

# Section 3

# Environmental Setting

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*This section describes the environmental setting within and surrounding the Project Site for the proposed East Boggabri Coal Mine.*

*Emphasis is placed in this section on providing information about the environmental features that would contribute to or influence the assessment of a wide range of other environmental parameters. Information is provided on the local and Project Site topography, geology, meteorology, land ownership and surrounding residences.*

*Other features of the surrounding environment that would or may be affected by the proposed coal mine are detailed in Section 4 in conjunction with the design and operational safeguards and an assessment of impact on those features.*

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## 3.1 TOPOGRAPHY

### 3.1.1 Regional Topography

The regional topography is shown on **Figure 3.1**.

The Project Site lies within the Namoi River Basin in an area representative of the transition from the more elevated and dissected country to the northeast and south associated with the Nandewar, Great Dividing and Liverpool Ranges, and the open plains to the west in the Wee Waa and Coonamble areas.

Natural slopes within the region range from less than  $1^{\circ}$  along the floodplain of the Namoi River, south and southwest of the Project Site, to in excess of  $25^{\circ}$  within the Willowtree Range in Leard State Forest to the immediate north of the Project Site and in excess of  $45^{\circ}$  within Kelvin State Forest, 14km south-southeast of the Project Site.

Elevations in the region range from 865m AHD within Kelvin State Forest to 240m AHD within the Namoi River Valley (approximately 10km southwest of the Project Site), with isolated peaks elsewhere such as Mt Binalong (18km southwest) and Goonbri Mountain (5km northeast) rising to in excess of 500m AHD.

### 3.1.2 Local Topography

The local topography in the vicinity of the Project Site and the northern section of the proposed transport route are shown on **Figures 3.2** and **3.3** respectively.

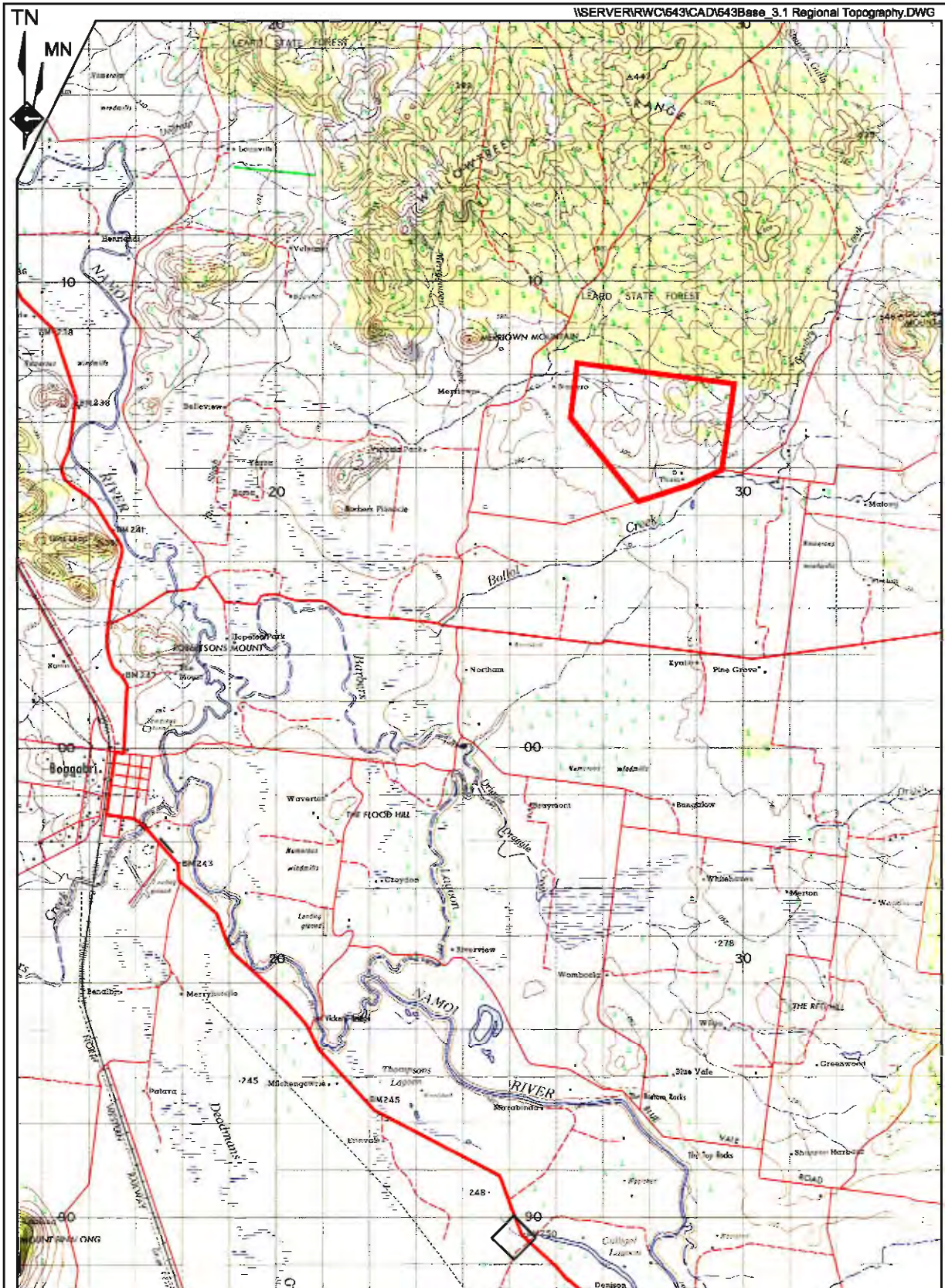
The local landform gradually rises from the various tributaries of the Namoi River to the south and southwest of the Project Site to the Willowtree Range in Leard State Forest to the north and northeast of the Project Site. The lower-lying areas of Bollol Creek, Driggle Draggie Creek and Barbers Lagoon have natural slopes of less than  $1^{\circ}$  and are prone to localised flooding.

In the immediate vicinity of the Project Site, there is a gradual rise in elevation from Bollol Creek at approximately 260m AHD to a small hill in the eastern section of the Project Site.

### 3.1.3 Project Site Topography

Elevations within the Project Site gradually rise from approximately 270m / 280m AHD on the southern, southwestern and western boundaries of the Project Site to a north-south oriented ridge (327m AHD) within the centre of the Project Site, and a higher isolated hill (350m AHD) towards the eastern side of the Project Site (see **Figure 3.4**). From the base of the eastern hill, the topography rises steeply at  $5^{\circ}$  to  $10^{\circ}$  to a local high point at 370m AHD. The slope of this gradual rise in elevation increases from  $<1^{\circ}$  on the cropping and grazing land adjacent to the southern and western boundaries to approximately  $7^{\circ}$  on the central ridge and  $10^{\circ}$  towards the eastern hill.





