

Section 4

Environmental Setting

This section describes the environmental setting within and surrounding the Project Site for the proposed Southern Extension of the Calga Sand Quarry.

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 and land ownership.

Other features of the surrounding environment that would or may be affected by the proposed quarry extension are detailed in Section 5 in conjunction with the design and operational safeguards and impact assessment for those features.



This page has intentionally been left blank



4.1 TOPOGRAPHY

4.1.1 Regional and Local Topography

The Project Site lies on an elevated region commonly referred to as the Hunter Plateau which forms part of the dissected Hornsby Plateau. Only gently-sloping ridges or remnants of the once extensive Hunter Plateau remain, surrounded by steep-sided valleys that developed through erosion of the plateau surface since it was uplifted. The plateau area lies between 100m and 200m above the surrounding drainage system. Locally, the Calga area is referred to as part of the Somersby Plateau, a north-south oriented, horse-shoe shaped ridge which has an elevation of between 150m to 200m AHD. Peats Ridge Road, which intersects with the F3 Freeway at Calga and Somersby, is roughly aligned along the top of the horse-shoe shaped Somersby Ridge line.

The landscape surrounding the Project Site is relatively flat to the east and north with elevations generally ranging between 200m AHD and 215m AHD. The landscape to the south and west of the Project Site consists of relatively steep sloping ridges and valleys falling to elevations of 10m AHD adjacent to Cabbage Tree Creek (see **Figure 4.1**).

4.1.2 Project Site Topography

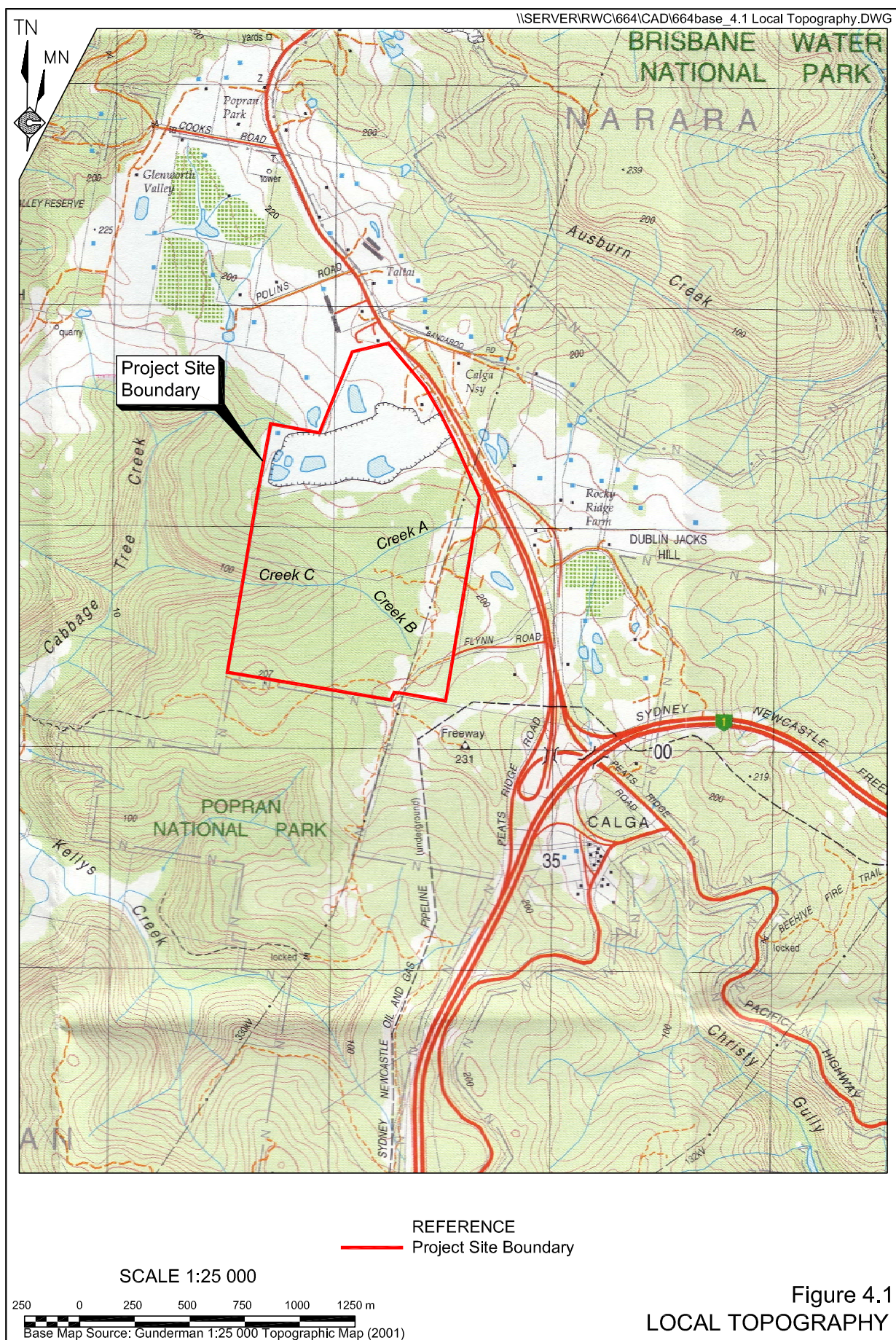
The topography of the proposed Stage 4 and Stage 5 area of the Project Site (see **Figure 4.2**) is dominated by two ephemeral drainage lines (nominated as Creek A and Creek B) which converge to form Creek C and flow towards Cabbage Tree Creek. The eastern boundary of the Project Site is aligned roughly parallel to Peats Ridge Road and represents the most elevated sections of the Project Site. From approximately 210m AHD at the southeastern corner of the Project Site, the topography rises to 225m AHD where Stage 4 adjoins Stage 3 before decreasing to 215m AHD at the northeastern corner of the Project Site. The elevation of the Project Site quickly decreases to the west following Creeks A, B and C.

