



# Narrabri Coal Seam Gas Utilisation Project

## Aboriginal Heritage Assessment

Prepared by

Cultural Heritage Advisor – PFAMC & NLALC

Specialist Consultant Studies Compendium

Part 5

November, 2007





ABN: 29 094 269 780

## Narrabri Coal Seam Gas Utilisation Project

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# Aboriginal Heritage Assessment

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**November, 2007**

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## **1 INTRODUCTION**

Eastern Star Gas Limited (ESG) has proposed to construct a Gas Gathering System (GGS), gas flow line (flow line) and expand the Wilga Park Power Station (WPPS). For the purposes of this cultural heritage assessment, the Project Site (**Figure 1**) refers to the 10m wide disturbance corridor within the Pilliga East State Forest and open farmland within the Narrabri Shire. The total area of the Project Site is approximately 36ha.

The main objective of the Aboriginal Heritage Assessment is to assess the proposal for its likely and potential impacts on places or items of Aboriginal heritage significance. This objective will be reached through the following means:

- Identify any previously recorded places or Aboriginal heritage significance through available Government and non-Government site registers and databases;
- Review available published reports and archaeological information for the region;
- Conduct a field survey of the area to be impacted by the proposal;
- Assess the significance of Aboriginal places and items identified during the survey;
- Provide alternatives to the proposed flow line route where an impacts on a place or items of significance is identified; and
- Develop, where required, a set of management procedures to protect all significant places or items within the Project Site.

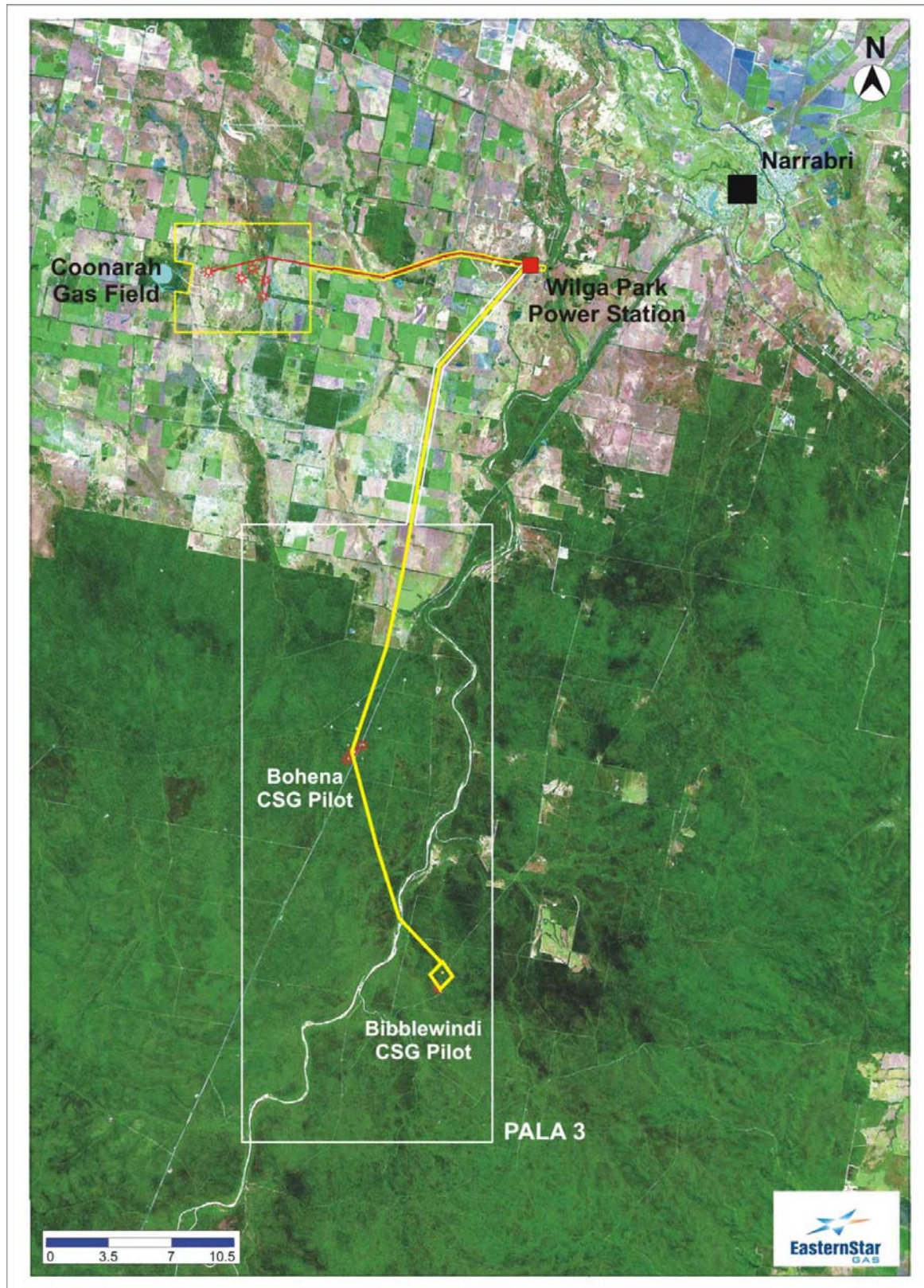
## **2 DESCRIPTION OF THE PROJECT**

### **2.1 The Proponent**

The Gunnedah Gas Joint Venture is a joint venture partnership between Eastern Star Gas Limited (ESG) and Gastar Exploration Limited. ESG is the operator and licence holder of PEL238 and proponent for the purposes of this cultural heritage assessment.

### **2.2 Project Location**

The Project Site is located within the 265 km<sup>2</sup> Bohena CSG Project Site is located approximately 25km south of Narrabri along the Newell Highway. For the purposes of this cultural heritage assessment, the Project Site refers to the 10m wide disturbance corridor required to permit the installation of a buried gas pipeline linking the Bibblewindi CSG Pilot and the Wilga Park Powerstation. The approximate mid-line coordinates for the Project Site are show in the following table.



Note: A Colour Version of this figure is available on the project CD

**Figure 1**  
**The Project Site – a 10m wide disturbance corridor linking the CSG Pilots**  
**and Wilga Park Power Station**

**Table 1**  
**Proposed flow line route co-ordinates (AGD66 Zone 55)**

Waypoint Description	Coordinates (AGD66 Zone 55)
Bibblewindi-5	754039mE/6608862mN
Bohena Creek Rd	751729mE/6610004mN
Bohena-3	750323mE/6617656mN
Dog Fence Rd	751526mE/6621931mN
Wheeler Property Fence line	751962mE/6623603mN
Unformed Road Easement	752311mE/6625252mN
Glenwood Lane	752617mE/6627093mN
Yarrie Lake Rd	753188mE/6630244mN
Power Line/Kiandool Lane	753778mE/6633522mN
Wilga Park	757361mE/6637525mN

## **2.3 Project Description**

The project involves the collection of gas from the Bibblewindi CSG Pilot located 36km south of Narrabri and its transmission by buried gas pipeline to the Wilga Park Power Station 16km west of Narrabri. The corridor for the gas flow line and hence area to be impacted by the Project is 10m wide between the Bibblewindi CSG pilot and the Wilga Park Power Station.

### **2.3.1 Flexibility of Design**

The current preferred route remains flexible until all environmental assessment components including Aboriginal heritage surveying has been completed. This flexibility is designed to permit the avoidance of potential impacts on places or items of significance that may be present along the proposed disturbance corridor.

## **2.4 Legislative Context**

The proposed development is being assessed by Planning NSW as a project of state significance under clause 24 of schedule 1 of the NSW State Environmental Planning Policy (Major Projects) 2005 and has accordingly been declared a project to which Part 3A of the *Environmental Planning and Assessment Act 1979* applies for the purpose of section 75B of that Act.

### **2.4.1 Commonwealth Legislation**

The *Native Title Act 1993* provides recognition of the indigenous inhabitation of this land prior to the arrival of European settlement. In terms of this project, the application of this act has occurred previously in the advertising of the PALA 3 application by ESG in which all crown lands contained within the boundary of the assessment lease was advertised for Native title claimants. No claims for native title were received during this period to the satisfaction of the requirements under this Act.

## **2.4.2 State Legislation**

The legislative context for the protection and management of Aboriginal heritage in NSW is facilitated under the following Acts:

- The *National Parks Act 1974* which provides statutory protection for all Aboriginal places and objects within NSW;
- The *Environmental Planning and Assessment Act 1979* which establishes a requirement for the formal assessment of Aboriginal heritage values in planning and development; and
- The *Heritage Act 1977* provides statutory protection for items listed on the State Heritage Register and facilitates Interim Heritage Order protection for sites of potential heritage significance.

The proposed development is subject to the various provisions within these legislative documents for the assessment of potential impacts of a development on Aboriginal heritage within the Project Site.

## **2.5 Zoning**

The southern section of the proposed gas pipeline development is located entirely upon lands designated Crown Lands State Forests under the *Forestry Act 1916*. This area falls under the control of the Pilliga Forest Aboriginal Management Committee and Forestry NSW (PFAMC).

The northern section of the proposed gas pipeline development is located upon land designated by the NLEP as Zone 1(a) (General Rural). This area falls under the control of the Narrabri Local Aboriginal Land Council (NLALC).

## **2.6 Disturbance History**

### **2.6.1 Farmland**

The northern section of the Project Site traverses highly disturbed agricultural lands under ongoing season cropping rotations and pasture improvement activities. The disturbance corridor lies adjacent to existing fence lines and retained shelter belts and historical road easements. No further clearance or modification of vegetation is required within this section of the Project Site.