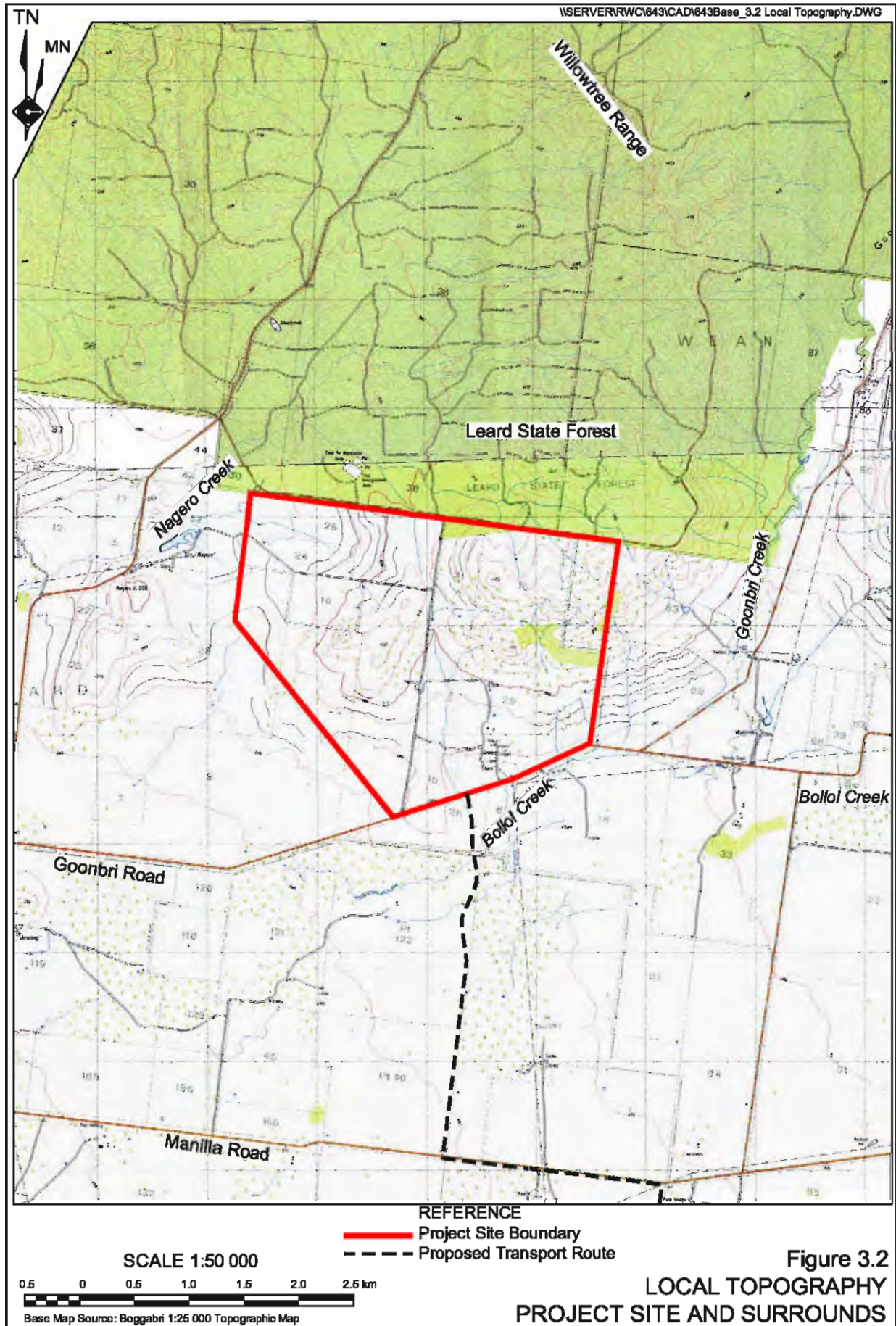
— REFERENCE  
 — Project Site Boundary

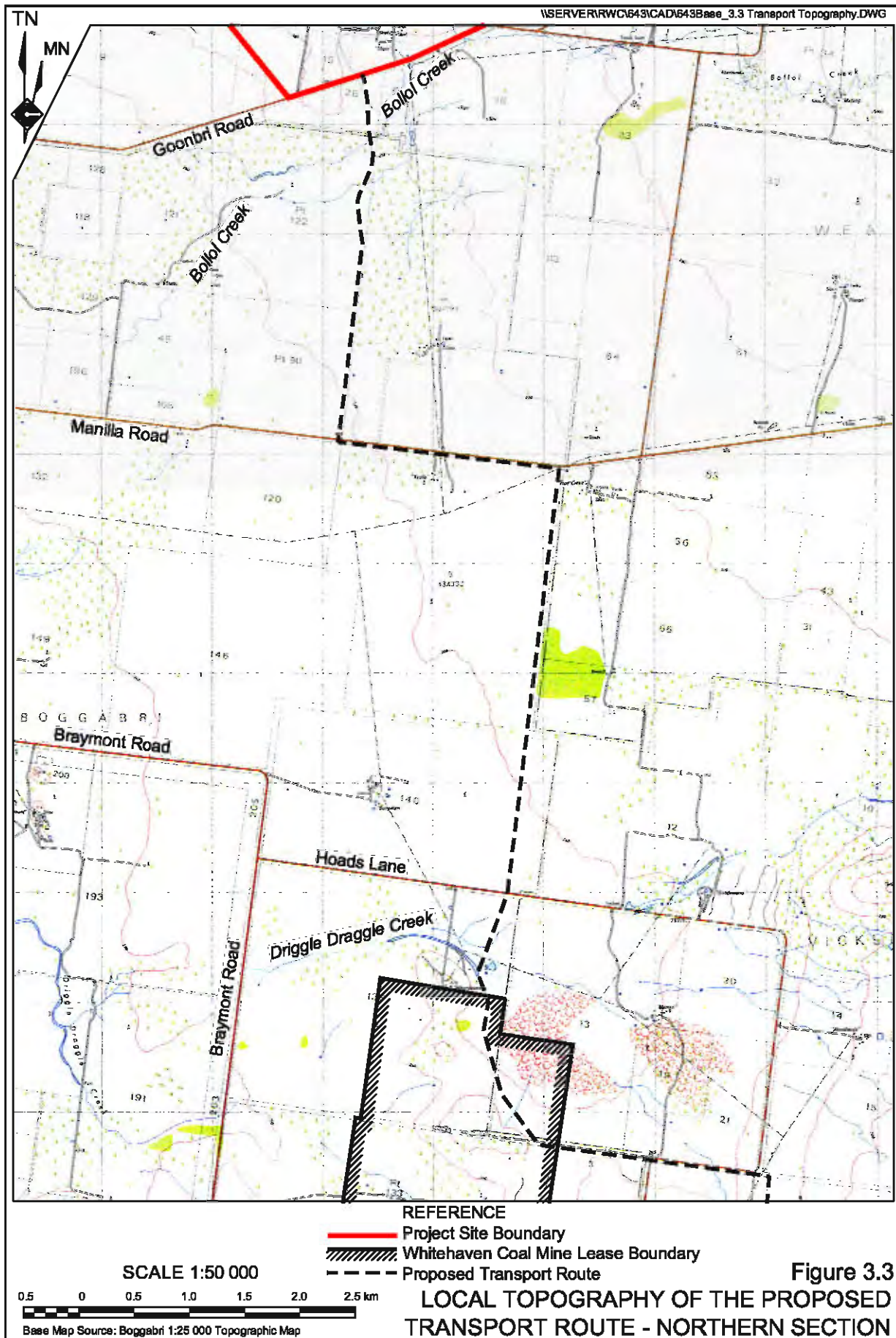
SCALE 1:125 000



Base Map Source: Boggabri 1:100 000 Topographic Map

**Figure 3.1**  
**REGIONAL TOPOGRAPHY**





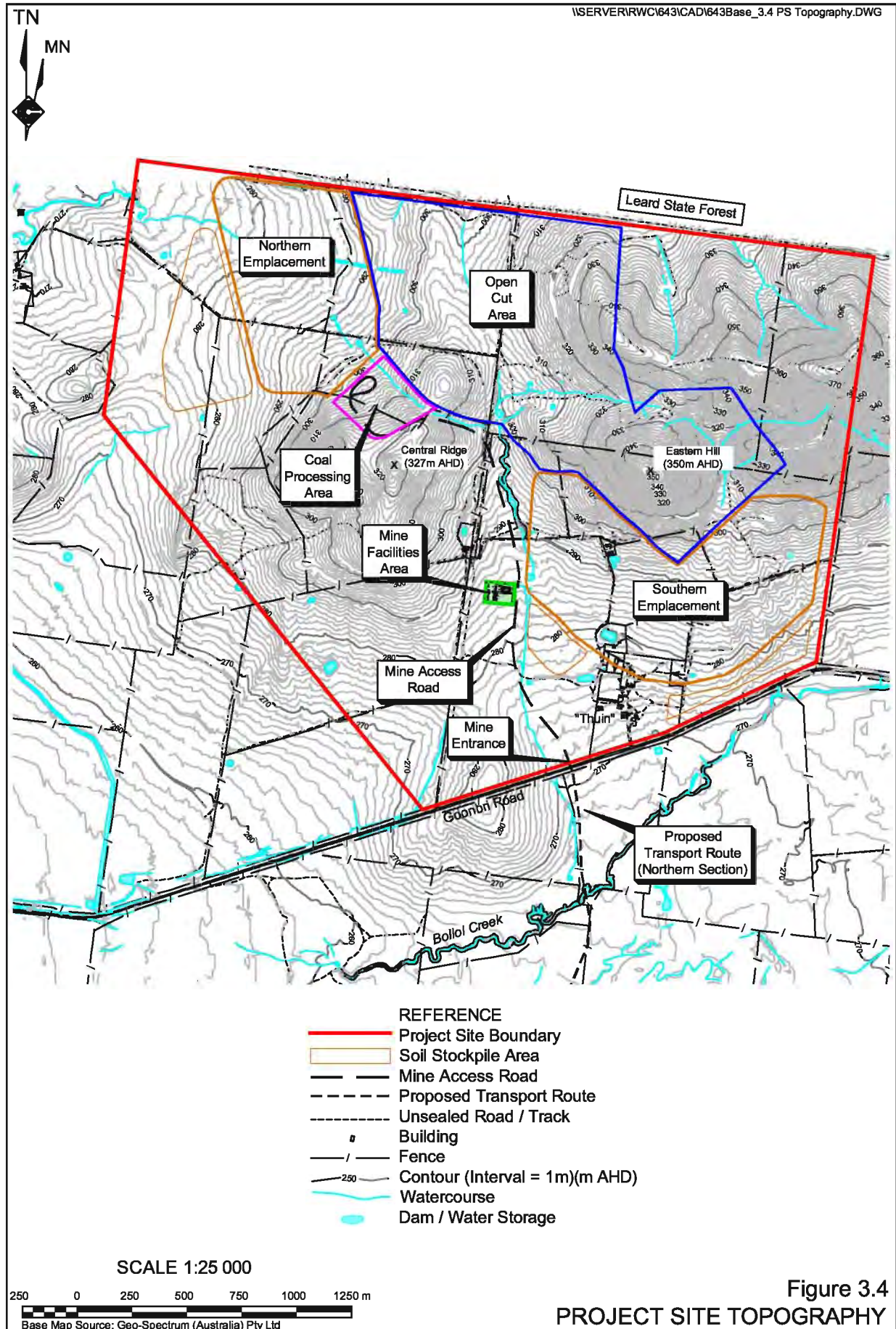


Figure 3.4  
PROJECT SITE TOPOGRAPHY



### 3.1.4 Proposed Transport Route Topography

Elevations along the northern section of the proposed transport route between the Project Site and the Whitehaven Coal Mine range between 260m AHD and 270m AHD with a slope  $<1^\circ$ , generally northeast to southwest, over the entire route. Further south along the southern section of the proposed transport route, the land slopes generally to the south towards the Namoi River where the elevation is typically approximately 250m AHD.

## 3.2 GEOLOGY

### 3.2.1 Regional Geology

Geologically, the Project Site is located in the Gunnedah Basin (**Figure 1.6**), which contains sedimentary rocks, including coal measures, of Permo-Triassic age. The Gunnedah Basin forms the central part of the Permo-Triassic Sydney-Gunnedah-Bowen Basin system which extends along the eastern margin of Australia. The basin is, in part, unconformably overlain by the Jurassic strata of the Surat Basin. A north-south-trending ridge of Early Permian volcanic rocks, the Boggabri Ridge, divides the Gunnedah Basin into two sub-basins as presented in **Figure 1.6**, namely:

- the Maules Creek Sub-basin to the east; and
- the Mullaley Sub-basin to the west and south.

On its western and southern margins, the Maules Creek Sub-basin laps onto the Boggabri Ridge, while to the east, this sub-basin is bounded by the Hunter-Mooki Thrust. To the north the Sub-basin continues at depth below overlying basaltic rocks of the Mount Kaputar Volcanic Complex.

The Maules Creek Sub-basin contains a multi-seam coal resource (the Maules Creek Formation) in a sedimentary section dominated by lithic conglomerate, lithic sandstone, siltstone, minor claystone, coal seams and localised volcanic rocks, mainly of Early Permian age. The formation is interpreted as being deposited primarily in a braided fluvial system. The coal seams are generally thicker and closer together along the western side of the basin. To the east and southeast, the coal seams are split by an increasingly thick section of clastic rocks. Large portions of this sub-basin are covered by recent alluvial deposits, particularly in the centre and to the east. Coal from the Maules Creek Formation is currently mined at the Whitehaven Coal Mine.