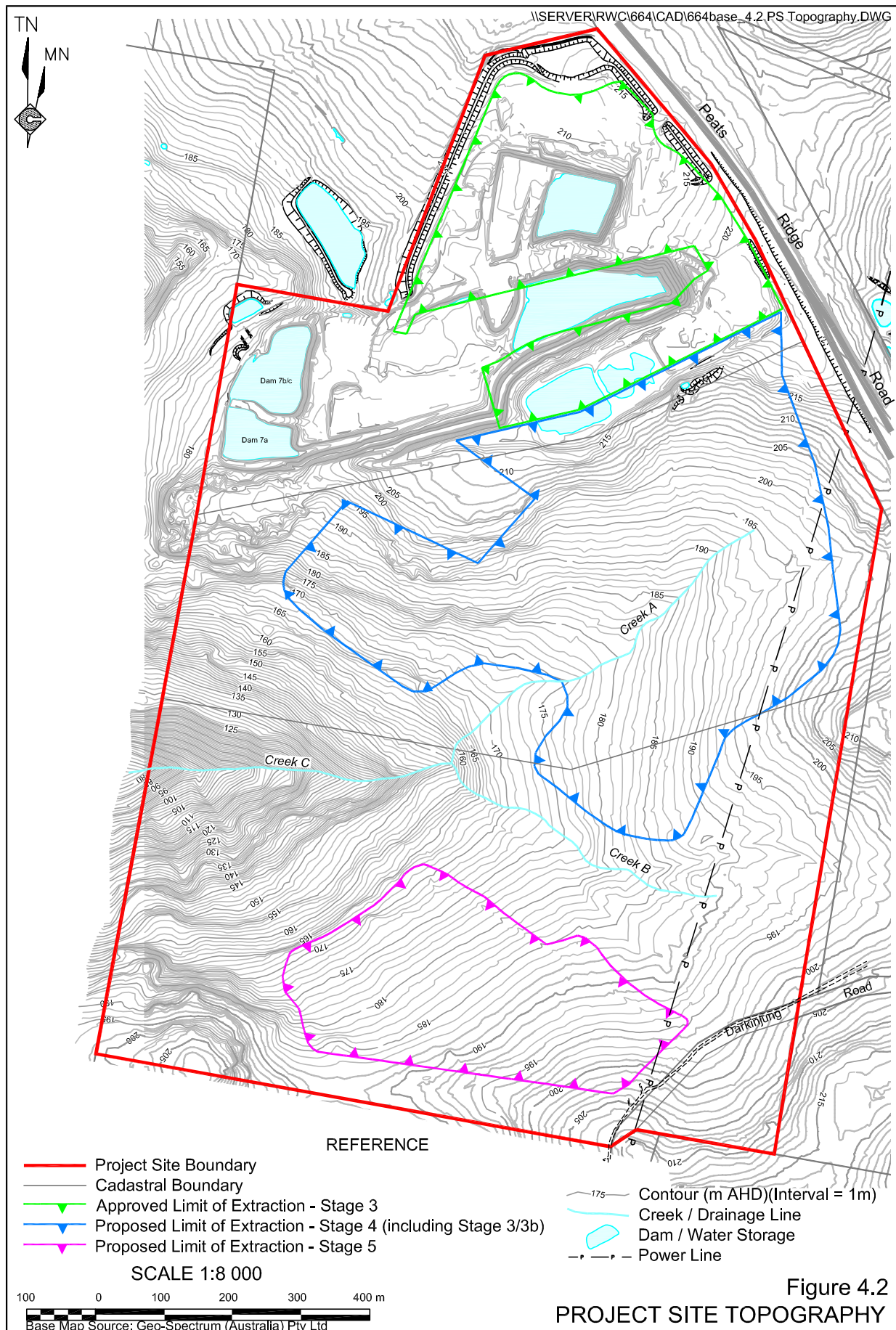
The slopes across the Project Site steadily increase from approximately 5° at the headwaters of Creeks A and B to 8° where the two creeks converge. The topography drops away more rapidly into Creek C, with slopes approaching 20°.