### **2.6.2 Pilliga East State Forests**

A review of the Disturbance History Mapping Project Report (RCAC, 2000) completed for the Western Regional Assessment indicates that the Pilliga East and Bibblewindi State Forests have been subject to disturbance regimes of varying types over a significant period. These disturbance events are mostly aligned with the various forestry products removed e.g. soft and hardwood products, gravels and other disturbances such as wildfires, grazing, mining exploration.

As part of the Stage 1 Brigalow Belt South Bioregional Assessment, State Forests of NSW completed a disturbance history mapping project that aimed to consolidate the available information on the management history of the public forested lands in the Pilliga and Dubbo regions. Data was collated on the following types of disturbance regimes:

- Logging and silvicultural treatment;
- Prescribed burning and wildfire;
- Previous clearing;
- Regular grazing; and
- Other relevant disturbances such as mining and mineral and gas exploration.

In terms of specific data collected for the Pilliga East State Forest, the mapping project indicates that a range of disturbances have impacted across large areas of the Project Site. The result of the Forestry Disturbance mapping project can be found in appendix a. They indicate that the main disturbances have come from pre-1960's forestry products harvesting (saw logs, sleepers etc) and two major wildfires in 1951 and 1982 which impacted the entire Bohena CSG Project Site.

The southern section of the Project Site traverses moderately wooded and relatively undisturbed forestry compartments of the Bibblewindi and Pilliga East State Forest. Various sections of the disturbance corridor intersect compartments previously selectively logged, vehicular access tracks receiving low and high frequency traffic, firebreaks of varying widths and areas subject to recent (<5years) bushfires. The disturbance corridor also intersects Bohena Creek approximately 2500m from the gas gathering system inlet hub at Bibblewindi-5 and an associate riparian zone approximately 150m wide which generally remains undisturbed.

### **3 THE ABORIGINAL COMMUNITY**

The Project Site lies within the area inhabited by the Gamilaraay/Gamilaroi Aboriginal Nation and administered as such by the Narrabri Local Aboriginal Land Council and the Pilliga Forest Aboriginal Management Committee.

#### **3.1 Aboriginal Stakeholders**

The people of the Gamilaraay/Gamilaroi Aboriginal Nation are the pre-eminent stakeholder in the conduct of this cultural heritage assessment. They are represented by the NLALC and the PFAMC.

### **3.2 Consultation and Involvement**

The ongoing development of the CSG exploration project including the proposed gas pipeline to which this report refers has undergone a continuous referral and consultative process since ESG assumed operatorship in 2004. The NLALC and PFAMC have been informed through two main channels:

- Presentations of current and future project developments at quarterly PFAMC meetings; and
- Direct correspondence with the NLALC on matters of Aboriginal heritage including surveying.

Additional consultation with Forestry NSW, the landholder of the Pilliga State Forests, has provided further means by which issues of Aboriginal heritage have been discussed and incorporated into applications for exploration and operations. Forestry NSW is the convener and administrator of the PFAMC which provides additional surety for the assessment and mitigation of impacts on culturally significant places posed by ESG's exploration and production based activities in the Narrabri Region.

## **4 IDENTIFICATION OF ABORIGINAL HERITAGE VALUES**

### **4.1 Preliminary Desktop Investigations**

The preliminary desk top investigations included:

- Consultation with the Aboriginal Cultural Heritage Assessment – Preliminary Report (Stage 1) Brigalow Belt South Bio-region (BBSB) (NSW NPWS – Western Directorate);
- Consultation with the proponent as to the extent of the proposed development and its likely and potential impacts; and
- Collation of information relating to cultural materials was gathered from previous reports and local knowledge.

### **4.2 Existing Cultural Heritage Sites**

Existing sources of Aboriginal site records vary considerably in their quality; three main sources are available that will permit a better understanding of the extent of Aboriginal inhabitation across the larger Pilliga outwash and more specifically within the Project Site itself.

The three sources of data available include the NPWS AHIMS database, the Forestry/PFAMC database and the data resulting from the stage 1 BBSB cultural heritage surveying.

#### **4.2.1 AHIMS Data**

A search of the AHIMS database for sites and items of cultural heritage significance within the vicinity of the Project Site are illustrated in **Figure 2**.

#### **4.2.2 Forestry NSW and PFAMC Data**

Consultation with the Forestry NSW & PFAMC cultural sites database contains data collected across all survey efforts to date (including the BBSB surveying) and indicates that a number of sites records exist within the vicinity of the Project Site and more specifically within 1000m of the disturbance corridor. No illustrative representation of this data has been made available at the request of the PFAMC and Forestry NSW although this point data has been utilised in the preparation of the proposed flow line route and accordingly has dictated location of the waypoints found in table 1.

#### **4.2.3 Western Regional Assessment Pre-survey Site Records**

The field surveying efforts for the WRA/BBSB generally comprised three parts: Aboriginal site surveying, landform mapping and recording native plants of aboriginal significance. The aim of combining these information sources was to highlight the relationship between Aboriginal cultural heritage and landform categories.

In preparation for the cultural heritage assessment for the NSW Western Regional Assessments, a search of available databases for known sites of significance was carried out, the result of which is illustrated in **Figure 2**.

### **4.3 Aboriginal Heritage Investigations for the Western Regional Assessments**

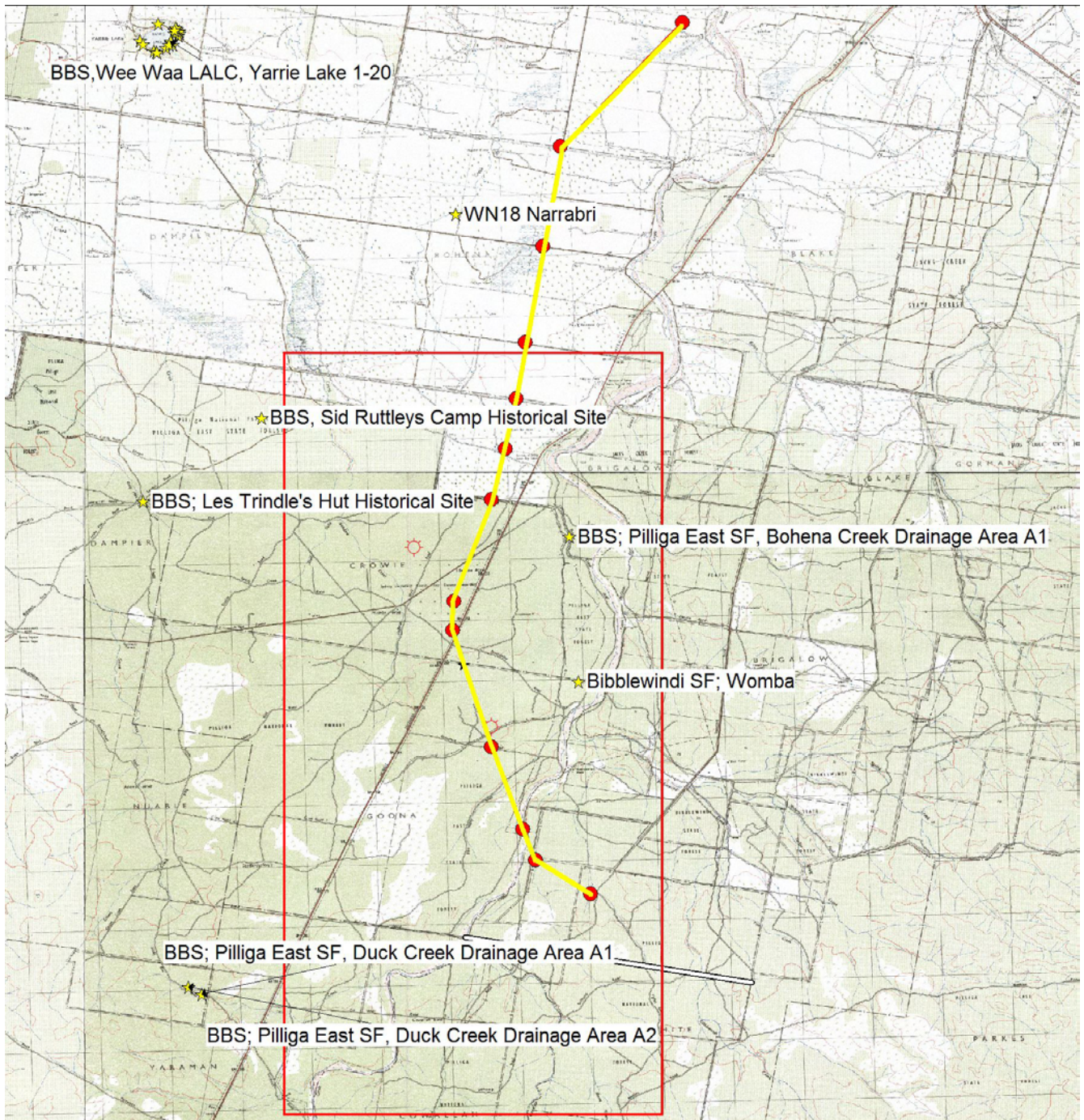
Completed in 2002, the Western Regional Assessments (WRA) was a series of bioregional scale investigations focused on the biodiversity and cultural heritage of NSW.

