crossings may also be constructed to facilitate the movement of construction vehicles over watercourses.

- After the pipes are laid, the trenches are filled and the ground smoothed by grading, using previously graded topsoil for land rehabilitation.
- Operation of the pipeline would include monitoring via aircraft with occasional on-ground monitoring by vehicle. Access during pipeline operation would be restricted to an agreed final easement within the construction corridor.

1.2 Location of the Study Area

The Study area is a line mainly following low ground between Young and Wellington (Figure 1).

Figure 1 Location of the Study Area. Local Aboriginal Land Councils are identified.



2 Statutory and Regulatory Context

2.1 Due Diligence Requirements

DECCW provides guidelines on due diligence requirements for the protection of Aboriginal objects.

Due diligence amounts to taking reasonable and practicable steps to protect Aboriginal objects. These Guidelines provide one process for satisfying the due diligence requirements under the *NSW National Parks and Wildlife Act 1974* (NP&W Act). They should be used where:

- A person is not sure whether Aboriginal objects are likely to be present on land; or
- Aboriginal objects are likely to be present, but a person is not sure that an activity they want to carry out will harm those objects.

There are three essential issues to consider when undertaking a due diligence process:

- Nature of the proposed activity
- Land condition and prior land uses
- Knowledge and available information

This document addresses those considerations.

Aboriginal objects are present on the land (See Section 7, 8, and 9)

There are a number of sites previously registered with the Aboriginal Heritage Information Management System [AHIMS], the closest being approximately 100m from the proposed alignment (see Section 7 and Appendix 1). The field survey documented a further 18 sites which have been registered with AHIMS.

The activity will not harm Aboriginal objects.

Pipeline planning for this project has taken advantage of an avoidance strategy, where sites [mature trees that may bear scars and stone artefact concentrations encountered within the alignment – see section 9] have been avoided by moving the alignment.

Previous land use patterns (Sections 5 and 6) have resulted in significant disturbance over much of the proposed pipeline. Many classes of site will have been damaged or destroyed.

For those sites that have been previously disturbed by prior land use activities, the proposed activity (mainly trenching) is unlikely to cause further damage. For example, isolated objects and previously disturbed stone artefact concentrations are unlikely to be damaged by trenching activities.

The proposed activity is therefore not likely to harm sites, features or objects.

The Nature of the Proposed Activity

The nature of the proposed activity is described in Section 1.1.

Land Condition and Prior Land Uses

The environment is described in Section 4 and previous land use in Sections 5 and 6.

Knowledge and Available Information

DECCW standards for obtaining knowledge and available information have been followed in the preparation of this document. The consultation process and consultation to date are described in Section 3.

The heritage assessment for the Young to Wellington Gas Pipeline follows the principles and guidelines of the Burra Charter (Australia ICOMOS Charter for Places of Cultural Significance 1999). Best practice is followed in all parts of this assessment, relying on the following Department of Environment, Climate Change and Water (DECCW) documents:

- Aboriginal Cultural Heritage Standards and Guidelines Kit (DEC 1997);
- Draft Guidelines For Aboriginal Cultural Heritage Impact Assessment and Community Consultation (DEC 2005) and
- National Parks and Wildlife Act 1974: Part 6 Approvals Interim Community Consultation Requirements for Applicants (DEC 2004).

Ethics standards are applied from the following archaeological organizations:

Australian Archaeological Association Code of Ethics

http://www.australianarchaeologicalassociation.com.au/ethics

Australian Association of Consulting Archaeologists, Inc. Code of Ethics

http://www.aacai.com.au//index.php?option=com_jdownloads&Itemid=55&task=view.download&cid=5

2.2 Environmental Planning and Assessment Act (1979)

Land use planning requires consideration of environmental impacts. In NSW this is regulated by the EP&A Act. Potential cultural heritage impacts are included with environmental impacts and as such any required Review of Environmental Factors (REF), Environmental Impact Statement (EIS) or Environmental Assessment (EA) requires an assessment of Aboriginal cultural heritage. The regulator considers potential or actual impact on all Aboriginal heritage values. These include:

- Traditional or contemporary natural resource use;
- Landscape features of spiritual importance;
- Potential impact on Aboriginal Objects and Aboriginal Places.

The approvals process for major infrastructure projects is set out in Part 3A of the EP&A Act. 'Major projects' are defined in the *State Environmental Planning Policy (Major Development)* (2005).

The Director-General of the Department of Planning, 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 Development then 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* (EPA Act) applies for the purpose of Section 75B of that Act."

As a consequence of this determination, the developer is not required to apply for approvals or permits under the *NSW Heritage Act 1977* or the NP&W Act. The Department of Planning is still required to fully assess any heritage impacts of a proposal under Part 3A. The DECCW, as the relevant statutory authority, generally has the opportunity to review Part 3A applications for the appropriateness of the proposal with respect to heritage significance.

2.2.1 Director General's Environmental Assessment Requirements under Part 3A of the EP&A Act

The Director-General of the NSW Department of Planning issued to ERM Power requirements for Environmental Assessment of the Wellington Power Station project on 22 July 2009 (Section 75F(2) of the EP&A Act).

Evidence from cultural heritage investigations relevant to the Director-General's General Requirement suggests that impact on material evidence of cultural heritage in and on the ground will be negligible. Strategies to minimise harm include: background documentation of the archaeological record of the Study Area; a field survey which determined the nature and location of sites and places of cultural importance; input to final alignment design resulting in the avoidance of all sites, including avoidance of all culturally modified trees; and contingency plans for unexpected events. The cultural heritage assessment provided short term employment for 23 local Aboriginal people.

The Director-General's requirements contain Key Assessment Requirements:

> Heritage Impacts - The Environmental Assessment must include sufficient information to demonstrate the likely impacts on Aboriginal heritage values/items and outline proposed mitigation measures in accordance with the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (DEC, 2005). The Environmental Assessment must demonstrate effective consultation with Aboriginal communities has been undertaken in determining and assessing impacts, developing options and selecting options and mitigation measures.

This information is set out in Sections 7, 8, 9, 10 and 11. Effective consultation is demonstrated in Section 3. Consultation has been ongoing and formed a significant part of the field survey methodology and practice.

2.3 National Parks and Wildlife Act (1974)

The NP&W Act provides for the protection of Aboriginal Objects. Aboriginal Objects constitute physical evidence of past use of an area or object. A discussion of the kind of site, feature or object that has been recorded in the region, or that may be present is set out in Sections 7 and 8. This evidence includes material of any time period, from the most ancient through to historical items and places. Aboriginal Places are also protected. These are defined as "a place that is or was of special significance to Aboriginal culture. It may or may not contain Aboriginal objects". An Aboriginal Place may only be declared by the Minister administering the NP&W Act. For a major project with Part 3a approval, it is not necessary to obtain a Section 90 Consent or a Section 87 Permit.

2.4 The Register of the National Estate

The Cwlth *Australian Heritage Commission Act 1975* established the Register of the National Estate. In 2004, a new national heritage system which includes the National and Commonwealth Heritage Lists was established under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Register of the National Estate and heritage lists at the national, state and territory, and local government levels may contain overlapping registrations. The Register has been frozen since February 2007, meaning that no places can be added or removed. The relevant registers were searched at http://www.heritage.nsw.gov.au/07_subnav_04.cfm

No sites are located within the Study Area (see Section 7.3).

Neville Brown and Lee Thurlow near Wellington

3 Consultation

Aboriginal community consultation is an integral part of the assessment of Aboriginal cultural heritage significance. Consultation has been conducted in accordance with DECCW Guidelines, as outlined in NP&W Act : Interim Community Consultation Requirements for Applicants (DEC 2004) and having regard to the Draft Community Consultation Requirements for Proponents (DECC May, 2009).

The proponent, ERM Power Pty Ltd is committed to ensuring that the consultation process continues throughout all stages of the project, including construction.