### 3.2.2 Local Geology

The description of the local geology of the proposed East Boggabri Coal Mine is drawn from information contained within SRK 2004.



The Project Site is located on the western side of the Maules Creek Sub-basin where it laps onto the Boggabri Volcanics (Boggabri Ridge). At this point, the Maules Creek Formation subcrops on the low hills in the vicinity of the boundary between EL 5967 and CL 368 but is obscured by extensive deposits of unconsolidated Quaternary alluvium (up to 50m thick) over the central and southern parts of EL 5967. Below the Maules Creek Formation are the Goonbri and Leard Formations, basal units of the Gunnedah Basin sedimentary sequence, which unconformably overlie the Boggabri Volcanics (the Leard Formation is identified on **Figure 3.5**). The Leard Formation outcrops in Leard State Forest to the northwest of the Project Site while there are no known local outcrops of the Goonbri Formation.

The Boggabri Volcanics and variably developed Leard and Goonbri Formations, dip gently to the east for a short distance before dropping away steeply. As the dip steepens, the thickness of the Maules Creek Formation increases from approximately 200m below the Project Site to in excess of 400m at the eastern edge of EL 5967 and 800m below the Hunter-Mooki Thrust. A cumulative thickness of more than 20m of coal is developed in coal seams of the Maules Creek Formation which subcrop or are near surface as they lap onto the Boggabri Ridge (see **Figure 3.5**).

### **3.2.3 Coal Seam Geology**

The coal seams of the Maules Creek Formation range in thickness up to 4.0m with an average thickness of 1.5m. Significant conglomerate interburden up to 40m thick between the Nagero and Northam Seams divides the coal seams of the Maules Creek Formation into two main groups. The comparatively shallower coal seams present above this conglomerate interburden layer have been recognised to have mineable potential by open cut methods and comprise, in descending order, the Braymont, Bollol Creek, Jeralong, Merriown, Velyama and Nagero seams. The deeper seams below the thick conglomerate layer may be recoverable by underground mining methods and include the Northam, Therribri, Flixton and Tarrawonga Seams.