The Aboriginal cultural heritage assessment for the Brigalow Belt South bioregion, of which the Project Site is part, was the first State funded project to involve Aboriginal communities on such a large scale (RCAC, 2002). The cultural heritage assessment considered various facets of Aboriginal cultural heritage including Aboriginal sites and historical, social and spiritual association of areas within the BBSB.

Field surveying for the WRA comprised three parts: Aboriginal site surveying, landform mapping and recording native plants of aboriginal significance. The aim of combining these information sources was to highlight the relationship between Aboriginal cultural heritage and landform categories.

The results of the surveying effort in the vicinity of the Project Site are illustrated in **Figure 4**. Overall, the cultural field surveying effort for the Stage 1 WRA identified 145 sites of significance which increased the number of known sites within the Pilliga Forest to 261. The results strongly indicate that Aboriginal sites occur in all landform categories identified and a relationship between Aboriginal sites and watered localities was established.

A number of sites of Aboriginal heritage significance were recorded during this survey within the Bohena CSG Project Site. A number of new sites associated with the riparian zone of Bohena Creek on or near the 'Womba' property were discovered in addition to a small cluster of sites in the north western corner of the Bohena CSG Project Site and are associated with the margins of Bundock Creek.



Note: A Colour Version of this figure is available on the project CD

**Figure 2**  
**AHIMS Data for the area surrounding the Project Site**

Actual site data records of these sites are unavailable; ESG requested that general, non specific data provided to ensure that the proposed development does not unduly impact on the known sites of heritage significance. The proposed route waypoints shown in **Table 1** take into account the location of these sites on Bohena Creek.

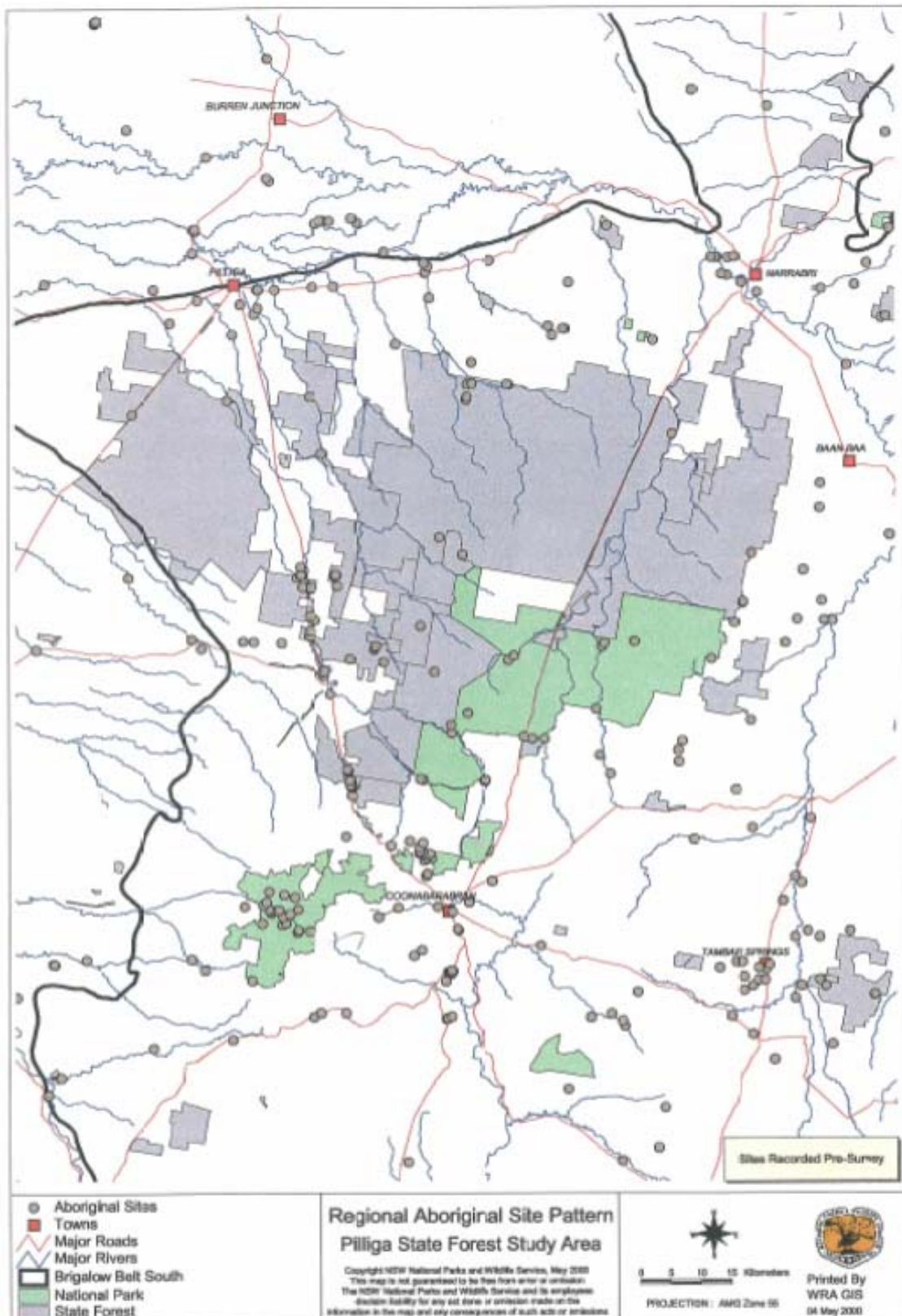
#### **4.4 Aboriginal Heritage Investigations for the Western Regional Assessments**

Cultural landscapes, landforms, places and areas are terms used among heritage practitioners and government agencies to express Aboriginal cultural linkage to the environment (RCAC, 2002). Landforms are the features of the physical landscape that can be described by criteria such as topographic relief, slope, morphology, drainage features and soil types. 12 landform categories were identified during stage 1 surveying in the Pilliga alone and Aboriginal sites were mapped among a sample of the landforms highlighting the relationship between sites and landforms.

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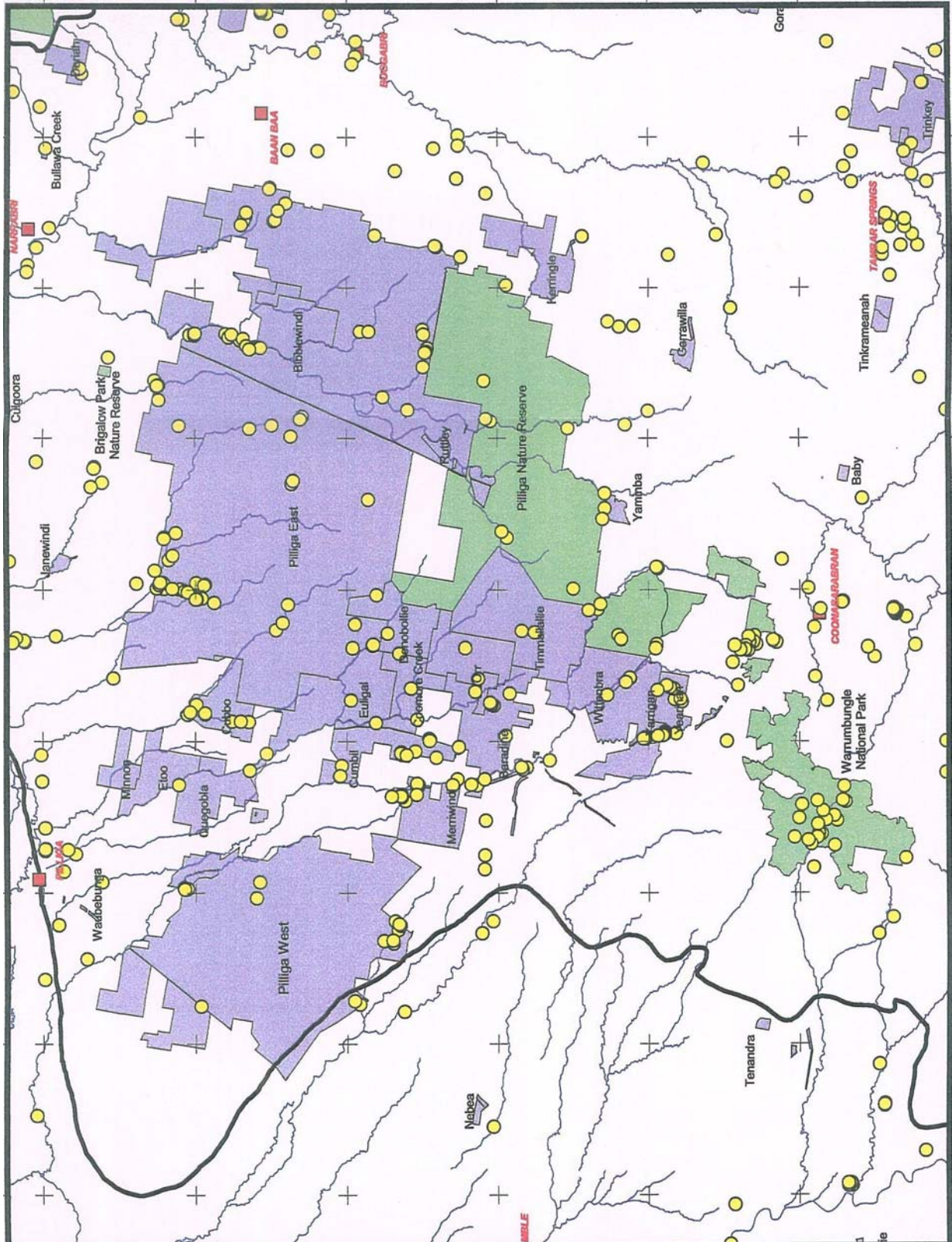
A review of available landform data for the general area of the Project Site within the Pilliga outwash province/landscape unit is located is summarised here:

*Mapped as alluvium and alluvial terrace, the Pilliga Outwash province can also be thought of as a series of intersecting alluvial fans formed by creeks draining from the Pilliga province towards the Namoi River. The outwash has a gentle slope, but still great enough to form a distinct boundary with the Namoi River floodplain and be above the level of inundation of that river. The Bohena Ck fan is identifiable because of the enormous area of gilgai formed on the alluvial surface. This was the largest area of gilgai observed in the bioregion. The gilgai form on the high points of the undulating landscape while the low areas between are subject to overland flow from local runoff.*



Note: A Colour Version of this figure is available on the project CD

**Figure 3**  
**Western Regional Assessment Pre-survey site records for the Pilliga State Forests**



Note: A Colour Version of this figure is available on the project CD

**Figure 4**  
**Results of Aboriginal site surveying for the WRA on the Pilliga State Forests**

In terms of describing the relationship between landform and culturally significant sites, the following summary was also sourced from appendix A of the Stage 2 Aboriginal Heritage Assessment (RACAC, 2002).