The aims of the consultation process have been as follows:

- to identify Aboriginal community groups and individuals with an interest in being involved in the ongoing consultation process;
- to provide representatives of the Aboriginal community with the opportunity to participate in the field assessment process and to inspect and comment on the Aboriginal sites and values of the study area;
- to encourage all Aboriginal stakeholders to participate in the cultural heritage assessment process through provision of knowledge that will ensure that sites are avoided, protected and any potential damage mitigated;
- to identify the Aboriginal cultural heritage values of the study area;
- to provide an opportunity for the registered stakeholders to comment on the outcomes and recommendations of draft heritage assessment reporting; and
- to integrate Aboriginal heritage values and recommendations for management into the assessment report.

A number of strategies were followed to ensure adequate stakeholder awareness of the proposed pipeline.

3.1 Identification of stakeholders

3.1.1 Strategy 1

Advice was sought from the following organisations:

(a) the appropriate DECCW regional offices (Queanbeyan and Dubbo);

(b) the appropriate Local Aboriginal Land Council(s) (Wellington; Orange; Cowra and Young);

(c) the Registrar, Aboriginal Land Rights Act;

(d) the National Native Title Tribunal;

(e) Native Title Services (NTS Corp);

(f) relevant local council(s) (Wellington, Cabonne, Cowra and Young); and

(g) relevant Catchment Management Authorities.

3.1.2 Strategy 2

Advertisements were placed in the following newspapers several times each over the space of two weeks between 7 and 21 August 2009. The advertisements sought

expressions of interest as registered stakeholders in the Aboriginal heritage assessment process.

- Koori Mail
- Cowra Guardian
- Wellington Times
- Young Witness

3.1.3 Strategy 3

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]. A map of the area of this claim has been provided.

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 GAHAI 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.

3.1.4 Strategy 4

Letters were sent to all nominated organisations and individuals outlining the proposed project, the methodology for assessing cultural heritage, and inviting expressions of interest and formal registration **(Consultation letter 1)**. The following provides details of all those who have registered as stakeholders:

3.1.5 List of Registered Stakeholders

Young Local Aboriginal Land Council

Ms Norma Freeman
247 Boorowa St.
Young NSW 2594

(02) 6382 5669

ylalc@yahoo.com.au

As a result of my notification, Ms Marnie Freeman registered an interest on behalf of Young LALC for its boundary and registered the following individuals for work:

Enid Clarke, Keith Freeman, Norma Freeman, Isabel Charles, and Barry McDonnell.

During further phone conversations with Marnie, she added Crystal Ingram's name.

Cowra Local Aboriginal Land Council

Lavinus Ingram, Chair
Frances Coe, CEO
12-18 Young Road,
PO Box 769
Cowra NSW 2794

(02) 6342 4808

cowralalc@bigpond.com

Cowra LALC responded registering their own organisation.

Orange Local Aboriginal Land Council

42 Dalton Street,
Orange
NSW 2800

Contact: Mr James Williams
Mobile: 0434 637 361
Phone: (02) 6361 4742

Gallanggabang Aboriginal Corporation

Mr Lee Thurlow

PO Box 463,
Wellington NSW 2820

Mobile: 0428 637 277

Email: gallanggabang@hotmail.com

Lee Thurlow, contact officer, provided details of their Native Title claim (including a map of the claim area) along with information on their experience in heritage work and examples of reports. In all heritage matters, they represent Wellington Valley Wiradjuri Native Title Claimants whose lodged claim is awaiting registration for the area between Wellington and Manildra. This was confirmed in a letter from their Solicitors (Teitzel & Partners) who wish to be copied into all correspondence.

The Wellington Aboriginal Community Working Party, comprising six Aboriginal organisations, including the Local Aboriginal Land Council, have formally identified

Gallanggabang Aboriginal Corporation as the only organisation that is to be consulted relating to traditional ownership for the assessment of sites in the Wellington Area.

Lee Thurlow has phoned with further information on skills and capacities.

Kalari Ngunnawal Descendants

c/o Cowra LALC [see above]

Ms Eva Coe, Ngunnawal elder, registered the Kalari Ngunnawal Descendants (via Cowra LALC) as a family group.

Mooka Traditional Owners Council

PO Box70
Cowra NSW 2794

Phone/Fax (02) 6341 2604
Mobile: 0447 851 560

Email: backstreetmission@yahoo.com.au

Neville Williams phoned and wrote to register an interest for Mooka Traditional Owners Council, as well as the following individuals, who are members of Mooka:

Neville Williams	PO Box 70, Cowra NSW 2794
Sharon Williams,	Windsor Riverside Van Park, 482 Wilberforce Rd, Wilberforce, NSW 2756
Shawn Williams	95 Ballandella Road, Toongabbie NSW 2146
Wayne Williams	26 Stewart Street, Cowra NSW 2794
John Williams	c/- 26 Stewart Street, Cowra NSW 2794
Stuart Cutmore	8 Nelson Street, Cowra NSW 2794

Mrs Esther Cutmore also contacted by phone and registered an interest for the following individuals, who are also members of Mooka: herself, Stuart and Mitchell Cutmore [her sons].

Mrs Esther Cutmore

(02) 6341 3756

Neville Williams requested information on known sites along the proposed pipeline route and made suggestions about methodology including his view that the survey should be carried out on foot for the whole length of the pipeline.

Waagan Waagan Project Group (WWPG)

Mr James Ingram 0406 419 247, [Secretary]

james.ingram59@yahoo.com.au

Mr Jack Hampton 0431 677 782

James Ingram rang to register an interest by WWPG (Men's Group). I spoke at the same time to Jack Hampton who knows the Wellington area. The following details were received by email.

The following people were identified as nominated WWPG representatives:

Robert Hampton Snr 0431 677 782
James Ingram, Jnr 0406 419 247
Chais Gilchrist
Timothy Hampton
Chris Hampton

Their reasons for registering were given as follows:

> WWPG membership is made up of Wiradjuri men from many places from within the great Nation of WIRADJURI in particular four (4) members were either born in Wellington or lived within the Wellington district for extensive periods of their lives and continue their association on a daily basis. Their walking/migratory paths extend from Wellington to Young to Wagga Wagga to Albury and return. Their cultural association includes knowledge of the Macquarie and Bell Rivers, Bushranger Cora creeks, Burrendong National Park, Mt Arthur Reserve, Wellington Caves, Nanima Mission Reserve. Other members have a similar story in regards to Young, its surrounding districts in particular their occupation sites, walking paths through Molong, Boree, Canowindra, Erambie, Wallamondra to Youngie, their deep association with the Nyrang Muttama Creeks and the Calarie (Lachlan) River.

Wiradjuri Traditional Owners Central West Aboriginal Corporation

14 Duramana Rd,
Eglington, NSW 2795

Brian Grant, Director and Aboriginal Heritage Manager, wrote to advise that the group is a registered native title organisation and that they will not be entering into any competitive selection process for participation in field assessment. Wiradjuri TOCWAC is a registered body under the *Aboriginal Association Act 1976* that represents traditional owners from the area in question and retains local and oral history on behalf of its membership. Mr Grant has stated 'we do not accept or support any person or organisation that comments regarding the said area' and that 'this Aboriginal organisation does not do volunteer work or attend unpaid meetings'.

Yarrawalk Aboriginal Corporation

PO Box 76
Carringbah, NSW 1495

Scott Franks, Director and Aboriginal Heritage Manager, wrote to advise that the group is a registered body under the *Aboriginal Association Act 1976*. Yarrawalk represents traditional owners from the area in question and retains local and oral history on behalf of its membership. Mr Franks has stated 'we do not accept or support any person or organisation that comments regarding the said area' and that 'this Aboriginal organisation does not do volunteer work or attend unpaid meetings'.

Mrs Enid Clarke

182 William St.
Young, NSW 2594

(02) 6382 3216

Although included in the Young LALC list, Mrs Clarke rang to register as an individual.

Ms Crystal Ingram

c/o Mrs Enid Clarke
182 William St.
Young NSW 2594

(02) 6382 3216

Although included in the Young LALC list, Mrs Clarke rang to register Ms Ingram as an individual.