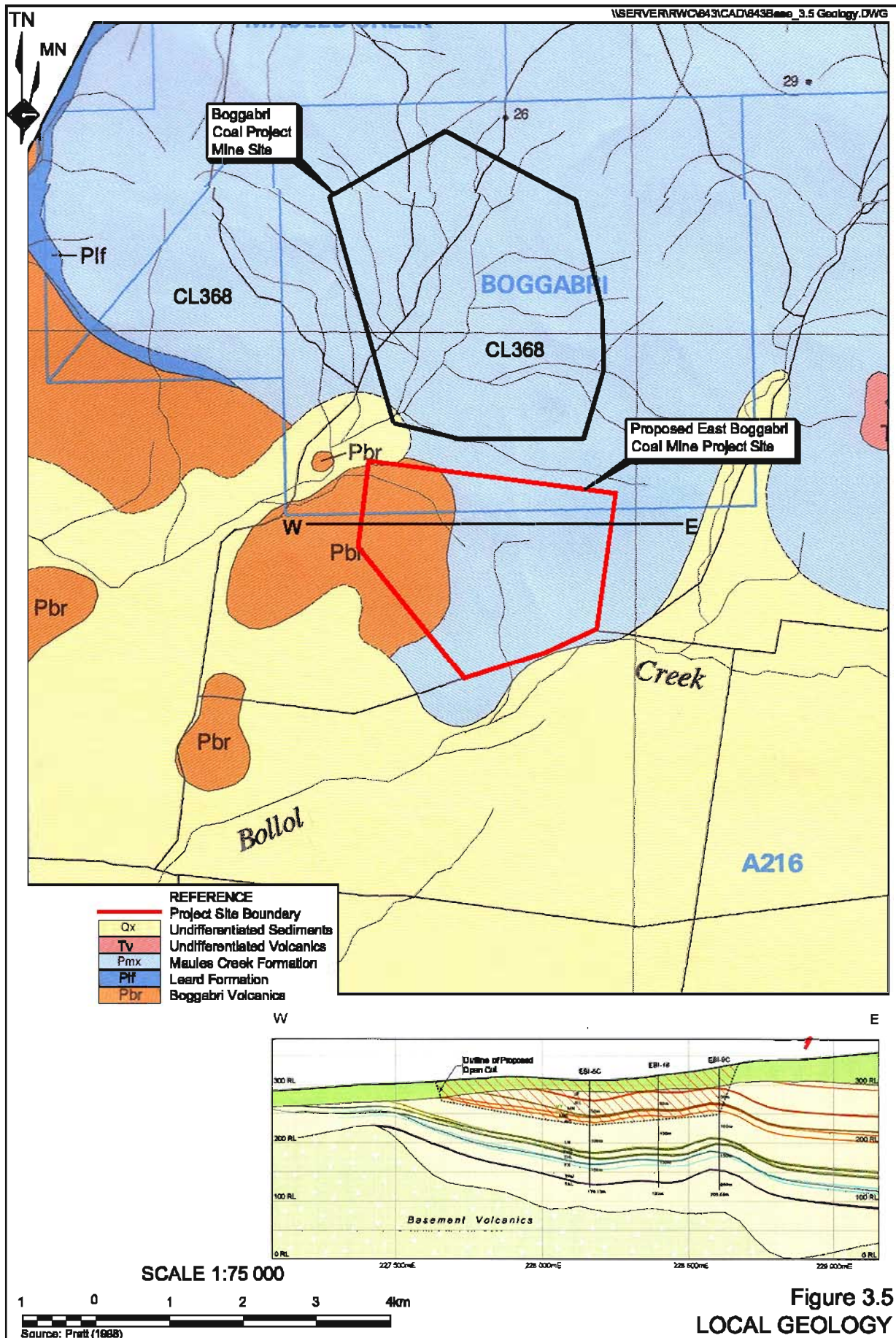
The strike and dip of the coal seams of the Maules Creek Formation are largely controlled by the pre-Permian basement surface. This feature is likened to the edge of the continental shelf, whereby the basement outcrops to the west, dips gently towards the east for a distance before dipping sharply, almost sub-vertically, resulting in a thickening of the Permian formations (Boggabri Volcanics and Maules Creek Formation). Beneath the Project Site, the coal seams strike generally in a north-south direction and dip to the east. The strike direction of the coal seams changes to almost east-west towards Leard State Forest. Given the change in direction of the coal seam strike, it is likely that small faults would be found accommodating the stresses associated with the tectonic forces required to change the strike direction (Hannah, 2002).

## **3.3 METEOROLOGY**

### **3.3.1 Introduction**

The Gunnedah/Boggabri area is situated between the tropical and temperate climatic zones, between the belts of the sub-tropical highs and the zone of mid-latitude westerlies. In summer, synoptic highs dominate the climate. Low pressure systems pass at regular intervals bringing milder temperatures and winds from the southerly quadrant. The climate is also influenced by substantial mountain ranges located to the east and south, and to a lesser extent to the west.





### 3.3.2 Source of Data

The following summaries of meteorological information for the Project Site have been derived principally from long term data collected by the Bureau of Meteorology at Stations No. 055023 and No. 055024 in Gunnedah (Gunnedah Pool Station and Gunnedah Soil Conservation Research Station respectively). Only rainfall data was available at the Bureau of Meteorology Boggabri Station (Station No. 055268) which is approximately 25km from the Project Site. Similar weather patterns are experienced in Gunnedah and Boggabri and as such, the data obtained from the two Gunnedah stations is considered to provide sufficiently accurate information on Project Site weather for the purpose of this EIS.

Data collected from each of the above stations is as follows.

Station 055023	:	temperature, rainfall, relative humidity, fog and frost frequency and wind (9:00am and 3:00pm).
Station 055024	:	pan evaporation.
Station 055268	:	rainfall.

Information describing continuous wind speed and direction has been largely based upon observations from the Whitehaven Coal Mine meteorological station located near the northern boundary of ML 1471 (see **Figure 1.7**). This has been used by RHA (2005) to generate annual and seasonal wind roses for the Project Site using The Air Pollution Model (TAPM). Garradd (1997) has also been sourced with respect to temperature inversions.

With the exception of continuous wind data, all meteorological data is summarised in **Table 3.1**.

### 3.3.3 Temperature

The data summarised in **Table 3.1** indicates that the area is characterised by mild to hot summers and cool winters. December, January and February are the warmest months with mean daily maximum temperatures approximating 33.5°C. July is the coldest month with a mean daily minimum of 2.9°C. Autumn and spring are generally mild with occasional erratic temperature fluctuations. Mean diurnal temperature variation is relatively constant throughout the year at about 15°C.

### 3.3.4 Rainfall

Rainfall in the local area results from the passage of one of three major synoptic systems, or from localised convective thunderstorms, namely:

- the regular passage of cold fronts across NSW, whenever these fronts extend north into the area; or
- the passage of moist upper atmosphere low cells into the area from Queensland; or
- the passage of inland tropical cyclones or low pressure systems which have been located over the Pacific Ocean.