*Eighty-four percent of the Pilliga Outwash has mapped landform coverage. One hundred and ninety eight sites occur among many of the landforms providing a good indication of which landforms have the higher potential for sites. Calculated by size of landform area and the number of known sites, scald, claypan and floodplain landforms have very high site density. Scald and claypan belong to the Terrace group of landforms which adjoin the margins of the floodplain landform, an example is the Namoi floodplain complex. The Alluvial group of landforms, floodplain, alluvium, alluvial fan, wetland and alluvial terrace, have strong site association. A distinctive feature of the Pilliga Outwash province is that the Higher group of landform (colluvial slope, rocky ground and soil mantled slope) have very low site numbers. The high site concentration among landform type (lunette) has not been graphed because of the high site density calculated (1 724). Sampling occurred at one specific lunette landform which is small in area (116 ha) and where many sites were recorded.*

In terms of the distribution and frequency of Aboriginal sites, Purcell (in RCAC, 2000) states that the location of Aboriginal sites reflects a strategic affiliation with landform features that harboured a diversity of resources or were strategic to other landforms where resources could be accessed with a minimum of effort. Watered localities are the most common feature associated with the remains of Aboriginal Camps, which were situated with a radius suitable for accessing resources.

## **4.5 Site Types**

The types of sites expected to occur within the Project Site and surrounding region are influenced by a range of factors including the geology, vegetation, landform and the availability of natural resources and shelter.

The main types of sites previously recorded in the Narrabri region and which therefore might be expected to occur within the vicinity of the Project Site are described below.

### **4.5.1 Artefact Scatters**

Scatters of stone artefacts exposed at the ground surface are a common type of sites identified in field surveying efforts. Varying in size from a few conspicuous stones and rock chips to large scatters of many thousands of artefacts, they may represent a range of activities and intensity of inhabitation.

### **4.5.2 Scarred Trees**

Slabs of bark cut from trees by Aboriginal people and utilised for a variety of purposes including shelters and constructing canoes, shields and containers are a common type of site recorded across NSW. Scars resulting from other activities such as food collection are more conspicuous. The classification of scarred trees is often problematic due to the relative age of such significant finds; a true scarred tree would by now be over 100 years old and in an area not previously cleared for agriculture. In this regard, the possibility of locating larger remnant trees in amongst forestry regrowth is low except in those areas on the margins of Bohena Creek where the removal of larger ironbarks may have been limited.

### **4.5.3 Open Campsites**

Open campsites resented by scatters of stone artefacts and the remains of fire hearths exposed on the ground are a common type of site. Open camp sites are invariably located near permanent or semi-permanent water sources and localised, well draining ground elevated above the local water source.

### **4.5.4 Project Site Limitations**

A limiting factor to the distribution and frequency of places and items of Aboriginal heritage significance across this area of the Pilliga is the lack of permanent water holes and suitable campsites offering shelter. The land in this area of the forest is characterised by flat, sandy soils, little topographic relief and almost non-existent sources of permanent and semi-permanent water.

In the area outside of the forested zone, the intensity of agricultural activity is likely to have impacted significantly on the heritage record to such an extent that the likelihood of identifying sites is low.

Additional limitations identified are related to surface visibility along the disturbance corridor. As the photographs in appendix A clearly show, many areas of the transects within the forested zone were affected by poor visibility of the ground surface due to dense to very dense vegetation and leaf litter.

## **4.6 Flora and Fauna**

### **4.6.1 Flora**

Smith (2002), in preparation for the 2001 Pilliga East Seismic Survey, suggested that the Pilliga State Forests and Nature Reserve, including Bibblewindi State Forest, form the largest forest remnants on the northwest slopes and plains of NSW and has national, state and regional conservation significance for the protection of biodiversity and threatened species due to its large size (>500 000 ha), high species diversity and high quality habitat.

The Pilliga East State Forest, covering approximately 32 000 hectares, is a small native forest zone managed by Forests NSW. Little published work on the vegetation composition of the forest is available (Clements and Moore, 2002). Prior to the commencement of the Western Regional Assessment for the Brigalow Belt South Bioregion Assessment, published reference material on the vegetation composition of the region was scant. The map strata (source: Forestry NSW) included reference to two communities, Narrow leaf Ironbark/Bull Oak/White Cypress and White Cypress/Narrow leaf Ironbark/Bull Oak (in order of dominance). Surveying to date indicates that no consistent differences were apparent between these communities in the field.

These original map strata have been developed for management rather than ecological purposes and disturbance regimes (logging, severe fire) since the date of mapping may have changed the species dominance (Elks, 2005). As a direct result of the field surveying, three communities have been identified as dominating the Bohena CSG Project Site; *Corymbia trachyphloia-Eucalyptus dwyeri* Woodland and *Eucalyptus crebra* Dry Open Forest.

#### **4.6.2 Fauna**

Prior to the development of the Bohena CSG Project Site, the area previously received little detailed attention in terms of fauna surveying to assess the presence of threatened faunal species, populations or ecological communities and potential/actual habitat. Fauna studies completed for Eastern Star's Pilliga Seismic Survey by Smith (2002) suggest that the Pilliga State Forests and Nature Reserve, including Bibblewindi State Forest, form one of the largest forest remnants on the north-west slopes and plains of NSW. The remnant has national, state and regional conservation significance for the protection of biodiversity and threatened species due to its large size (>500 000 ha), high threatened species diversity and high quality habitat.

ESG has engaged Kendall & Kendall Ecological Consultants over three separate survey efforts to compile detailed fauna data across the Project Site throughout 2005/2006; the baseline data continues to add significant value to Eastern Star's knowledge base.

The NSW DEC wildlife atlas identified eight threatened species as occurring within approximately 5km of the study area; they include;

- Barking Owl
- Speckled Warbler
- Painted Honeyeater
- Hooded Robin
- Black Striped Wallaby
- Brown Treecreeper
- Glossy Black Cockatoo
- Koala

A search of the DEC threatened species database was used to determine other TSC Act threatened species that may occur in the locality or within the study area. The search parameters included the geographical subregions of the Namoi catchment, the Pilliga Outwash and Pilliga 'Part A' whose habitat includes various dry sclerophyll vegetation communities. 25 threatened fauna species fulfilling these search parameters were listed within the DEC wildlife database and are listed in table 2 of the attached fauna survey report (Kendall & Kendall, 2007)

#### **4.6.3 Summary**

The biotic environment within the Project Site is likely to contribute significantly to the presence of places, sites and items of Aboriginal heritage significance. Previous surveying across this area confirms the utilisation of these and other species as resources for food, tools and shelter. Of particular note is the distribution of the various species of *Eucalyptus* commonly referred to "Box Gums" (e.g Yellow Box, Pilliga Box etc.). These species show a higher incidence of cultural scars due to their soft, pliable barks and their proximity to water localities.

## 5 ABORIGINAL HERITAGE FIELD VALUES

### 5.1 Objectives

The key objectives aboriginal heritage surveying were to:

- Locate and record any Aboriginal places or items of significance within the area impacted by the proposal; and
- Mitigate any risk of impacting on previously unrecorded places or items of significance through the proposed development.

### 5.2 Survey Constraints and Limitations

The survey effort was limited to the 10m wide flow line easement for the entire length of the Project Site. Ground visibility in the southern, forested section of the Project Site varied considerably from good to poor depending on groundcover and midstrata density.

### 5.3 Survey Constraints and Limitations

Developing a predictive model for locating sites/location within the Project Site is a key pre-survey process that assists in understanding the basis of Aboriginal inhabitation, the distribution of significant places and provides a baseline against which the results of field surveying can be discussed.

#### 5.3.1 Existing Data

Consultation with available heritage registers including AHIMS and the limited access database maintained by the PFAMC/Forestry NSW indicates that 6 (+ PFAMC) sites of significance can be found within the vicinity of the proposed disturbance corridor. Four of the sites provide information critical to the development of the predictive model.

**Table 2**  
**AHIMS cultural site data and landform association**

Site Name	Site Type	Landform Association
Bibblewindi SF; Womba	Axe Grinding Groove	Bibblewindi Creek/Womba Property
Pilliga East SF; Bohena Creek Drainage Area	Not recorded	Bohena Creek
Pilliga East SF; Duck Creek Drainage area	Not recorded	Duck Creek
Pilliga East SF; Duck Creek Drainage area	Not Recorded	Duck Creek

The discovery of significant sites in association with the otherwise ephemeral creeks intersected by the disturbance corridor suggests that a more detailed surveying effort will be required within the undisturbed riparian zones and within the vicinity of potential camping sites for up to 500m on either side of such creeks.