Local Government Authorities

The following LGAs have expressed a wish to be registered as stakeholders in the cultural heritage process:

Cowra Council

Paul Devery, General Manager
Private Bag 342
Cowra NSW 2794

Wellington Council

Mr Allan Dive, General Manager
PO Box 62
Wellington NSW 2820

Catchment Management Authorities

The following CMA has registered as an interested party:

Central West CMA

William Burns, Catchment Officer, Aboriginal Communities
Level 1, 211 Macquarie Street
PO Box 2015
Dubbo, NSW 2830

Contact for Aboriginal Reference Group: Will Burns (02 6881 3415)

William.Burns@cma.nsw.gov.au

3.1.6 List of organisations and individuals who declined to register or did not respond:

Wellington Local Aboriginal Land Council

Wellington LALC, along with all other local Aboriginal organisation based in Wellington, refers all cultural heritage matters to Gallanggabang Aboriginal Corporation.

Mr Peter Peckham

27 Jennings Rd,
Geurie, NSW 2831

Gundungurra Aboriginal Heritage Association inc

PO Box 31
Lawson, NSW 2783

Gundungurra Tribal Council Aboriginal Corporation

PO Box 7, Cranebrook,
NSW 2749

Ph: (02) 4782 6578

Wiradjuri Council of Elders Cultural Heritage Committee

Mr Robert Clegg
3 Loretta Pl
Glendenning, NSW, 2761

Cabonne Council

Mr Graeme Fleming, General Manager
PO Box 17
Molong, NSW 2866

Young Shire Council

Mr Peter Vlatko, General Manager
Young Shire Council
Locked Bag 5,
Young, NSW 2594

Lachlan CMA

Central Office:
2 Sherriff Street
FORBES 2871
Phone: (02) 6851 9500 / 1800 885 747
Fax: (02) 6851 6991

Email: lachlan@cma.nsw.gov.au

Contact: Russell Hill

Cowra CMA office

30 Lynch Street
Cowra NSW 2794
Phone: (02) 6341-1600
Fax: (02) 6342-2565

Aboriginal community Officer

Email: Russell.Hill@cma.nsw.gov.au

Contact: Russell Hill [Forbes]

Young CMA office

Cnr Lynch & Lovell Streets
Young NSW 2594
Phone: (02) 6382-5833
Fax: (02) 6382-2134

3.1.7 Feedback from Native Title Services Corporation

Although Native Title Services Corp was contacted, they declined to provide names or contact details on privacy grounds. As a consequence, it is not known who may have contacted Colin Pardoe as a result of this consultation, or which groups or individuals may have been contacted by NTSCorp. It is therefore not known if any groups or individuals known to NTSCorp, but not known when consultation was undertaken, may wish to register an interest in the future.

3.1.8 Feedback from the Office of the Registrar, Aboriginal Land Rights Act 1983

The Registrar advised by letter [17 August 2009] that they had searched the Register of Aboriginal Owners and that the subject land did not appear to have any registered Aboriginal Owners pursuant to Division 3 of the *NSW Aboriginal Land Rights Act 1983*.

They recommended that we should contact the Cowra, Young, Orange and Wellington LALCs.

3.2 Participation of stakeholders in the heritage assessment process

3.2.1 Initial communication and planning

The registration process was completed on 17 September 2009. A total of 31 groups and individuals registered their interest as stakeholders. Some were from Aboriginal organisations, some from non-Aboriginal organisations, some from individuals, some from people who live in the area, and some from people living elsewhere who retain an interest.

On 9 October, all 31 registered stakeholder groups and individuals were provided with additional details of the proposed development and an expanded heritage assessment methodology following the initial consultation **(Consultation letter 2)**. Two groups had provided feedback on the initial brief methodology. The second, more detailed methodology addressed the issues raised. Strategies for collection of cultural information as well as for involvement in the field survey were canvassed.

The 9 October letter also advised stakeholders that, given the level of interest, it had been agreed with the proponent that two vehicles would be used and that up to 6 Aboriginal participants would be invited to participate in the field survey component of the heritage assessment. In line with DECCW Guidelines, a selection process was designed that would give all stakeholders wishing to participate in the field survey the same opportunity to present relevant information.

As part of this selection process, an application form and map of the proposed pipeline route was sent to all stakeholders. Those wishing to participate in the field assessment were invited to complete the form, detailing their skills, capacities and other relevant information. They were also asked to outline on the attached map the area for which they are recognised stakeholders.

Stakeholders were also advised that strategies were being put in place for facilitating cultural input from all interested parties before, during and after the field survey. These were to include local meetings and individual interviews as required.

It was explained that as a result of stakeholder feedback, it had been decided to divide the pipeline survey into **four** stages based on LALC areas. It was acknowledged that land councils are only one form of local organisation and that there are many other organisational and cultural boundaries in NSW, such as registered native title claims, that are significant. It was also recognised that, as a result, there would inevitably be some overlap of personnel and interests. Community feedback, however, suggested

that for practical reasons, LALCs would provide an appropriate operational basis in the first instance. Further, according to DECCW's *Interim Community Consultation Requirements for Applicants*, LALCs are identified as major stakeholders who are required to receive and comment on Heritage Assessments for their area. It is noted that Wellington LALC and all other Wellington based Aboriginal organisations have formally delegated heritage responsibilities to Gallanggabang Aboriginal Corporation whose territorial boundary overlaps with Orange LALC territory. This has been discussed with both organisations who are happy to work together on this.

Stakeholders wishing to participate in the field component were asked to return their completed forms and additional information by 23 October 2009.

3.2.2 Consultation about the timing of the field survey

Stakeholders living in the area were contacted by phone on 12 October 2009 and consulted about local knowledge on the state of crops in their area, the extent to which ground visibility in the significant agricultural areas was compromised by crops, along with anticipated harvest dates. Feedback suggested that visibility was poor at that time and likely to be so until after harvest. People considered that January or February would be the most appropriate times to ensure adequate visibility, although several stakeholders expressed concerns that this would be the hottest time of the year. For this reason, February was targeted for the field assessment to avoid the worst of the heat. A letter was sent to all stakeholders advising them that the survey had been deferred until February and assuring people that ERM Power Pty Ltd was committed to a policy of site avoidance. Dr Pardoe would continue to work on the desktop study. A sheet of supplementary detail on the field survey was also provided **(Consultation letter 3).**

3.2.3 Distribution of additional material and information

Following work on the desktop study, the heritage consultant, Dr Pardoe, distributed to stakeholders details of known (recorded) sites in the area and the chapter he had prepared on the archaeological background of the area (Sections 6 and 7 of this report). It was hoped that this would prove useful to those stakeholders wishing to participate in the field survey. The letter **(Consultation letter 4)** also provided information about a proposed public meeting to be held in Orange. Stakeholders were advised that they would be remunerated for attendance at the meeting and that travel expenses would be reimbursed. Consultation letter 4 also nominated the start date of the field survey as 8 February, and outlined anticipated dates of work in different areas. A major focus of the meeting was to be the provision of community advice on appropriate representatives to participate in the field survey, although participants were invited to provide relevant cultural information at the meeting if appropriate. Additional safety requirements for participants in the field survey were provided. Those stakeholders who had not completed all components of the fieldwork form or produced evidence of their insurances were asked to provide this before or at the Meeting.

3.2.4 Public meeting of stakeholders

A public meeting of stakeholders was held at Orange Local Aboriginal Land Council on Monday 1 February from 10.30 am to 2.30 pm. Orange was selected as being the most accessible venue for all registered stakeholders. Since a major focus was to be the identification of participants in the field survey, those organisations wishing only to be kept advised of the works, such as LGAs and CMAs sent their apologies. Two of the Aboriginal organisations that had registered as stakeholders (Wiradjuri Traditional Owners Central West Aboriginal Corporation and Yarrawalk Aboriginal Corporation) did not attend.

A total of 23 Aboriginal people attended the meeting along with Dr Colin Pardoe (the Heritage Consultant) and Beau Fraser (from CNC Projects). Although some of the Aboriginal participants had registered as individual stakeholders for insurance and other reasons, the following 7 organisations were represented: Young LALC; Cowra LALC; Mooka Traditional Owners' Council; Kalari-Ngunnawal Descendants; Orange LALC; Gallanggabang Aboriginal Corporation (GAC) and Waagan Waagan Project Group (WWPG).