Where the topography drops away rapidly within and adjacent to Creek C, a number of sandstone shelves and caves have been created. These are notable as some archaeological investigations on the Somersby Plateau have often identified Aboriginal artworks, engravings or shelters below, on, or within these shelves and caves.

While the bulk of the Stage 3 extraction area has been altered by quarrying and related activities including the extraction area, water storage dams, silt cells, and stockpiles, the currently undisturbed northern area displays topography similar to the elevated areas of the proposed Southern Extension, ie. gently sloped to the southwest sloping (1° to 4°) with elevations from approximately 200m AHD to 215m AHD.







4.2 METEOROLOGY

4.2.1 Introduction

This section provides a summary of the meteorological data relevant to the Project Site. The information provided in this section has been presented to provide an overview of meteorological conditions within and surrounding the Project Site. Impact assessment undertaken by specialist consultants may include the following data sets, however, may also include additional data sets.

4.2.2 Source of Data

The meteorological data presented in this section has been obtained both from Project Site specific and local Bureau of Meteorology sources as follows.

- i) Rainfall data has been collected at the Project Site since 1994.
- ii) Wind speed and wind direction data has been collected from a meteorological station installed and commissioned at the Calga Sand Quarry in April 2006.
- iii) Rainfall, temperature, humidity, evaporation, wind speed, wind direction and fog and frost frequency has been collected from the Bureau of Meteorology at Peats Ridge Station (No. 61351) at an elevation of 280m AHD, approximately 10.5km to the north of the Calga Sand Quarry.