### **5.3.2 Summary**

In summarizing the previous data and observations discussed in available survey reports, the following predictive model of site frequency and distribution within the vicinity of the flow line disturbance corridor can be proposed:

- Irrespective of the lack of permanent or semi-permanent water within the Project Site, the ephemeral creek lines and riparian zones possess a reasonable likelihood of containing places or items of significance. The survey effort will focus closely on the creek line itself and for up to 250m either side of the creek bank where natural depressions, elevated terraces and potential shelter may be identified.
- Scarred trees may be encountered on the margins of the ephemeral creeks where suitably mature (>100 years) individual may still exist; and
- Although the lack of suitable rock outcrops reduces the likelihood of encountering quarry sites, grinding groves and associated open artefact scatters resulting from tool manufacture, maintenance etc, there is a possibility that exposed sandstones may be located.

## **5.4 Field Methods**

The main focus of the field based survey effort for the cultural heritage assessment has been the area likely to be directly impacted by the proposed development. The preliminary flow line route links the Bibblewindi CSG pilot and the Wilga Park Power Station running via the Bohena CSG pilot. The width of the flow line route and hence the area of impact does not exceed 10m and is quite often less than 5m in width where existing access is available and prior disturbances have occurred.

No specific surveying was carried out on the cleared agricultural lands. A short visual inspection of the proposed disturbance corridor is to be completed.

The survey effort in the southern, forested section of the Project Site was conducted by Mr. Eddie Trindall, cultural heritage officer representing the PFAMC, Mr. Matthew Trindall, trainee cultural heritage officer representing the PFAMC and Tim Donnan, Eastern Star Gas Ltd's environmental officer.

## **5.5 Survey Area and Routes**

### **5.5.1 Section 1**

The survey commenced at the cleared Bibblewindi-5 well site and worked in a west/northwest direction towards Boundary Road and the margins of Bohena Creek.

The first waypoint on Bohena Creek Rd was set to avoid the cluster of heritage sites on the margin of Bohena Creek further north near the confluence of Bibblewindi Creek and the 'Womba' property.

Using the intersection of Brandons Rd and Worombi Rd as an approximate target waypoint, the survey continued in a north/northwesterly direction for 4000m.

The total area surveyed in this section was approximately 6ha.

### **5.5.2 Section 2**

The survey route utilised the Bohena-3 well site as the next waypoint. The survey route intersects Apple Rd before reentering the forest for 900m. The survey route intersects the Newell Highway approximately 200m southeast of the Bohena-3 well site.

From Bohena-3, the survey route tends more northerly for approximately 4500m aiming for an existing north/south fence line that crosses the first free hold agricultural block. During this leg of the survey transect, a possible scarred tree was identified.

The total area surveyed in this section approximates 8.5 ha.

### **5.5.3 Section 3**

This section incorporates all of the northern section of the Project Site on the cleared agricultural lands. The extent of disturbance along this section is likely to have impacted severely on any places or site of Aboriginal heritage significance. This section does not intersect any natural watercourses where the predictive model suggests that sites may be found in conjunction with riparian zones possibly retained during land clearing. No further discussion of this section of the Project Site will be included in this assessment.

## **5.6 Survey Results**

The field based surveying effort identified one possible site of Aboriginal heritage significance; a scarred tree within the forested zone as described in the survey summary (Appendix B).

The scarred tree shown in **Figure 5** is located between Dog Fence Road and Pilliga Forest Way on the alluvial terrace between Bundock Creek and Bohena Creek. Within a lightly wooded section of the northern Pilliga East State Forest, the surrounding area is typical of the narrow leaved Ironbark woodland common across the region. As shown in the above figure, the immediate vicinity of this site has previously been impacted by some degree of clearing activity, most likely forestry operations targeting ironbark and white cypress as confirmed by the disturbance history mapping shown in Appendix 1. This area has been subject to considerable disturbances from saw log, sleeper, firewood timber harvesting in addition to the wildfires of 1951 and 1982. This individual Pilliga Box is one of less than 10 in the surrounding hectare of forest and has possibly been previously identified (but not recorded) and retained.



**Figure 5**  
**Scarred tree located within the vicinity of the Project Site**

## **5.7 Discussion**

The field surveying effort was able to confirm four main landform units along the disturbance corridor in order of occurrence from south to north;

- Sandstone hilly slopes adjacent;
- Mixed Ironbark/Bulloak/White Cypress forest on texture contrast soils (Humphreys *et al* in Dargavel, Hart and Libbis, 2001); and
- Flat, mixed agricultural lands on cracking grey clays and fluvial soils

The low number of sites identified during this survey are generally thought to be related to a range of environmental factors, primarily;

- A lack of permanent or semi-permanent water around which places (e.g. campsites) of cultural significance may have been based;
- The lack of landforms such as rocky outcrop or exposed rocks that would have provided shelter and a potential materials resources;
- The lack of sufficiently mature old growth trees from which definite or possible scars could be located;
- The frequency of bushfire across much of the Project Site and there impact on indigenous vegetation.

An additional factor affecting the potential for sites to be identified is the relatively narrow corridor of disturbance, significant disturbance pressures from forestry logging operations and the impact of historical instances of wild fires.

The location of the possible scarred tree on the alluvial terraces/plains between Bundock Creek (2300m west) and Bohena Creek (3400m east) was generally unexpected. The area was dominated by narrow-leaf Ironbark open woodland and contained very few, scattered box (*Eucalyptus sp.*) that contain a high percentage of cultural scars. The possible scar on the *E. pilligaensis* identified in **Figure 5** was one of no more than 10 scattered individuals in this sparsely vegetated section of the disturbance corridor. This area has been subject to logging operations over the past 60 years.

The proposed project will require the clearance of a 10m wide easement approximately 15km long within the northern Pilliga East State Forest. Due to the relative flexibility of the proposal design, the likely impact of the activity on this site will be negligible. With a 30m exclusion zone surrounding this site, the disturbance corridor will be moved to account for this site and no impact will be recorded.

This one remaining mature Pilliga Box and its possible cultural scar is a significant reminder of the past Aboriginal inhabitation, past use and occupation of the Pilliga Forests. Whilst no further sites were identified within the disturbance corridor, the potential for additional places and sites of significance remains moderate and must be reflected in the recommendations and operations planning for the proposed development.

## **6 ASSESSING THE IMPACTS OF THE DEVELOPMENT**

### **6.1 Summary**

The potential impacts of the proposed development on places and sites of Aboriginal heritage significance has been well characterised in this assessment; no places, sites or items of significance will be impacted by the proposed gas pipeline.

Adequate site management safeguards have been devised to account for any impacts on unknown places, sites or items as discussed in section 6.2.

### **6.2 Recommendations**

The following general and specific site management safeguards have been devised to ensure that the objectives of this cultural heritage survey as discussed in the introduction are preserved and conveyed throughout the project implementation. Based upon the information collated from previous heritage assessments and the field surveying effort, the following recommendations are provided:

- The NLALC and PFAMC are consulted if and when any changes are made to the project plans provided to date where heritage assessment activities are required;
- Where changes are made to the project plans in regard to the surveyed disturbance corridor, further field based surveying is carried out prior to any development activities commencing most specifically around the margins of Bohena Creek;

- If any potential places, sites or items of cultural significance are identified, all activities are to cease until such time as the appropriate representatives of the NLALC or PFAMC have assessed the site and adequate site management have been devised;
- The scarred tree identified in field surveying is marked and the proposed routes altered to account for the 30m exclusion zone;

# APPENDICES

(No. of pages excluding this page = 13)