The meeting went through the following agenda:

(a) Welcome to Country by Mr James Williams, CEO of Orange LALC.

(b) Introduction of all stakeholder groups and individuals.

(c) Colin Pardoe presented an update of the Project to date and distributed copies of the Field Survey Statement of Works, the Nature of the Work, and the Safe Work Statement. He also distributed additional copies of the archaeological background study, presented an overview of the cultural heritage in the area and outlined the range of site types that might be expected. Discussion took place on the need to cover significant areas on foot to provide certainty to stakeholders. There was considerable discussion on safety precautions and the need for people to be fit for work, given the uneven terrain and the off-road conditions. Questions were asked about the guidelines outlined for hot weather and anticipated hours of work.

(d) Beau Fraser outlined the financial arrangements agreed between the client, ERM Power Pty Ltd and CNC Projects in terms of daily rates and number of participants. Daily rates were agreed to but there was a request that the number of participants be increased from 4 to 6 in the second half of the survey (the Cowra and Young LALC areas).

(e) Before the break for lunch, Colin Pardoe explained that it was important that relative representation by different groups and individuals was discussed openly and publicly negotiated in a transparent and equitable manner. He redistributed copies of the map of the pipeline route, divided into sections, and asked individuals and groups to identify on the form those parts of the pipeline for which they had recognised cultural rights and authority. Participants discussed this between themselves over lunch.

(f) After lunch, Mr James Williams of Orange LALC wrote up on the white board the names of those individuals and groups who had nominated themselves for each section. This was publicly endorsed by all present with no disagreement.

3.2.5 Follow up consultation after the meeting

In response to a proposal put at the meeting by representatives of Cowra LALC and Kalari Ngunnawal Descendants and endorsed by others, the client ERM Power agreed to fund 6 participants in the second half of the survey. Gallanggabang and Orange LALC agreed to provide 4 participants as originally proposed. One Waagan Waagan representative was added to the Wellington section as a result of negotiations.

A preliminary roster was then drawn up for participation in the field survey based on the individuals nominated during the meeting and taking account of their organisational affiliation. This was sent out to stakeholders and adjusted in some instances if individuals were not available on particular days. Two stakeholders had to withdraw their participation because of other work commitments and their places were taken by others.

The two Kalari Ngunnawal Descendants stakeholders who wished to participate in the survey did not possess the necessary insurances. They declined our offer to put them in touch with Manpower, the organisation that insured individual Mooka and Waagan Waagan representatives. They were, however, members of Cowra LALC and were able to participate in that capacity under land council insurances.

3.2.6 Consultation during the field survey

Representatives from the 6 participating organisations were encouraged to comment on the significance of any items or sites found in the course of the survey. These comments were documented and some are reproduced in Sections 9 and 10.

On completion of each of the four sections of the survey, Dr Pardoe gave a preliminary verbal summary of findings to participating organisations.

3.2.7 Consultation following the survey

Three weeks after the survey had been completed, **Consultation Letter no 5** was sent out to stakeholders. This provided an update on the number of sites (18) that had been recorded and sent to DECCW for registration. The letter also outlined the structure of the report and the consultation process necessary to finalise the CHA. Stakeholders were advised that once the Recommendations had been accepted by the client and avoidance and protection measures agreed to, both Sections 9 (Survey results) and Section 10 (Recommendations) would be made available to stakeholders for comment and feedback. In the meantime, draft versions of Section 5 (Aboriginal life: historical context) and Section 6 (Changing land patterns and previous disturbance of land) were made available so that by the time Sections 9 and 10 were ready for distribution, stakeholders had had the opportunity to read the bulk of the CHA. Feedback on these sections was invited.

3.2.8 Aboriginal responses to the draft Cultural Heritage Assessment

On Tuesday 13 April, copies of Section 9 (the Field Survey results) and Section 10 (Recommendations) were made available to all stakeholders who had participated in the survey.

They were accompanied by a letter **(Consultation letter no 6)** stating that ERM Power Pty Ltd had accepted all the Cultural Heritage Advisor's recommendations for avoidance, site protection, and monitoring as set out in Section 10. Maps of the whole alignment with all sites and monitoring areas identified were also made available to stakeholders. The letter advised stakeholders that:

- all 18 sites registered as a result of the survey will be avoided as a result of shifts to the pipeline alignment;
- any sites near the alignment will be protected by fencing and flagging; and that
- monitoring will take place in the vicinity of all sites within the construction corridor and other relevant designated areas as discussed during the survey.

Contingency Plans (Section 11) have been prepared to address any unanticipated findings during the course of construction. These were also made available to participating stakeholders.

Stakeholders were asked to provide any feedback within two weeks.

The following feedback was provided and is documented in the order in which it was received.

Young LALC

During a telephone discussion with Mrs Norma Freeman, CEO of Young LALC [16 April], it was noted that no sites had been found within the short section of the alignment that falls within Young LALC. She appreciated that visibility had not been very good in this section because of the heavy rains and welcomed the opportunity to provide monitors to ensure certainty.

Waagan Waagan Project Group

Mr James Ingram, Secretary of WWPG whose members had participated in three of the four sections of the survey expressed himself as happy with the report and its recommendations. He was pleased that his members had had an opportunity to participate and welcomed the fact that sites would be avoided. He asked that his group be approached to provide monitors in the areas where they had participated in the survey as part of construction planning.

As Secretary of WWPG, Mr Ingram was keen to emphasise their interests in employment in a range of areas. He has had success with placing people on construction projects and construction training as a result of initial cultural heritage assessments for a variety of developments including the Hume Highway upgrade. He asked that his group be informed of employment possibilities for the pipeline construction and the power station itself.

Mooka Traditional Owners' Council

Dr Pardoe spoke with Mr Neville Williams on 16 April 2010 concerning the results and recommendations. Mr Williams had not yet had time to read them, but agreed to send his comments and/or endorsement direct to CNC Project Management.. He reiterated that he was glad with the outcome of the survey and our preliminary recommendations discussed in the field.

Mr Neville Williams, Chair of Mooka Traditional Owners' Council, also supported the recommendations and the avoidance and protection strategies agreed to by ERM Power.

He expressed the view that monitoring should take place along the whole length of the pipeline and that Mooka members should participate in this within the Cowra and Young LALC boundaries. This will be considered by ERM Power in its ongoing consultation with key stakeholders.

Orange LALC

Orange LALC is currently in a state of transition following the recent resignation of Mr James Williams, former CEO of Orange LALC. Copies of Sections 9 and 10 have been provided to Ms Annette Steele, interim CEO of Orange LALC and Dr Pardoe has discussed the survey results and recommendations over the phone. Ms Steele emailed the following on 16 April 2010:

> Thanks for the information. Very informative. I have read the drafts and endorse the recommendation proposed for the Orange LALC area.

A copy was sent to the alternative email address we had for Mr Williams, CEO during the cultural heritage assessment process. He responded supporting the recommendations and their acceptance by ERM Power. He suggested that his members who had taken part in the field survey would be particularly pleased that it had proved possible to avoid the Bourimbla open site as they had all commented on it and appreciated its importance as one of the few locations in the area where you could picture pre-contact life.

Gallanggabang Aboriginal Corporation

Following the field survey, a separate report to CNC Project Management was prepared by a representative of Gallanggabang Aboriginal Corporation (Gallanggabang Aboriginal Corporation 2010). This report addressed the Wellington to Cumnock section of the pipeline and included GAC documentation of the heritage of the area and a list of the sites and artefacts discovered each day and their significance. The report also included a list of 9 recommendations for site protection and preservation that were endorsed by representatives of Wellington Valley Wiradjuri Elders: Joyce Williams, Margaret Gordall and Violet Carr on 13 March 2010. The GAC report provided information that was useful in preparation of Section 9 of this report.