**Table 3.1**  
**Mean Monthly Meteorological Data**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<b>TEMPERATURE (°C)</b>													
Gunnedah Pool (Station No. 055023) – 115 Years of Records													
Mean Maximum	34.0	32.9	30.8	26.4	21.2	17.5	16.7	18.9	22.7	26.6	30.2	33.0	
Mean Minimum	18.3	18.1	15.8	11.4	7.1	4.2	2.9	4.1	6.9	10.6	14.0	16.8	
<b>RAINFALL (mm)</b>													
Boggabri (Station No. 055268) – 38 Years of Records													
Mean	107.0	65.4	47.0	41.7	60.7	38.0	51.6	36.7	38.0	58.0	65.6	64.3	675.9
Median	89.8	45.2	30.2	15.0	49.0	31.6	48.3	35.6	30.8	50.5	59.2	54.8	691.5
Mean Rain Days	5.9	4.6	3.8	3.7	4.8	4.3	4.8	4.6	4.9	5.6	6.2	57	59.0
Highest	351.6	251.4	186.7	246.3	235.0	94.0	208.8	121.2	122.8	211.8	199.6	189.2	1 011.4
Lowest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	312.2
Gunnedah Pool (Station No. 055023) – 125 Years of Records													
Mean	72.4	65.9	48.5	38.2	43.3	42.5	42.3	41.9	39.5	55.6	59.9	66.3	616.4
Median	53.9	50.2	34.4	32.5	33.1	36.3	33.3	35.7	32.6	52.4	52.8	50.2	619.9
Mean Rain Days	6.5	6.0	4.7	4.3	5.3	6.2	6.2	6.2	5.8	6.9	6.7	6.9	71.7
Highest	301.0	253.5	367.6	151.4	171.2	172.5	177.8	138.5	128.0	161.2	259.3	185.4	
Lowest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.3	0.0	
<b>EVAPORATION (mm)</b>													
Gunnedah Soil Conservation Research (Station No. 055024) – 19 Years of Records													
Mean Monthly Pan Evaporation *	238.7	187.6	186.0	129.0	83.7	57.0	58.9	83.7	117.0	164.3	198.0	244.9	1 752
<b>RELATIVE HUMIDITY (%)</b>													
Gunnedah Pool (Station No. 055023) – 32 Years of Records													
Mean 9:00am	61	65	64	67	73	78	77	71	65	61	58	57	67
Mean 3:00pm	43	43	44	46	52	55	53	48	43	43	39	38	46
<b>WINDS km/hr</b>													
Gunnedah Pool (Station No. 055023) – 41 Years of Records													
Mean 9:00am Wind Speed	7.7	8.4	8.2	6.7	5.8	5.8	5.4	5.8	6.8	8.0	7.9	7.3	7.0
Mean 3:00pm Wind Speed	9.8	9.1	9.7	8.7	7.7	9.2	10.2	11.0	11.0	10.5	11.2	10.5	9.9
<b>FROST FREQUENCY (DAYS/MONTH)</b>													
Gunnedah Pool (Station No. 055023) – 32 Years of Records													
Mean Monthly	0.0	0.0	0.0	0.0	1.0	3.8	3.8	5.0	1.2	0.0	0.0	0.0	
<b>FOG FREQUENCY (DAYS/MONTH)</b>													
Gunnedah Pool (Station No. 055023) – 32 Years of Records													
Mean Monthly	0.1	0.0	0.0	0.1	0.3	0.4	0.4	0.1	0.3	0.1	0.0	0.1	
Source:	Bureau of Meteorology										*Based on daily data		

Of these, the latter two principally occur in the warmer months when convectional storms are also most frequent and result in the majority of the area's total rainfall. Falls during this period are often of high intensity.

Mean and median monthly rainfall for Boggabri and Gunnedah are presented in **Table 3.1**, with the difference between the median and mean rainfalls due to the influence of very high or very low rainfall events which are not expected with sufficient frequency to affect the median, but which have a significant effect on the mean. Consequently, the median value is considered to be a better estimate of monthly rainfall expectancy. **Table 3.1** shows that highest rainfalls recorded at Boggabri occur during Spring and Summer with January having the highest median rainfall of 89.8mm. March and April are the driest months with median rainfalls of 30.2mm and 15.0mm respectively. On average, Boggabri experiences 59 rain days per year.



A statistical review of rainfall records has identified that for a dry year (10<sup>th</sup> percentile rainfall event) the annual rainfall is 373.6mm. For a wet year (90<sup>th</sup> percentile rainfall event) the annual rainfall is 843.4mm.

### 3.3.5 Wind

The features of the winds experienced around the Project Site are described in this sub-section using a summary of the 2003 annual wind behaviour recorded at the nearby Whitehaven Coal Mine and The Air Pollution Model (TAPM) software developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO). Annual and seasonal wind roses compiled from this data and software are presented in **Figure 3.6**. TAPM is a prognostic model used to predict three-dimensional meteorological data. Records from the Whitehaven Coal Mine meteorological station were included along with general information on local terrain, vegetation and soil type, and synoptic scale meteorological analyses to generate the 2003 wind roses. For further information on TAPM, see Part 8 of the *Specialist Consultant Studies Compendium*.

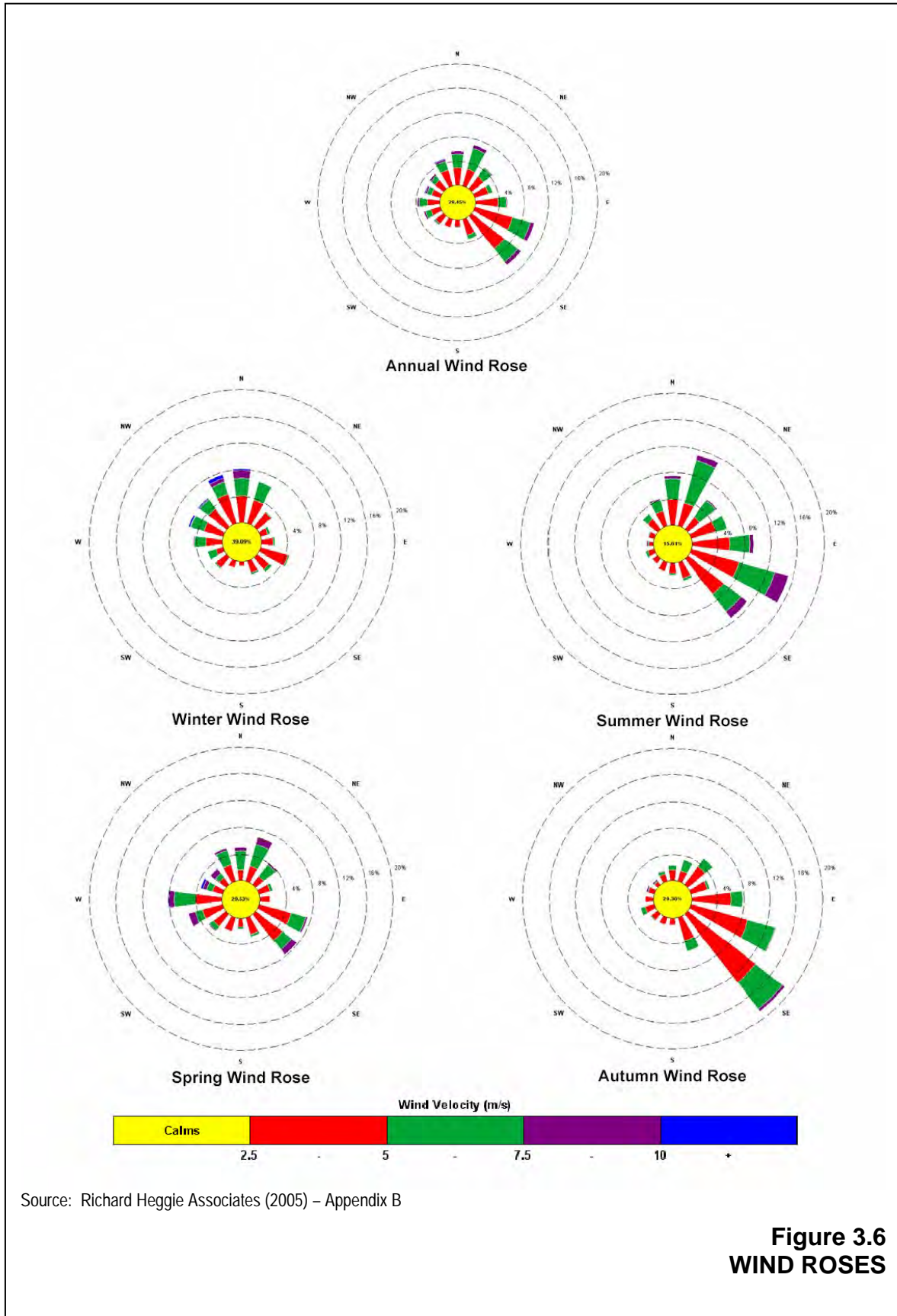
The annual wind rose indicates that the Project Site would tend to experience mild winds (average wind speed of between 2.5m/s and 5m/s) from the southeast and east-southeast through the year. Seasonal variations include the following.

- In winter, mild northwest and north-northwest winds are experienced approximately 10% of the time.
- In spring, moderate winds (average wind speeds of between 2.5m/s and 7.5m/s) are present from the east-southeast (7% of the time), west (6% of the time) and north (5% of the time).
- In summer, moderate winds occur predominantly from the east-southeast (16% of the time), southeast (10% of the time) and north-northeast (10% of the time).
- In autumn, moderate winds from the southeast and east-southeast prevail, occurring 15% of the time.