Appendix 1: Disturbance History

Appendix 2: Survey Record

Appendix 3: Survey Photographs

Note: A Colour Version of all figures is available on the project CD

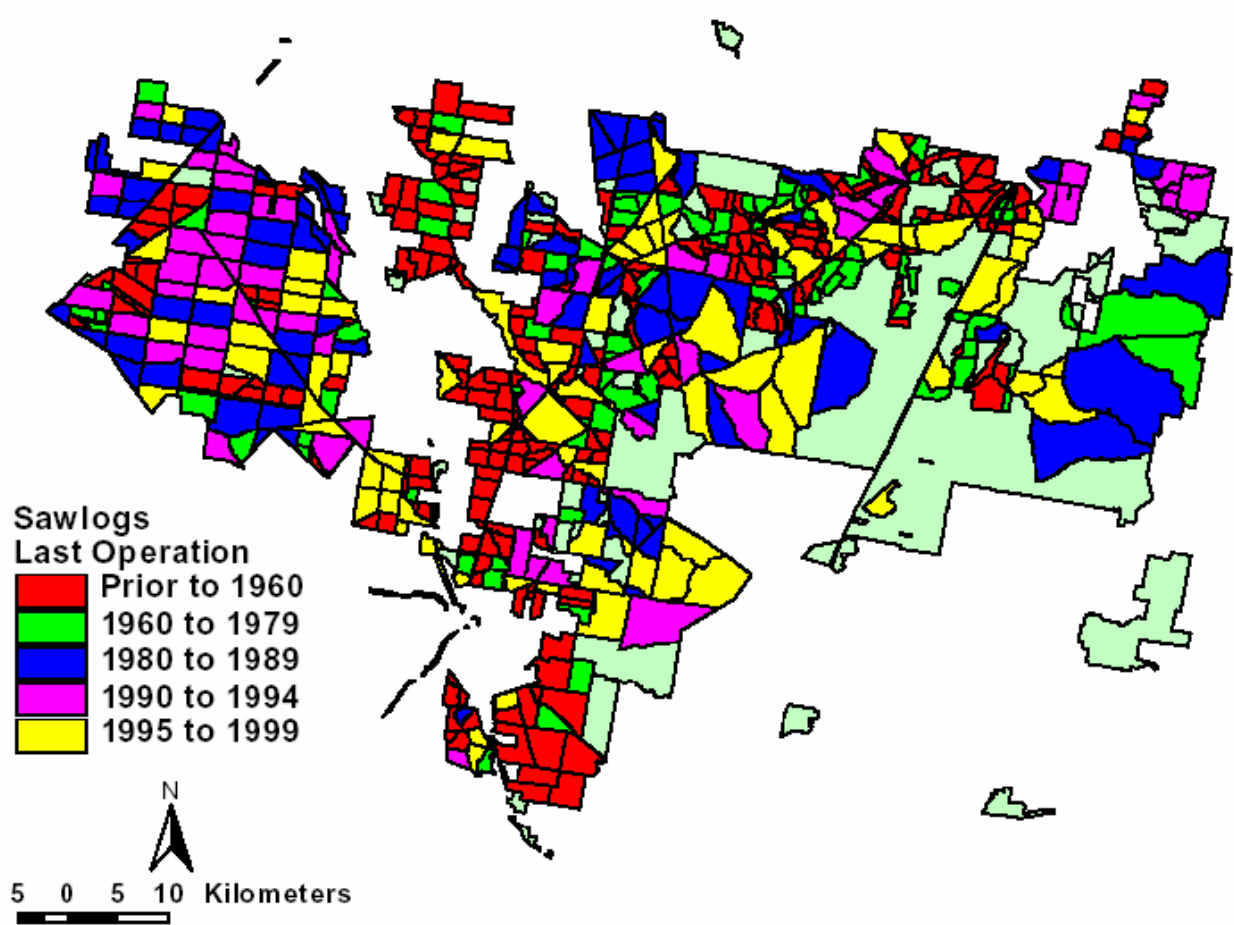
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# Appendix 1

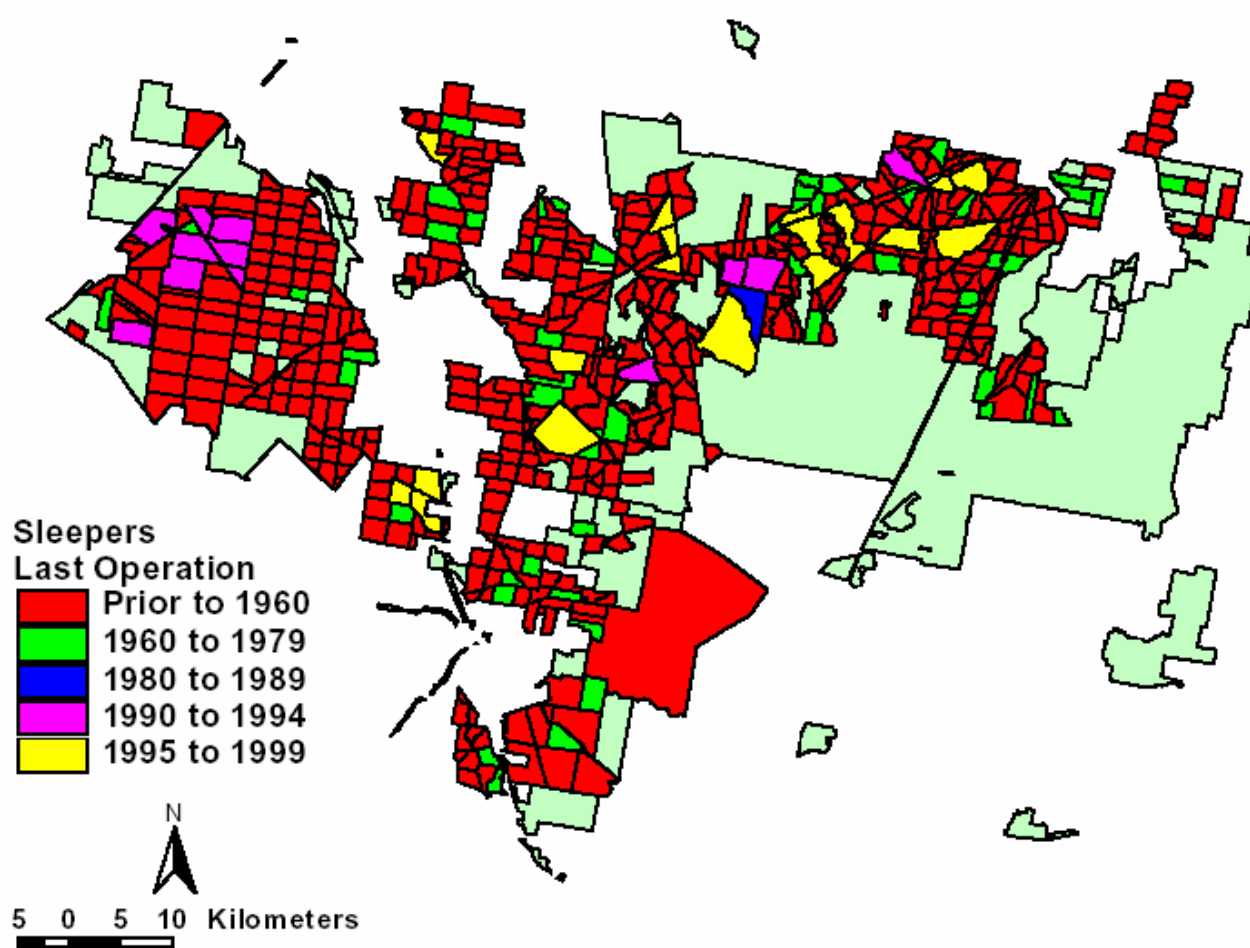
## Disturbance History

(No. of pages excluding this page = 7)

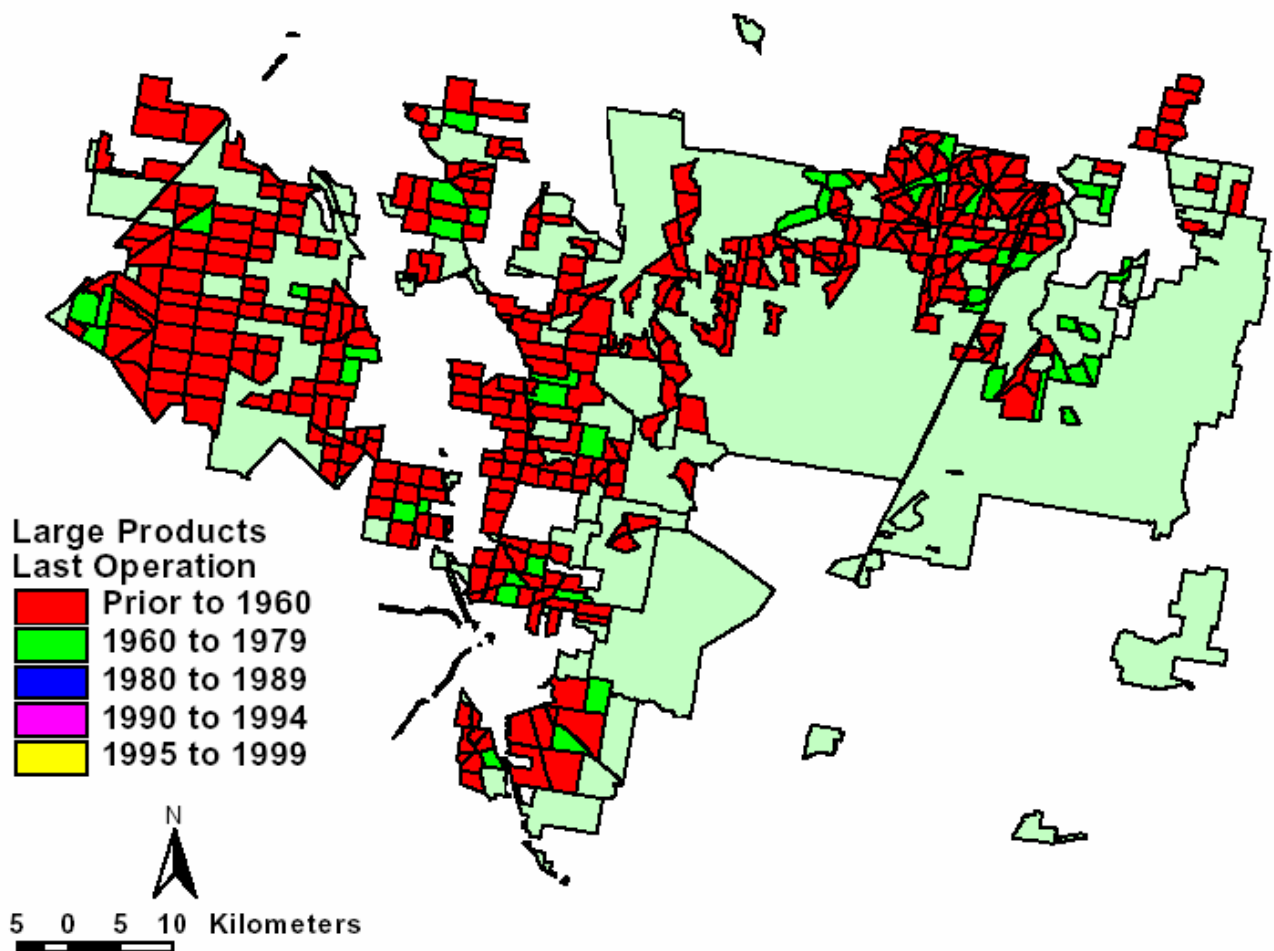
Please Note: All figures are presented in colour on the project CD