All sites in the GAC report were identified as 'high impact'. Avoidance measures have been put in place for all sites so described and the recommendations in Section 10 of this report will ensure that the proposed pipeline will have no impact on the sites identified. Two of the sites included in the GAC list fall outside the pipeline corridor near the site of a proposed power station. This is discussed in Section 9. These scarred trees were recorded by Dr Pardoe at the request of GAC (with the agreement of ERM Power) and forwarded to DECCW for registration.

All GAC recommendations for avoidance have been accepted. A further recommendation on the finding of Aboriginal objects in the course of construction is addressed in the Contingency Plans (Section 11).

A number of other recommendations in the GAC report fall outside the scope of this Cultural Heritage Assessment and have been referred to ERM Power Pty Ltd for consideration. These include sites that fall outside the alignment; employment and contracting opportunities for GAC members in pipeline construction work; and the negotiation of an Indigenous Land Use Agreement (ILUA) prior to commencement of the Wellington to Young Gas Pipeline Project.

A further recommendation (11.5) that a scarred tree be removed and relocated has been identified in Section 9 of this CHA as an issue of significance. GAC members consider it to be potentially under threat should the pile of trees be burned. Since it falls outside the pipeline alignment and is not impacted by the development, this matter has been referred separately to ERM Power Pty Ltd for consideration.

The GAC report also recommended that monitors appointed by them be present throughout the whole construction process within their country. The recommendations in this report (Section 10) have restricted monitoring to specific areas rather than the whole pipeline length. This will be considered by ERM Power in its ongoing consultation with key stakeholders.

Following receipt of Sections 9, 10 and 11 of this report, a response was received from GAC.

Mr Lee Thurlow, Contact Officer of Gallanggabang Aboriginal Corporation acknowledged all the avoidance recommendations and referred the recommendations to the GAC Board.

Kalari Ngunnawal Descendants (KND)

Mrs Eva Coe and Mrs Rebecca Ingram participated in the field survey as Cowra LALC members. Their response to the recommendations is therefore discussed below within the Cowra LALC section.

Cowra LALC

No formal response has been received yet from Cowra LALC to either the report or the recommendations accepted by ERM Power.

All sites found within the Cowra LALC area have been registered with DECCW and following avoidance measures, none will be impacted by the pipeline construction.

Cowra LALC will be contacted to provide monitors when pipeline construction passes through their area.

3.2.9 Responses from stakeholders who did not participate in the field survey

On 14 April, an email was sent to all other stakeholders providing them with a summary of the results of the field survey and the recommendations. They were also advised that ERM Power Pty Ltd had accepted all avoidance and protection recommendations.

Once submitted, the complete Environmental Assessment will be available for examination by other stakeholders.

No responses had been received at the date of this report.

4 Environment

Physical environment and climate are the two most important factors determining the nature and distribution of the archaeological record, as well as its preservation. In this section the landforms that determine the placement of rivers, plains, animals and plants are shown to have evolved in a time span relevant to the archaeological record.

A summary of environment and the region sets the scene for how people might make a living in different parts of their tribal country and at different times of the year.

4.1 Landforms

Geomorphology – the shape, nature and evolution of the ground – provides an understanding of how landforms evolve. The following summary of landforms and their evolution relies on several publications (Brown and Stephenson 1991).

The proposed pipeline winds between low ranges such as the Catombal, range south of Wellington, the Warrumba range west of Cowra, and the Crowther range between Cowra and Young. These rows of hills are aligned north-south, showing the buckling waves that spread westward with the pressure from the continental plates that gave rise to the Dividing Range. Millions of years of erosion have exposed many strata.

The rivers start as small streams in the Alpine region before quickly coalescing into the main rivers that trend north and west through the region. Many smaller streams feed these. This is the Slopes ecosystem.

As the rivers reach the Riverine Plain, they become distributary channels. These rivers spread out into a sand plain and bring sediments with the flood waters from the Great Dividing Range, a belt of old hills surrounding the upper tributaries of the Murray River. These sediments of alluvial sand in the upper or eastern parts of the Riverine Plain, with increasing proportions of silt and clay filled the Murray Basin to its present elevation at about 80 m above sea level on the floodplain.

The distributary channels lived during the Glacial periods of the last 2 million years. They were much larger than the rivers today, flowing on the surface between large levee banks that might be as much as 2 km apart. Water flow has been calculated to be as much as nine times the modern flow (Schumm 1968, 1986). This flow would have been fed in the springtime by the glaciers sitting where today's snowfields are.

The modern rivers are incised into that earlier landscape, sometimes cross-cutting and other times being influenced by earlier channels. Sediments laid down in the modern era – the Holocene epoch covering the last 10,000 years – consist of alluvial deposits of unconsolidated grey to brown clay, silt, sand and gravel in the upper reaches. These occur also in the narrow floodplains incised within the older landscape.

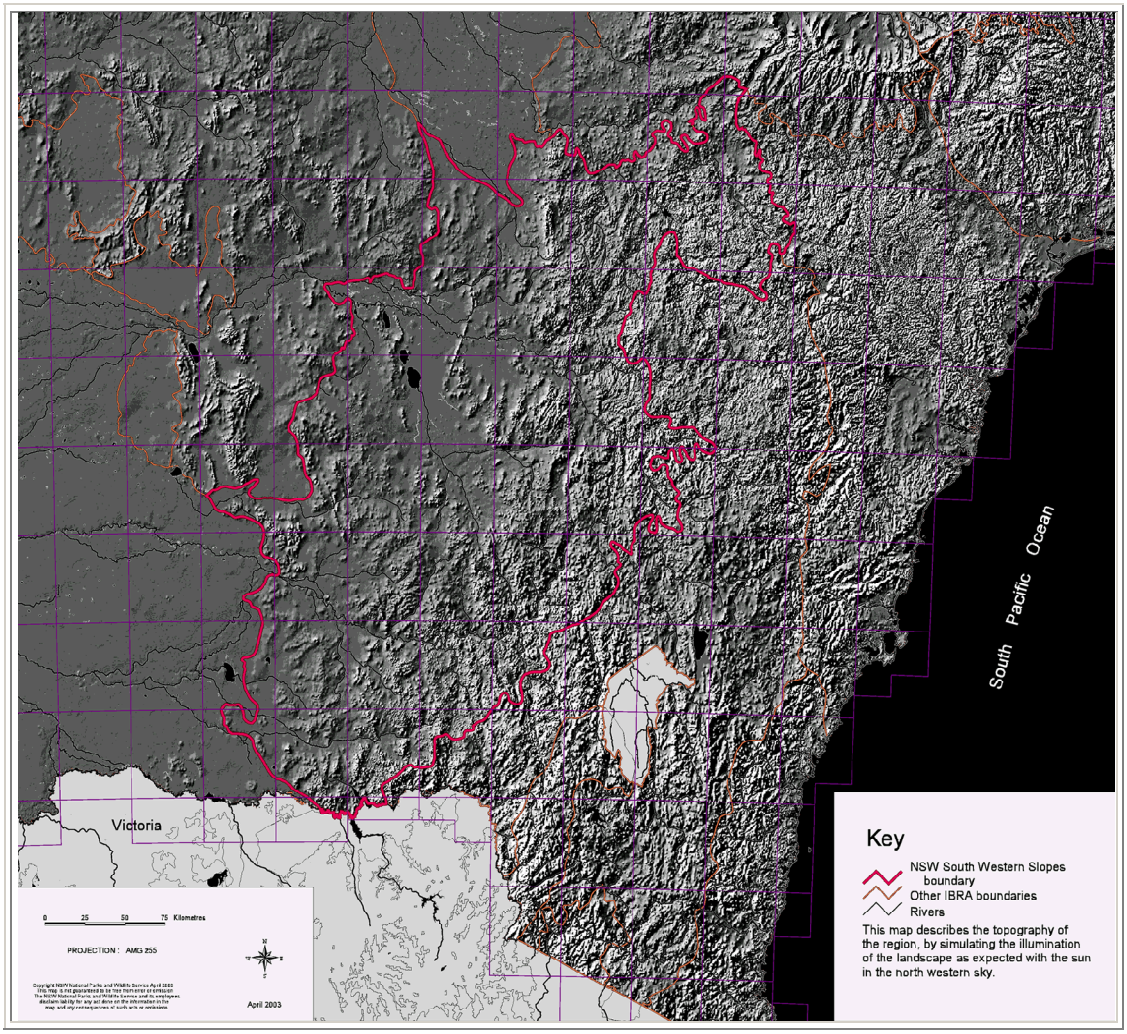
Rock is common in the region. This has implications for the archaeological evidence. There are several stone resources valuable to people that occur locally, and can often be sourced at a distance of no more than 25 km.