It is noted that an analysis of data from the Whitehaven Coal Mine meteorological station suggests the prevailing wind conditions at this site (10km south of the Project Site) are either predominantly calm (during summer and autumn) or from the east-northeast (evening and night-time winds during winter and spring). Whilst the predicted wind conditions for the Project Site are based on observed winds at from the Whitehaven Coal Mine meteorological station, the variation in observed and predicted prevailing winds is probably best explained by local topographic features on and surrounding the Project Site. Notably, the Willowtree Range in Leard State Forest to the north may influence the wind conditions of the Project Site.

The prevailing meteorological conditions are indicative of moderately stable Class “D” conditions (see Part 8 *Specialist Consultant Studies Compendium*), with conditions particularly stable in the winter months. Atmospheric stability refers to the tendency of the atmosphere to resist or enhance vertical motion of air particles. The Pasquill-Gifford-Turner assignment scheme identifies six Stability Classes, “A” to “F”, to categorise the degree of atmospheric stability.





Source: Richard Heggie Associates (2005) – Appendix B

**Figure 3.6**  
**WIND ROSES**



Stability Class “A” represents highly unstable conditions that are typically found during summer and categorised by strong winds and convective conditions. Conversely, Stability Class “F” relates to highly stable conditions, typically associated with clear skies, light winds and the presence of a temperature inversion. Classes “B” through to “E” represent conditions intermediate to these extremes.

### 3.3.6 Relative Humidity

The relative humidity in the Boggabri/Gunnedah area is typical of a warm temperate climate. Mean 9:00am relative humidities range from approximately 57% in late spring and early summer to 78% in early winter. Mean 3:00pm relative humidities range from between 38% and 43% in late spring and early summer to 52% to 55% in late autumn and early winter.

### 3.3.7 Evaporation

Mean monthly evaporation observed at the Gunnedah Soil Conservation Research Station (No. 055024) is greatest from November to March and corresponds to the months of highest temperatures and lowest relative humidities. During each of these months, evaporation exceeds 180mm. Mean monthly evaporation is least during June and July at 57.0mm and 58.9mm respectively. Average evaporation exceeds rainfall in all months and exceeds median annual rainfall by a factor of nearly three.

### 3.3.8 Temperature Inversions

Temperature inversions are significant noise enhancing phenomena and are often expressed as fogs and/or frosts. Temperature inversions invariably occur of an evening with clear skies and when wind speeds are low or calm conditions prevail. Temperature inversions normally disappear early the following morning.

**Table 3.1** shows that frosts generally occur in the Gunnedah area between May and September. Fogs may occur at any time of year but are a rare phenomenon. In a detailed review of the meteorology of the Gunnedah area, Garradd (1997) noted that “surface inversions might be expected on 50% or more nights throughout the year”. An assessment of inversion occurrence at the nearby Whitehaven Coal Mine during 2001 showed a similar result to that identified in Garradd (1997), with inversions occurring on in excess of 40% of nights. Night-time inversions generally prevail from about 8:00pm. During the daytime, ie. 7:00am to 6:00pm, inversions occurred at the Whitehaven Coal Mine site on less than 1% of summer, autumn and spring days and on approximately 3% of winter days, but only prevailed to approximately 8:00am before dissipating. Given the proximity of the Whitehaven Coal Mine to the Project Site, it is expected inversion events would occur at a similar frequency.



## 3.4 LAND OWNERSHIP, SURROUNDING RESIDENCES AND LAND USE

### 3.4.1 Introduction

In order to assess the impact the development and operation of the proposed East Boggabri Coal Mine would have on the surrounding biological, physical and social environment, an understanding of the number and location of surrounding landholdings and residences along with the current and potential land uses is required. This sub-section identifies the landholdings and residences in the vicinity of the Project Site and the northern and southern sections of the proposed transport route. The sub-section also presents the proximity of surrounding residences to the proposed areas of activity and provides an overview of the land uses both in the local area and surrounding the Project Site.

### 3.4.2 Land Ownership and Surrounding Residences

#### 3.4.2.1 The Project Site and Surrounds

The East Boggabri joint venture partners own the freehold land within the Project Site within the properties of “Thuin”, “Nagero”, and “Forest View”. Leard State Forest, owned by the Crown, is located to the immediate north while the “Bollol Creek Station” property, owned by J. Picton, shares a common boundary with the Project Site along the southern section of the eastern Project Site boundary.

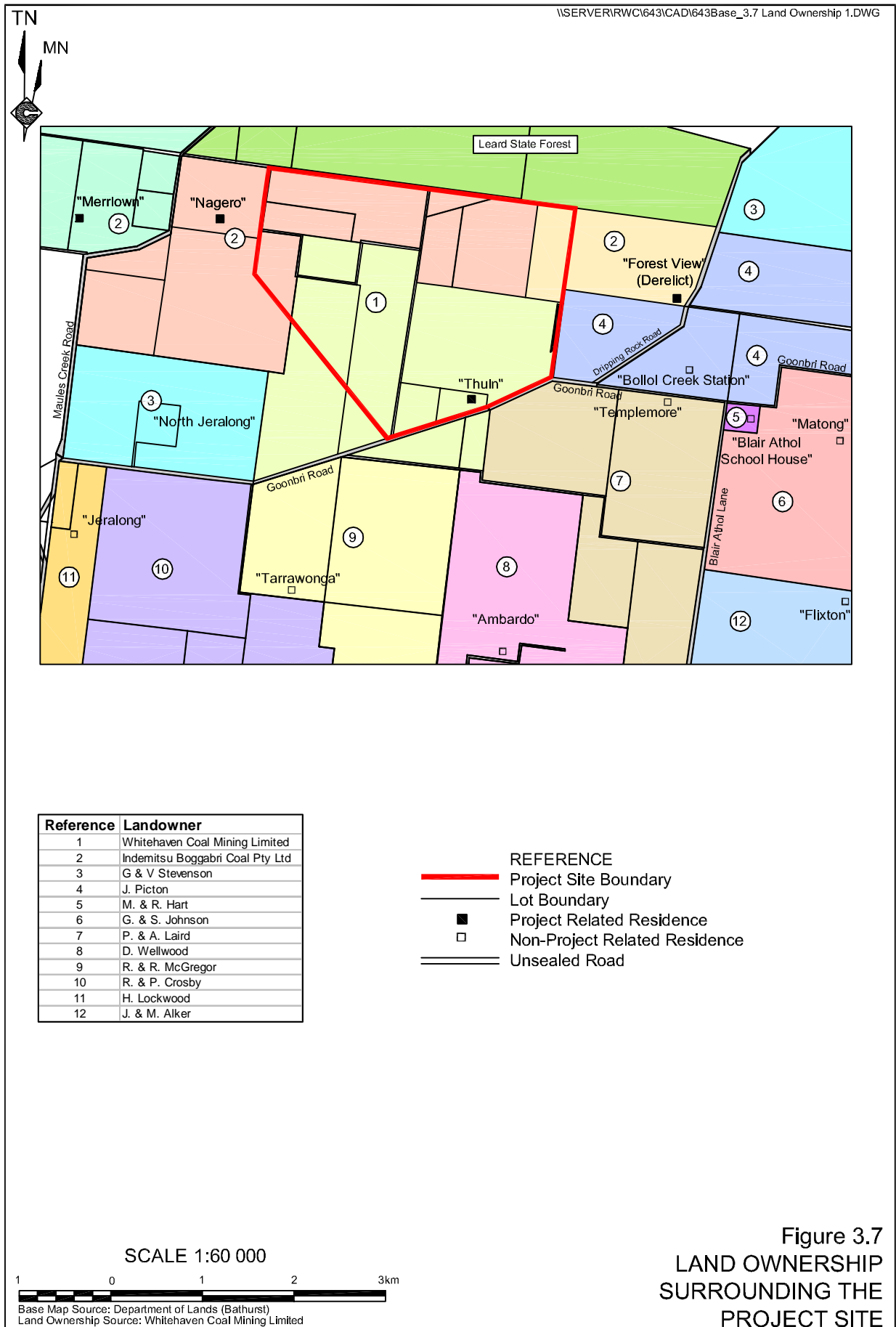
**Figure 3.7** presents the ownership details of these and other properties surrounding the Project Site. Each of the non-project related residences identified on **Figure 3.7** is listed in **Table 3.2** together with the distance to the closest proposed mining or processing activities in Year 1 and Year 6. Of the non-project related residences, “Templemore” would be the closest to mining and activities (1 420m during Year 6). It is noted that the residences on “Merriown”, “Nagero”, Thuin” and “Forest View” are referred to as project-related as they are owned by either WCM or IBC.