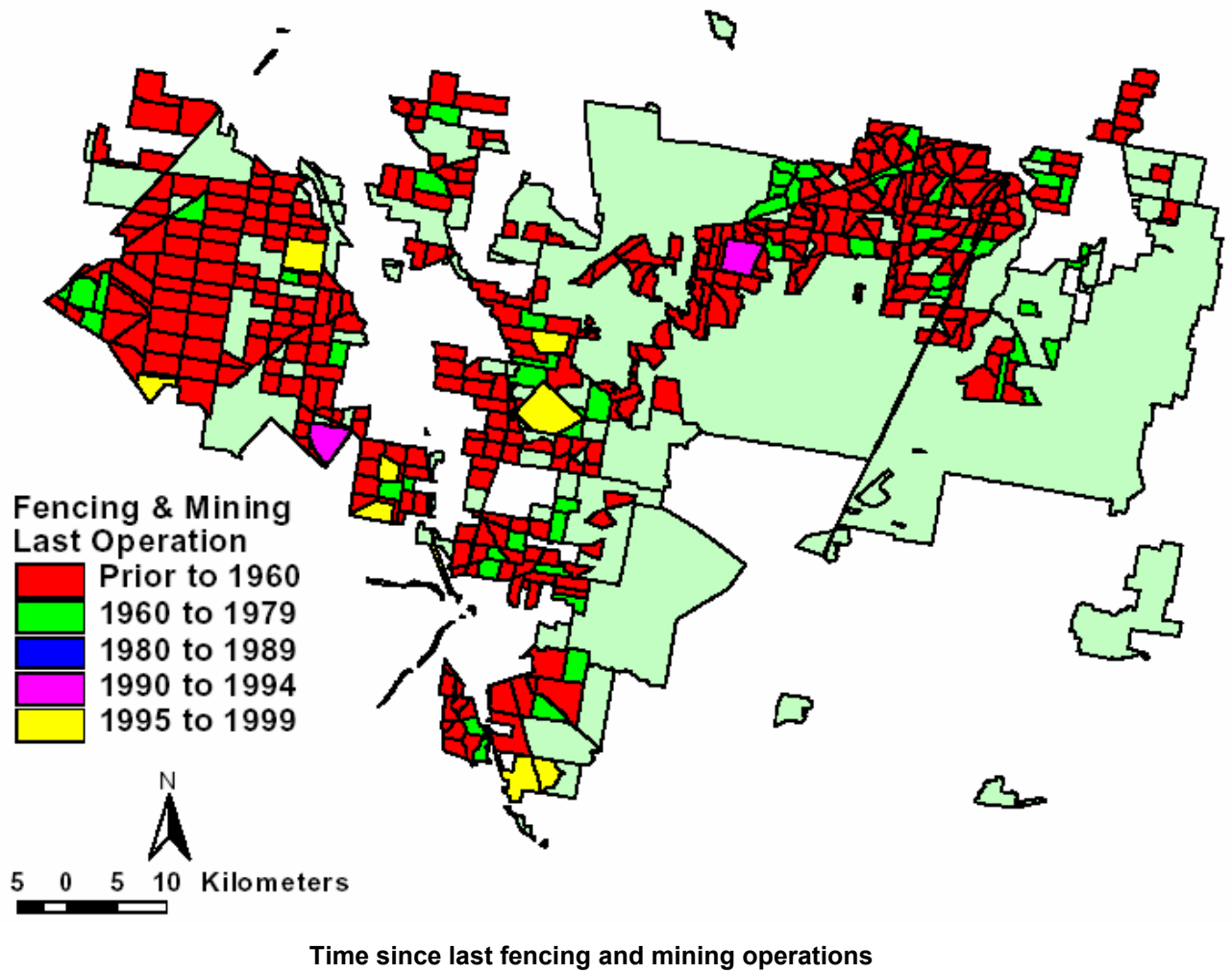
**Time since last saw log operation**

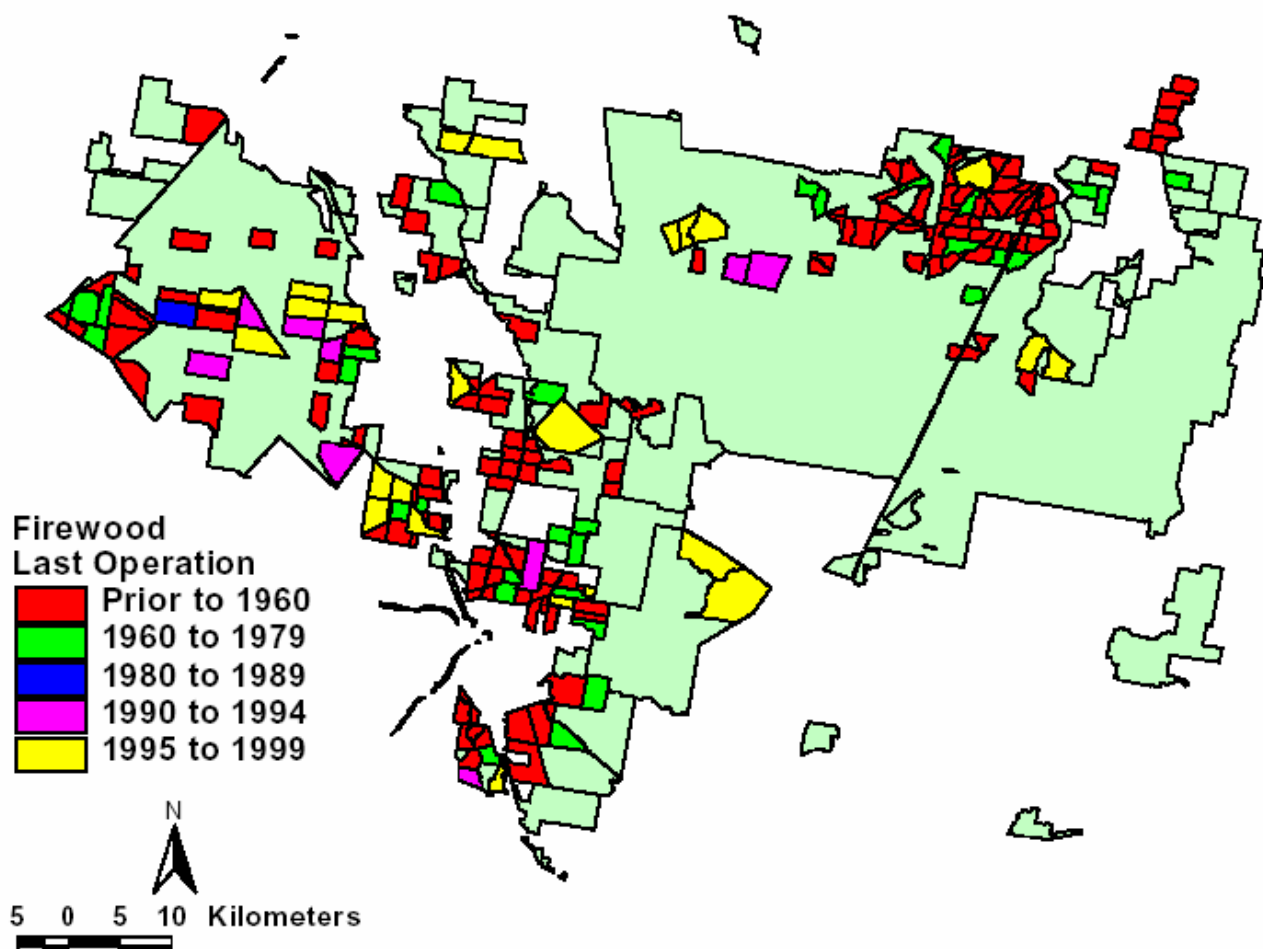


**Time since last sleeper operation**

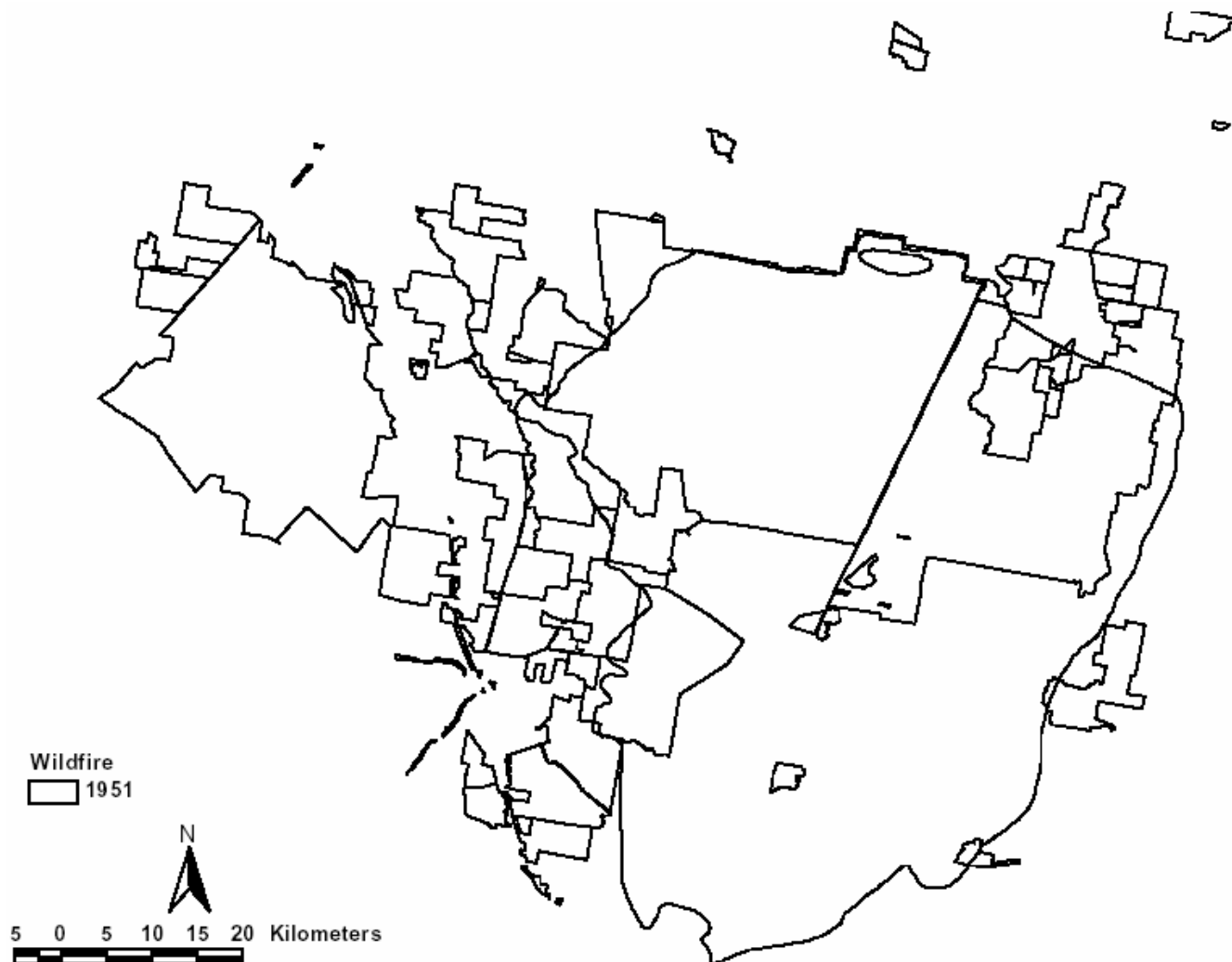


Time since large products operations

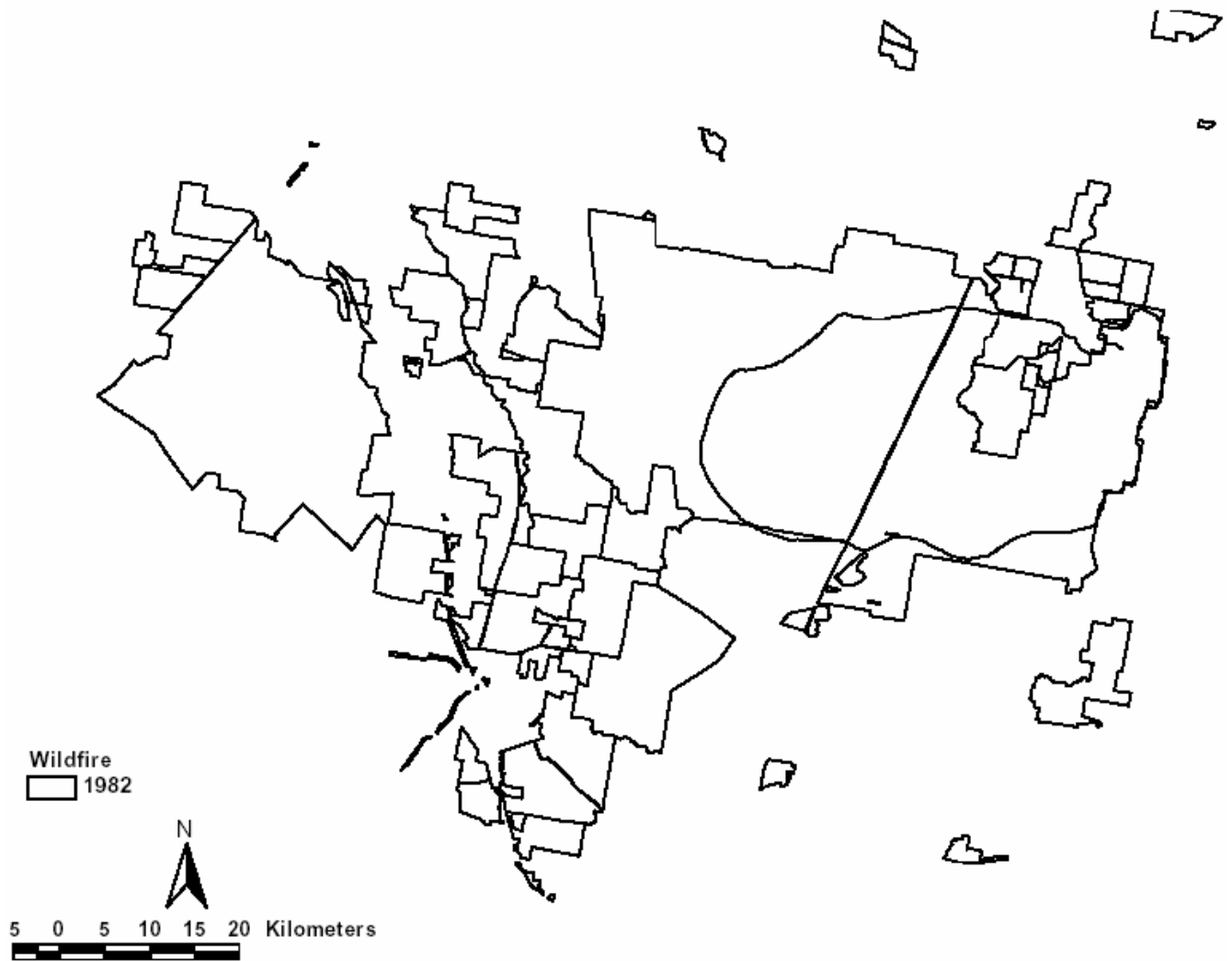




**Time since last commercial firewood operations**



**Area burnt during the 1951 wildfire**



**Area burnt during the 1982 wildfire**

# Appendix 2

## Survey Record

(No. of pages excluding this page = 1)

Note: A Colour Version of all photographs is available on the project CD

Site ID			
Site Name	PFAMC ESG01		
Owner	Department of Primary Industries (Forestry NSW)		
Owner Address	Forestry NSW Baradine, Cnr Lachlan & Darling Streets Baradine NSW 2396		
Location			
Location	Pilliga East State Forest Site is approximately 30km south of Narrabri via the Newell Highway between Dog Fence Road and Pilliga Forest Way.		
Map	Baan Baa 1:100K		
Datum	AGD66 Zone 55	Coordinates	XXmE/XXmN
Site			
Site Type	Scarred Tree (not previously recorded)		
Description	Possible scar most likely on mature <i>Eucalyptus pilligaensis</i> (Pilliga Box) approximately 12-15m tall, 2m 57 cm circumference with 12m diameter drip line.  Scar 74cm long by 44cm wide, starting point from ground level 44cm.		