Quartz would have been available for stone tool manufacture in traditional times. Metamorphic stone, prized for axes; indurated sandstones are used for grinding dishes; silcrete, quartzite, silicified volcanics, indurated mudstones, metamorphosed quartz were all available for flaking. Hammers of great hardness and a convenient range of sizes occur throughout the region.

Ochre could be treated separately, but its sources were as widely distributed. Ochre becomes more abundant to the north, although systematic investigation has not been made.

Most stone would have come from within the region and to the east, but none from the west, where the large sedimentary basin of the Murray – Darling extended beyond the South Australian border.

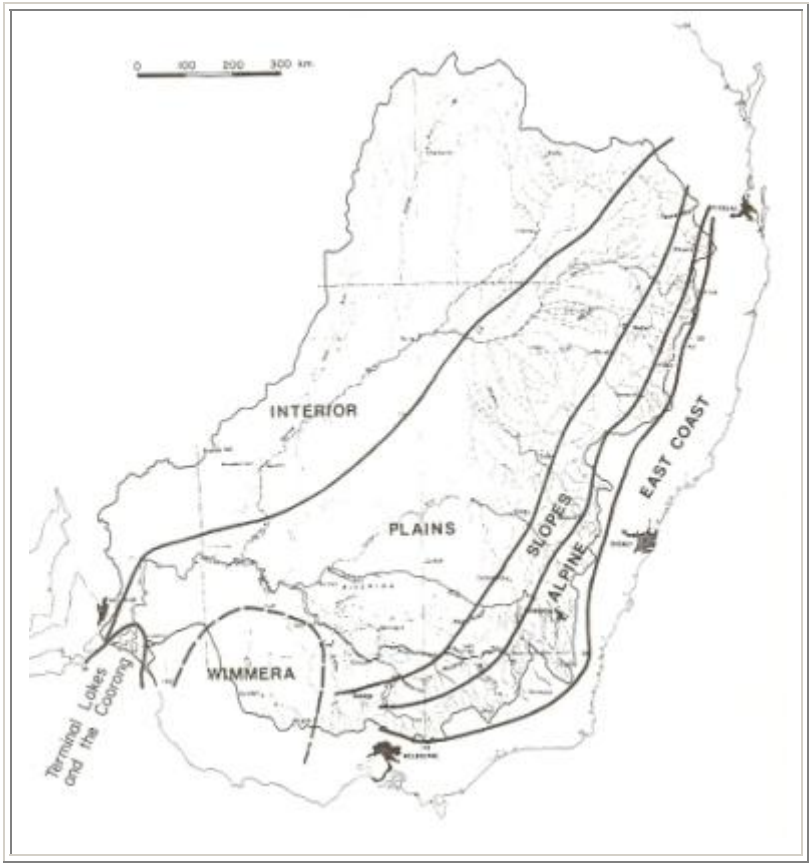
Figure 2 Regional topography of the South West Slopes Biogeographic Region [IBRA] (DECC 2009) http://www.environment.nsw.gov.au/resources/nature/NSWSouthWesternSlopesMapsVegetation.pdf).



4.2 Ecosystems

The ecosystems that develop in a region are based on the nature of the ground and soils, the rainfall and water flow over the surface, elevation and level, temperature and a myriad of other factors. Although changes in number, proportion and distribution of animal and plant species may occur in a regular fashion over many hundreds of kilometres, there are also rapid changes from one ecology to another. The boundaries of these ecosystems may be blurred or very sharp. The proposed pipeline runs along one of the ecotones, or boundaries of the Murray – Darling Basin, between the ecosystems of the Plains and the Slopes (Figure 3.).

Figure 3 Regional Ecosystems (Murray Darling Basin Ministerial Council 1987: 128, Figure 4.3).



These features are the setting for the advent of people into the continent. The ancestors of the three river tribes entered the Murray – Darling Basin sometime around 50,000 years ago. They settled the sloping savannah between the exceedingly flat plains to the west, and the steeply dissected Dividing Range to the east.

4.3 Micro - Environments

The western slopes region can be divided into 8 discrete environmental units for archaeological purposes. People use different micro-environments differently. Since resources are structured (although not completely determined – these are often differences of degree rather than kind), the archaeological materials may reflect that structure. Equally, some relations between site and micro-environment are direct. Quarries only occur in certain locations; culturally modified trees occur according to the distribution of trees.

These units are defined on the basis of several interrelated factors including: vegetation and underlying soils (clay versus sand); proximity to water (still or flowing); salinity; and the depositional nature of the landform (building, eroding or stable). A brief description of micro-environments relevant to the distribution of sites, features and artefacts follows.

Flowing Streams

This unit is characterized by the riverbanks of main and creek channels, which may be running or dry. Backwaters and slow deep pools are also included. Vegetation is largely comprised of stands of River Red Gum and associated understorey. The soils are largely clay and are prone to frequent flooding in the lower reaches. The number and density of sites is roughly proportional to the permanence of the water source.

The proposed pipeline crosses 163 streams, of which 8 are perennial and 155 are non-perennial. There are 33 crossings of 27 named streams. The largest are the Macquarie and Lachlan Rivers.

Floodplain

The floodplain is low-lying and regularly flooded. The soil consists predominantly of gray 'cracking' and silty clays that are usually in the process of being deposited, so the surface is likely to be recent in age. Carbonate precipitation often produces a layer of carbonate nodules, or gravel. There may be grasses, lignum swamps or bare ground cover.

Box Plain

Box plains are found in the western parts of the region. They are slightly higher in elevation than other parts of the floodplain. The soils are sandier than the grey clays and consequently are better drained. Black Box and Grey Box are the most common forms of vegetation. Box plain is flooded less regularly and may have ephemeral pools (box swamps). This microenvironment is less likely to be encountered along the pipeline alignment.

Open Grassy Plains

Open grassy plains are common features of the western slopes. Slight variation in soil and water availability contributes to this mosaic. Traditional fire stick farming probably contributed to the creation and maintenance of these open plains.

Low Rocky Ranges

Rocky ranges tend to be oriented along a line trending roughly north-south. This is the result of folding as the Dividing Range was pushed up by pressure between two colliding continental plates. These ranges are the eroded remnants of what was originally an undulating wave slowly dissipating as it entered the Murray – Darling Basin. Fortunately, that combination of undulation and erosion has resulted in the exposure of several layers of rock on slopes of the ranges.

These areas were also important for some game and small permanent water holes. Stone arrangements with religious or other social importance may be found on hill tops.

Although larger sites may not be common in this micro-environment, it is possible that quarries, stone tool manufacturing sites [including axe grinding grooves], isolated objects, and stone arrangements may be encountered.

Basal Slopes

Sites may be found in basal slopes, particularly where the slope flattens in the vicinity of a stream. Given the possible erosion from upper slopes, particularly post-clearing, Potential Archaeological Deposits (PADs) may be present. PADs are defined in section 9.3.4.

Ridge and Spur-Line Crests

These landforms generally do not contain archaeological materials unless there is sufficient flat ground at the top. In such cases there may be rare, but significant, occurrences of stone arrangements.

Sand Hills

Source bordering dunes form most frequently near bends of the river (ancient or modern), where wind carries the sand from the dry riverbed or exposed sand bar, and deposits it on the floodplain. They occur, therefore, on the eastern side of the water source, downwind from the strong westerlies. Sand hills are usually covered with stands of cypress pine, grasses and various annuals and bulbs.