**Table 3.2**

**Proximity of Non-Project Related Residences Surrounding the Project Site**

Property Name*	Closest distance to mining/processing activity (m)	
	Year 1	Year 6
“Jeralong”	4 200	4 000
“Tarrawonga”	3 650	3 030
“Ambardo”	4 230	2 890
“Templemore”	3 100	1 420
“Bollol Creek Station”	3 100	1 520
“Matong”	5 000	3 320
“Blair Athol School House”	4 100	2 440
* See Figure 3.7		





### 3.4.2.2 Proposed Transport Route

**Figure 3.8** presents the land ownership on and surrounding the northern section of the proposed transport route. The northern section traverses two properties not owned by the Proponent and crosses one road reserve (with a permit), two public roads (Manilla Road and Hoads Lane) and an unformed road. It is noted that the Proponent has an agreement with the owners of the “Tarrawonga” and “Kyalla” properties to allow a section of the proposed transport route to traverse their properties. However, it remains the Proponent’s intention to satisfy transport noise criteria at the residences on these properties.

**Table 3.3** lists the five non-project related residences within 2km of the northern section of the proposed transport route. The closest residences to this section of the proposed transport route are “Kyalla” and “Pine Grove” at distances of 200m and 250m respectively.

**Table 3.3**

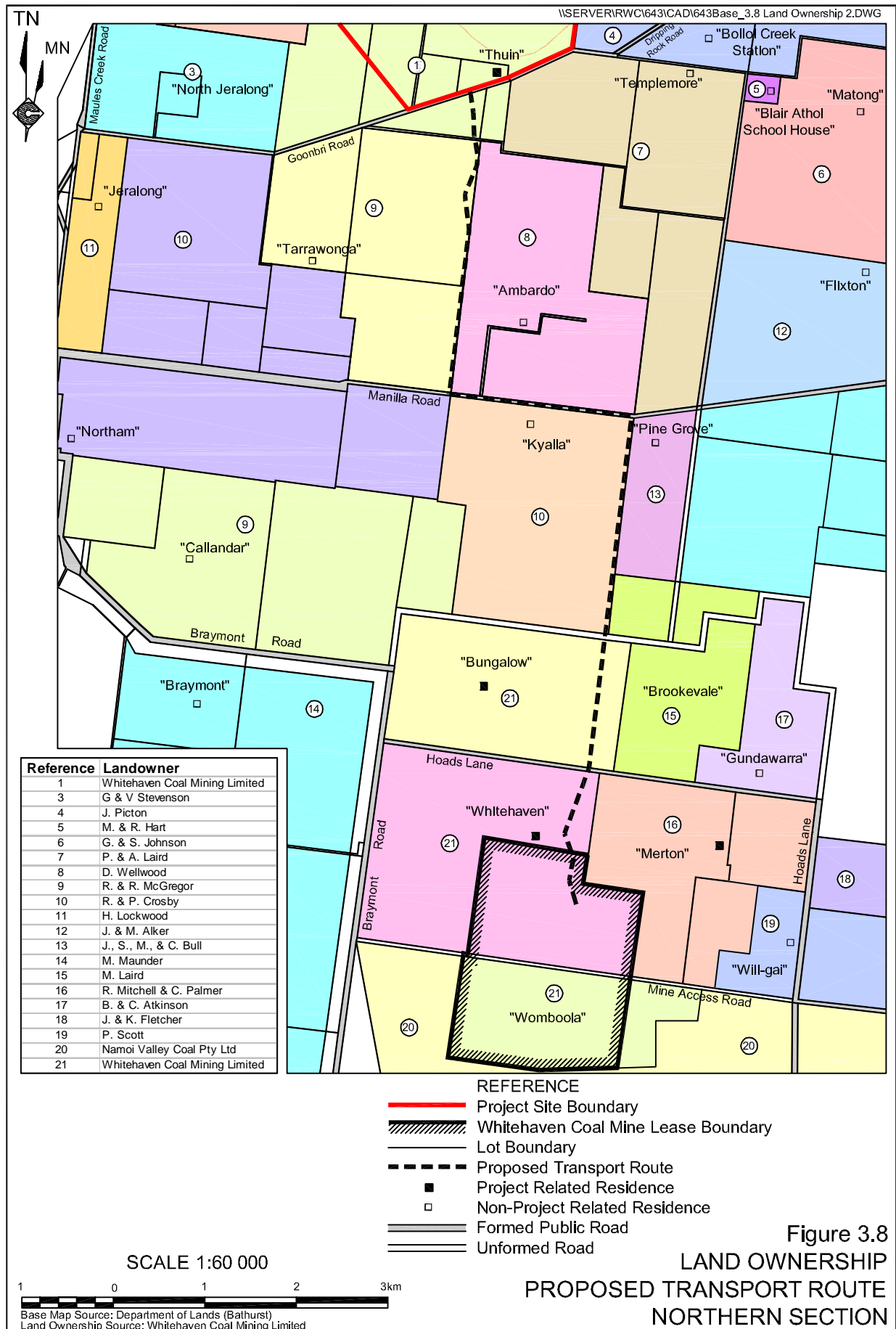
#### Non-Project Related Residences within 2km of the Proposed Transport Route

Ref	Property Name	Distance to Proposed Transport Route (m)
<b>Northern Section<sup>@</sup></b>		
8	“Ambardo”	720
9	“Tarrawonga”	1 700
10	“Kyalla”	200
13	“Pine Grove”	250
17	“Gundawarra”	1 950
<b>Southern Section<sup>#</sup></b>		
19	“Will-gai”	280
22	“Tralee” (Derelict)	100
25	“Nalya”	600
26	“Weroona”	330
28	“Wood-End”	1 340
29	“Eldorado”	1 230
30	“Brooklyn”	70
35	“Tarcoola”	1000
36	Unnamed	700
<sup>@</sup> See Figure 3.8		<sup>#</sup> See Figure 3.9

A total of eight occupied residences are located within 2km of the southern section of the proposed transport route which is already used for the transportation of coal between the Whitehaven Coal Mine and Whitehaven CHPP and rail loading facility (see **Figure 3.9**). A further six residences are set back between 2km and 3km from the southern section of the proposed transport route. The distances of each residence from either Hoads Lane or Blue Vale Road are listed in **Table 3.3**. Residences closer to the Kamilaroi Highway than the proposed transport route have been excluded from **Table 3.3** given noise levels at those residences would be more influenced by highway traffic noise.

It is noted from **Table 3.3** that the closest inhabited residences to the southern section of the proposed transport route are “Brooklyn” (70m), “Will-gai” (280m) and “Weroona” (330m).