Environment	Moderately dense Eucalyptus crebra Dry Open Forest comprising <i>E.crebra</i> , <i>Allocasurina luehmanni</i> (bull oak) and <i>Callitris glucophylla</i> (White cypress) with scarce <i>E.pilligaensis</i> . Ground covers and mid strata scarce although scattered <i>Lomandra sp</i> visible. Forbs, grasses and graminoids absent due to very dry conditions.  Site is located on alluvial floodplains/terraces between Bundock Ck (2.3km west) and Bohena Ck (3.4km east).		
Survey Description and Recording			
Survey	Cultural heritage assessment for proposed gas pipeline		
Date	Survey carried out 12 & 13 August 2007		
Survey Team	Edward Trindall and Mathew Trindall representing the PFAMC; and Tim Donnan, Eastern Star Gas Ltd		
Survey Method	Linear transect of proposed 10m wide x 15km long pipeline easement		
Significance	Site is considered significant to the PFAMC		
Photographs	Yes		

# Appendix 3

## Survey Photographs

(No. of pages excluding this page = 5)

All coordinates are in the AGD 66 Zone 55 datum and are approximate.



**Photo 1 Looking NW at 753934mE/6608975mN**



**Photo 2 Looking W along firebreak towards Bohena Creek 751185mE/6614378mN**



**Photo 3 Looking E from Bohena Creek Rd along fire break 752155mE/6611058mN**



**Photo 4 Looking SE near Brandon's Rd/Worombi Rd intersection 751337mE/6613781mN**



**Photo 5 Looking NW near Bohena South-1 751120mE/6614510mN**



**Photo 6 Looking NW near Apple Rd 750610mE/6616590mN**



**Photo 7 Looking S from Dog Fence Rd 751560mE/6621953mN**



**Photo 8 Looking S from Yarrie Lake Rd 753189mE/6630245mN**



**Photo 9 Looking N 753495mE/6631186mN**



**Photo 10 Looking NE along Power line easement 753796mE/6633604mN**