Residential sites are common on dunes close to rivers. Burials may be present, although usually at low densities (see Section 9.1.7).

4.4 Climate

Climate change is topical today, but has been an important part of archaeological understanding since its beginning. Reconstructions of palaeo-climate are central to our understanding of the archaeology. We often think that the world is stable, but appearances may be deceiving, and there is evidence everywhere of change in climate, river course, and sand dunes.

Analyses of dates at the Willandra Lakes to the west have shown a close relationship between residence and global climate variation, from the height of the last Glacial period, through the beginning of modern times around 12,000 years ago, to today (Bowler 1998, Gillespie 1998). Other studies have shown the effect of the El Nino Southern Oscillation [ENSO] over the last 5,000 years in coastal Queensland (Turney and Hobbs 2006).

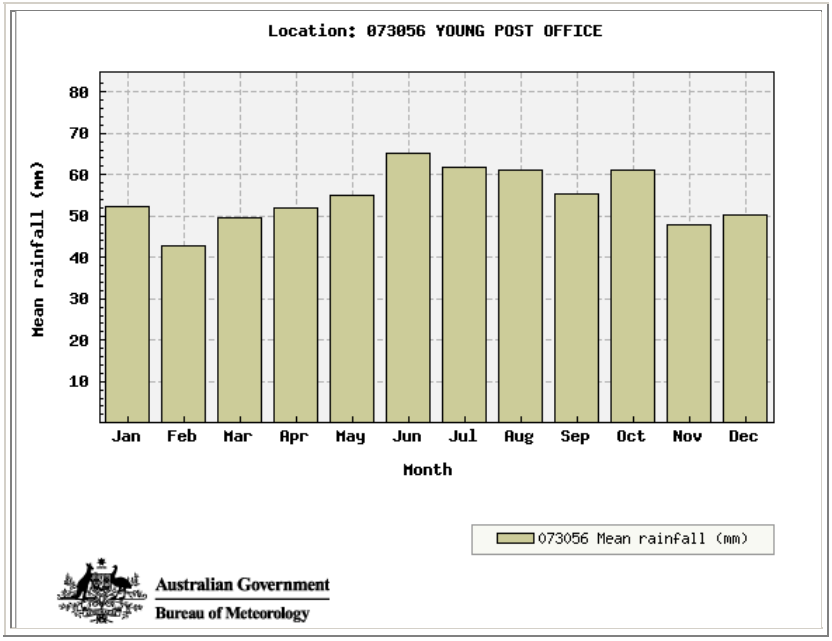
No similar detailed analysis has been carried out in the region. Although large scale climate patterns would produce similar effects, local climate variation over thousands of years is not well understood. Lower temperatures and windier conditions during glacial times before about 13,000 years ago would have meant fewer trees and more grassland. The larger rivers would have had a stronger difference in flow, with large floods coming from snow fields in the Dividing Range. Sand dunes associated with rivers would have developed during this time, with the expectation that archaeological materials would be present in such features.

For people living in traditional times, the shorter scale patterns of climate proved more important. Hot summers average more than 30º and last for up to six months between October and March. Numerous frosts are experienced during the cold winters. Rainfall, discussed in more detail below, varies between 250 mm and 500 mm in most years. The number of rain days is moderate, averaging 120 days per year at Young. The evaporation potential in the region is extreme. A billabong will lose more than 1.3 m of water from evaporation alone during the summer.

Rainfall

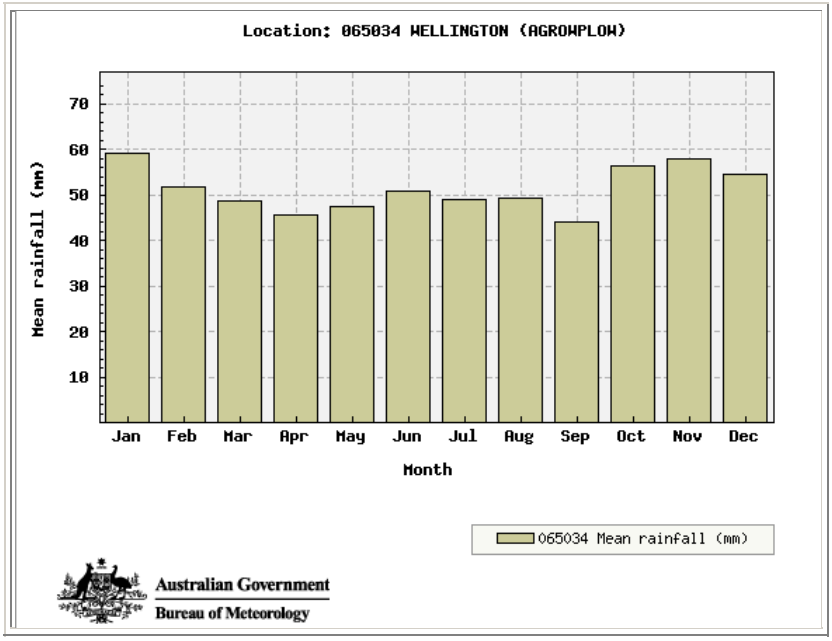
As for most of the Murray Darling Basin, rainfall and river flow provide water and other resources at different times. For example, rainfall has a typical annual cycle (figure 4) that is subject to major fluctuations brought about by global phenomena such as the El Nino Southern Oscillation [ENSO].

Figure 4 Average Monthly Rainfall at Young for the Years 1871 to 1991. Graph Courtesy of BoM.



Annual rainfall (Figure 5) is highly variable and provides a significant challenge to making a living. ENSO events show up at this scale as periods of above or below average rain lasting for several years.

Figure 5 Average Annual Rainfall at Wellington. Graph Courtesy of BoM

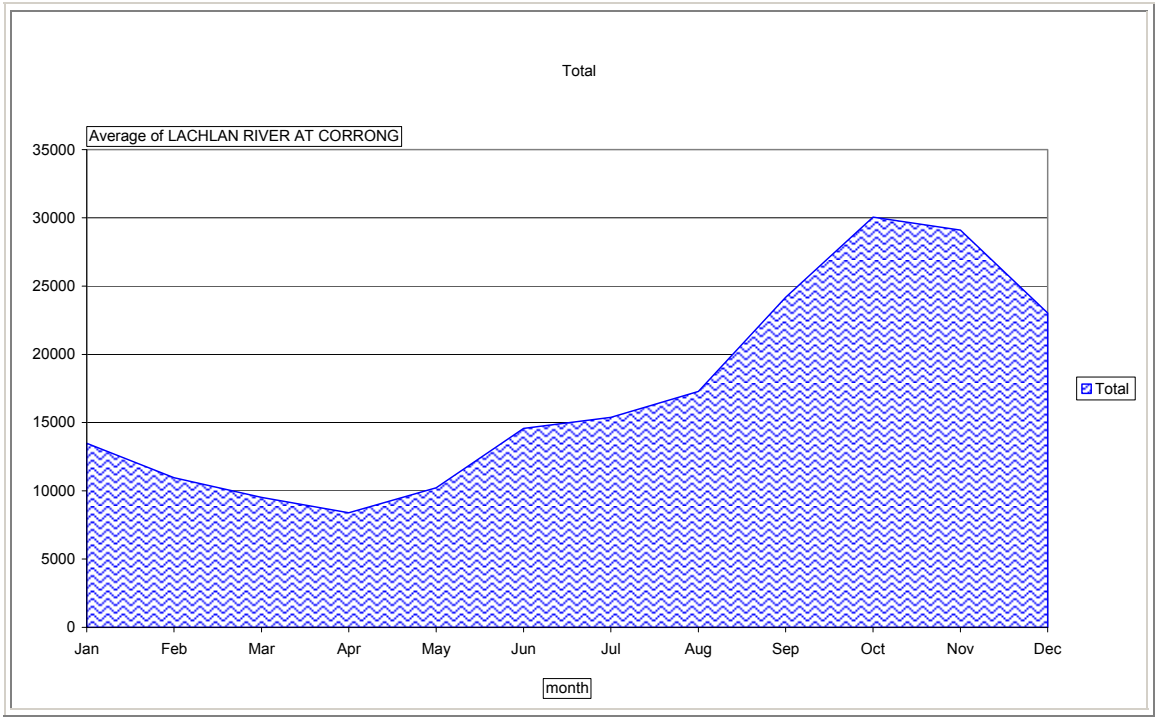


4.5 River Flow

The Rivers of the Murray – Darling Basin provide a large amount of what is often termed 'unearned' water. This water falls further up the catchment and replenishes streams, waterholes, lagoons, and billabongs. For the rivers that rise in the southern part of the Dividing Range, water is retained as snow during winter. This provides a spring pulse and extreme fluctuations in water flow downstream (Figure 6). River flow has been regulated for nearly a century in many of these rivers.