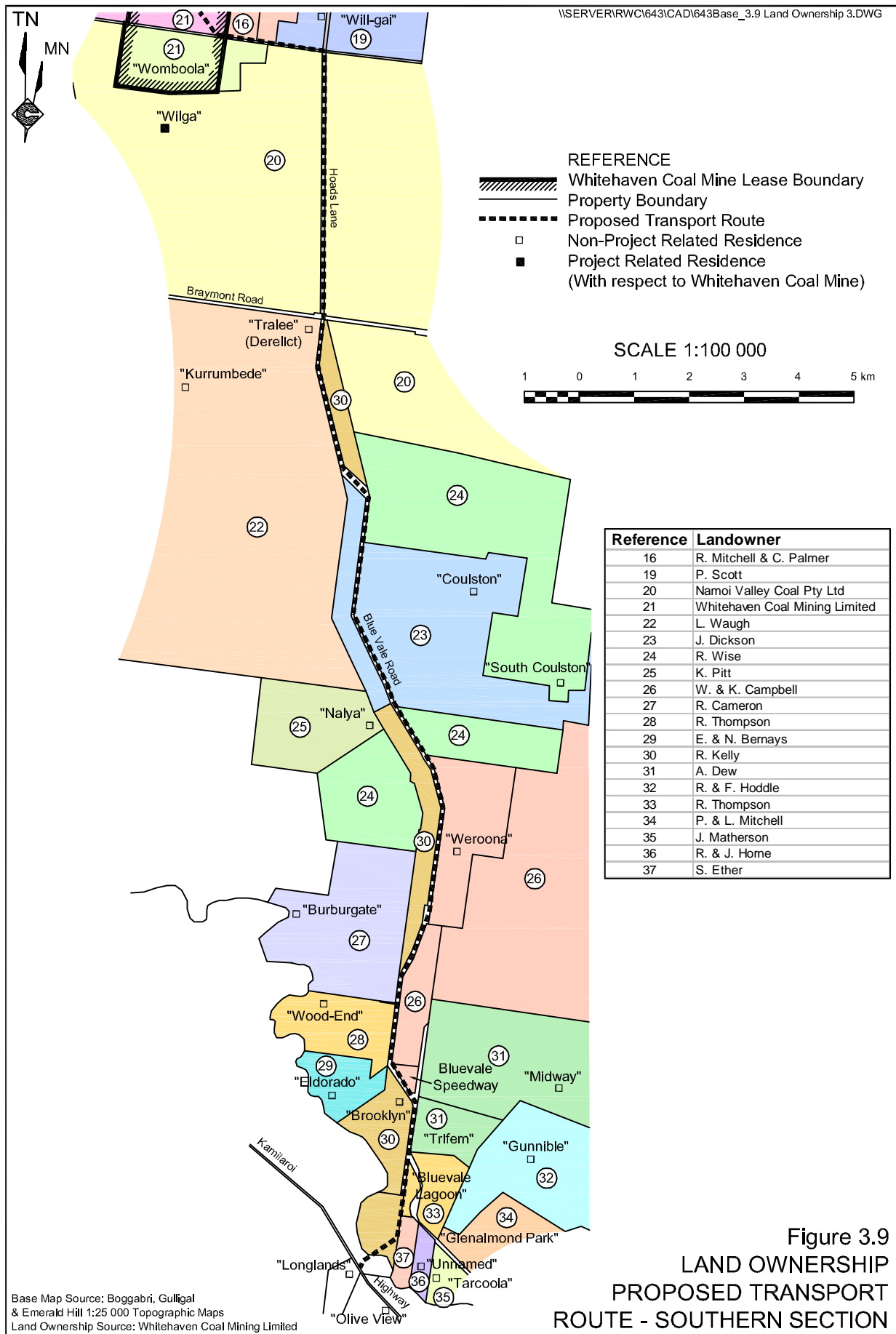


Figure 3.9  
LAND OWNERSHIP  
PROPOSED TRANSPORT  
ROUTE - SOUTHERN SECTION



### 3.4.3 Land Use

#### 3.4.3.1 The Project Site and Surrounds

Immediately to the north of the Project Site is Leard State Forest. In a recent decision by the State government (5 May 2005) identifying new community conservation areas in the Brigalow Belt South and Nandewar Bioregions, Leard State Forest was declared as within a Zone 4 community conservation area. Forestry, recreation and mineral extraction are permissible land use categories within this zone.

On the Project Site itself and other properties to the east, south and west of the Project Site, land use is best described as agricultural, primarily cattle grazing and cereal/fodder cropping.

The land uses on each of the properties within and surrounding the Project Site are as follows.

#### Project Related Properties

- “Thuin” – cattle grazing in rotation with cropping. The property also retains a piggery although this is not a current land use.
- “Forest View” – cattle grazing and some cropping.
- “Nagero” – cattle grazing in rotation with cropping.
- “Merriown” – cattle grazing in rotation with cropping.

#### Non-Project Related Properties

- “Templemore” – cattle grazing in rotation with cropping.
- “Jeralong” – cattle grazing in rotation with cropping.
- “Tarrawonga” – cattle grazing in rotation with cropping.
- “Pine Grove” – mixed farming
- “Kyalla” – cattle grazing in rotation with cropping.
- “Ambardo” – cattle grazing in rotation with cropping.
- “Northam” – cattle grazing in rotation with cropping.
- “Bollol Creek Station” – cattle grazing in rotation with cropping.

Whilst it is not considered any of these agricultural land uses would be sensitive to mining or the mining-related activities proposed, these activities, if not properly managed, have the potential to impact on the nature conservation land use of Leard State Forest. The potential impacts on all current and future land uses is further discussed in Section 4.12.



### 3.4.3.2 Proposed Transport Route

The principal land uses adjacent to the northern section of the proposed transport route are as follows.

#### Project Related Properties

- “Bungalow” – cattle grazing.
- “Whitehaven” – mining within ML 1471 and cereal/fodder cropping in rotation with sheep production external to ML 1471.

#### Non-Project Related Properties

- “Pine Grove” – mixed farming
- “Kyalla” – cattle grazing in rotation with cropping.
- “Northam” – cattle grazing in rotation with cropping.

The land uses adjacent to the southern section of the proposed transport route are also predominantly agricultural, although in the vicinity of the Whitehaven Coal Mine, the land within the former Vickery Coal Mine is still predominantly subject to post-mining revegetation. The only non-agricultural use adjacent to Blue Vale Road between the Whitehaven Coal Mine and the Whitehaven CHPP is the Blue Vale Speedway which is used mainly of a weekend.

## 3.5 BUSHFIRE HAZARD

Much of the Project Site has been cleared for agricultural activities and would be expected to exhibit a low bushfire hazard. The Project Site does, however, contain areas where an open woodland with White Cypress Pine regrowth is prevalent. The vegetation along and adjacent to the proposed transport route similarly comprises a mixture of cleared areas and small patches of native woodland vegetation.

To assess the bushfire hazard of the Project Site, a Type A assessment for bushfire prone areas (NSW RFS, 2001) was performed. The vegetation was categorised as open woodland (despite the fact that much of the Project Site has been cleared for agricultural purposes) with the terrain categorised as predominantly level (0° to 5°) rising to hilly (5° to 10°). Following the assessment guide of NSW RFS (2001), the Project Site has been assessed as displaying a low-medium hazard rating.

The vegetation of the northern section of the proposed transport route was also categorised as open woodland (despite the fact that much has been cleared for agricultural activities) with the terrain categorised as level (0° to 5°). Following the assessment guide of NSW RFS (2001), the northern section of the proposed transport route has been assessed as displaying a low hazard rating.

Areas like the Project Site and proposed transport route should not be considered in isolation as the bushfire risk of surrounding areas may raise the level of bushfire risk associated with the site. The vegetation of land surrounding the proposed transport route is very similar to that of the route itself and is therefore likely, if anything, to decrease bushfire risk. In contrast, to the north of the Project Site, Leard State Forest contains significant areas of dense woodland / forest vegetation over hilly terrain. This would increase the risk of bushfire on the Project Site although given its largely cleared nature, the risk would not be unacceptably high.