Previously, yearly flow of the major rivers of the region was very regular, with spring melt waters producing a peak by about September and lasting for a few months. Water levels then started to fall as summer approached, reaching lowest levels in the first few months of the year. This pattern has been remarkably consistent.

Figure 6 Average monthly river flow of the Lachlan River at Corrong near the Murrumbidgee junction. Although far from the study area, this river flow is indicative of seasonal variation. Original data from Murray Darling Basin Authority.



River flow during the last 10,000 years has been fairly consistent, even where river courses have changed. During the last Glacial period prior to 13,000 years ago, rivers flowed more strongly. Even though rainfall was reduced, glaciers in the Dividing Range held water as snow during the winter months, releasing it in large pulses during the spring. The rivers of that time were generally larger and wider, carrying up to nine times the volume of water. Flow would have been faster, making the rivers colder and much more dangerous.

While drought would have been dangerous, floods brought other challenges. The recent flood down the Paroo River (September 2008) in northern NSW has shown the difference between flows on unregulated rivers of the Murray – Darling Basin compared to flows on regulated rivers. Floodwaters may spread widely, although this would not be a significant problem over most of the Study Area. Mounds are one feature of the riverine landscape that would prove important at this time of year.

Floods also bring biting insects, and they bring not just discomfort, but danger in the form of diseases such as encephalitis and viruses similar to Ross River Fever.

People of the Rivers had some water insurance that was not available to people in more arid areas such as the Wotjobaluk and Wergaia of central west Victoria, Barindji of western NSW or Danngali west of the Darling River.

Rainfall and river flow are related to a degree, however, and failure of both did occasionally occur. Although water would be retained in billabongs and rock pools, the relatively greater number and density of people along the major rivers were at serious risk when all waters failed. This situation has been seen three times in the last century (1902-03, 1914-15 and the last few years), equating to roughly one major drought per generation.

4.6 Animal and Plant Resources

Just as the underlying geology of the region is highly varied, with alluvial plains, low rocky ranges, streams of varying size, and soils ranging from coarse sand to fine clay, the study region is characterised by a variety of animal and plant resources. This has certain implications for the distribution of the archaeological record.

While the *availability* of food resources is important for determining the number and distribution of people, there are other considerations. Availability of resources such as firewood, shell and wood for tool manufacture, and the water of the rivers, all contributed to carrying capacity.

Predictability and *distribution* (Pardoe 1988a, 1990) of resources also determine how people may make a living. Riverine resources are dense and stable, a fine grained mosaic. Those of the plains to the west become increasingly unpredictable; a coarse grained mosaic of resources which vary according to the seasons and to longer term weather cycles. The low ranges are not highly productive, but they do retain more protected country for game animals. The small springs, soaks and waterholes also provide a wider distribution of more permanent water in the region. Gilgai plains are common through the region and while not enormously productive, would contribute to the seasonal round for hunters and gatherers (Pardoe 2009).

Ecological diversity is perhaps the best asset a group of people may have, so that they might minimize risk of famine. Wiradjuri peoples of the region maintained access to resources of the rivers, floodplains, ranges and plains.

Archaeological evidence for the food quest may come from many different quarters. Animal bones and plant food remnants may be found in earthen mounds. Excavation and analysis may then provide information on what was eaten at these places.

While archaeology has traditionally concentrated on hunting (because animal bones may be more readily preserved in sites), humans typically rely on plant resources. For much of south-eastern Australia the main staples were seeds, roots and tubers. Greens were commonly eaten, either as salad or cooked in ovens with the main meal. The grinding of seed for flour is indicated in the archaeological record by grinding dishes and mortars. Where people do not have access to suitable stone it is traded substantial distances. Grass seed was intensively used to the west (Gott 1999, Pardoe 2009, Tindale 1976). Roots and tubers are available year round. “Of the 940 species recorded as used for food in Victoria, 296 (32%) were used for their underground parts” (Gott 1999). “[The Aborigines] burn the grass, the better to see these roots, but this burning is a fault charged against them by squatters” (Robinson 1841, in Clark 1998).

4.7 The Environment in the 1800s: Historical Evidence

A number of Europeans moved into the region in the middle of the nineteenth century – the first non-Aboriginal people to view this landscape. Their descriptions are important as they help us to picture the country before it was so rapidly and radically transformed by sheep, cattle, timber felling and agriculture only a few decades later.

The first detailed description of the environment in the area of the proposed pipeline was provided by John Oxley, Surveyor-General, when he passed through the area in 1817 and again in 1818.

After following the course of the Lachlan downstream into the plains, he cut back north-east, passing over a mountainous range before heading down a narrow glen on 18 August 1817:

> It is impossible to imagine a more beautifully romantic glen than that in which we lay. There was just level space on either side of the stream for the horses to travel along, the rocks rising almost perpendicularly from it to a towering height, covered with flowering acacia of various species, whose bright yellow flowers were contrasted and mingled with the more sombre foliage of the blue gum and cypress trees. (Oxley 1817)

The following day, the glen opened out into a river that Oxley named Bell's River, after Major Bell in the 48th Regiment. He also named the whole valley the Wellington Valley and describes the landscape as follows:

> [I]magination cannot fancy anything more beautifully picturesque than the scene which burst upon us. The breadth of the valley to the base of the opposite gently rising hills was, between three and four miles, studded with fine trees, upon a soil which for richness can nowhere he excelled; its extent north and south we could not see: to the west it was bounded by the lofty rocky ranges by which we had entered it; this was covered to the summit with cypresses and acacia in full bloom: a few trees of the sterculia heterophylla, with their bright green foliage, gave additional beauty to the scene. In the centre of this charming valley ran a strong and beautiful stream, its bright transparent waters dashing over a gravelly bottom, intermingled with large stones, forming at short intervals considerable pools, in which the rays of the sun were reflected with a brilliancy equal to that of the most polished mirror.

Oxley initially thought that he had found the upper waters of the Macquarie River, but on riding downstream towards the north, he found that this stream 'joined a very fine river, coming from the east-south-east from among the chain of low grassy hills, bounding the east side of the valley in which we were.' Oxley had finally reached the Macquarie, which he thought a magnificent and noble river, different in every respect from the Lachlan, in habit, appearance, and landscape. He described the Macquarie as bordered by rich lands, fed by numerous tributaries, whereas the Lachlan dispersed its waters 'over low and barren deserts, creating only wet flats and uninhabitable morasses'.

As he travelled up the Macquarie, he described a range of vegetation:

> The timber was unusually fine, consisting chiefly of very large and straight blue gums; beautiful large casuarina trees [casuarina filifolia] were occasionally growing at the very edge of the water. The tops and sides of the rocky precipices on the west side of Wellington Vale were clothed with cypress trees, which had all the appearance of the pinus silvestris, that adorns the mountains and glens of Scotland. (Oxley 1817)

Other Europeans who described the landscape of the western slopes in the early 1800s include Evans, Cunningham and Mitchell (see below).

Today, white cypress pine [Callitris glauca] are still to be found on the upper ridges in the area, while the open woodland vegetation of the upper slopes is dominated by white box [Eucalyptus albens] and grey box [E. macrocarpa], with yellow box [E. melliodora] tending to dominate the lower slopes and drainage lines (AMBS 2008).