Meteorological data summarised for the Peats Ridge Station is presented in **Table 4.1**.

4.2.3 Temperature

The Calga area generally experiences warm summers and mild winters with a mean maximum temperature of 26.7°C experienced in January and mean minimum of 6.0°C experienced in July. A relatively stable humidity is experienced at the Project Site with precipitation more likely to fall in the morning as a result.

4.2.4 Rainfall

The climate of the Somersby Plateau can be classified as temperate with coastal influences. Mean monthly and annual rainfall recorded at Peats Ridge Station and the Calga Sand Quarry Meteorological Station are listed in **Table 4.1**.

There is a seasonal factor in the distribution of annual rainfall. During the summer months, convectional lifting of moist coastal air produces showers and storms of greater intensity than winter rains. These are usually of short duration covering isolated pockets, resulting in varied rainfall throughout the warmer months. The months between January and April generally have the higher monthly rainfalls both at Peats Ridge Station (recorded since 1983) and the Project Site (recorded over 12 years: 1994, 1996-1997, 1999-2007).

The driest months at Peats Ridge Station are June, July and September with June, August and September recorded as the driest months since 1994 at the Project Site.



Table 4.1
Mean Monthly Meteorological Data – Peats Ridge/Project Site

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
TEMPERATURE (°C)													
<i>Bureau Of Meteorology Peats Ridge Station (No. 61351) – 24 Years of Records</i>													
Mean Maximum	26.7	26.2	24.4	22.1	19.0	16.3	15.7	17.5	20.3	22.9	23.7	25.8	
Mean Minimum	16.0	16.1	14.5	12.0	9.8	7.1	6.0	6.5	8.5	10.8	12.5	14.8	
Lowest	7.9	8.4	6.2	3.7	1.1	0	-0.1	-0.1	0	1.4	5.2	6.9	
Highest	42.9	39.1	38.9	34.7	26.9	23.6	23.7	28.9	32.7	38.6	40.7	40.8	
RAINFALL (mm)													
<i>Bureau Of Meteorology Peats Ridge Station (No. 61351) – 24 Years of Records</i>													
Mean	127	143	150	137	105	79	72	89	71	91	111	91	1267
Mean Rain Days	13.8	14.2	14.8	11.0	12.9	10.4	10.0	9.2	9.3	10.2	12.8	12.2	140.8
Highest	261	620	338	526	351	302	227	339	185	385	284	225	
Lowest	6.2	36.6	22.4	4.8	4.8	3.6	1.2	0.8	3.9	1.2	18.4	9.2	
<i>Calga Sand Quarry Rain Gauge – 12 Years of Records</i>													
Mean	92.4	177.6	102.7	76.9	66.2	49.4	63.7	49.7	53.8	74.7	66.5	90.4	967.2
Highest	147.0	360.0	188.0	161.5	201.0	109.5	234.5	197.0	165.0	230.0	156.0	223.6	
Lowest	56.0	36.6	19.0	11.5	13.4	4.0	17.0	18.0	3.5	12.0	25.0	19.0	
EVAPOTRANSPIRATION (mm)													
<i>Bureau Of Meteorology Peats Ridge Station (No. 61351) – 24 Years of Records</i>													
Mean	146	118	105	78	59	48	53	78	102	127	135	152	1 200
RELATIVE HUMIDITY (%)													
<i>Bureau Of Meteorology Peats Ridge Station (No. 61351) – 24 Years of Records</i>													
Mean 9:00am	77.5	81.2	81.1	77.7	80.1	77.1	74.5	69.7	64.8	64.5	71.2	73.0	
Mean 3:00pm	64.3	65.8	66.8	66.1	69.1	65.7	60.4	56.3	54.2	57.7	61.0	62.7	
FROST FREQUENCY (DAYS/MONTH)													
<i>Bureau Of Meteorology Peats Ridge Station (No. 61351) – 24 Years of Records</i>													
Mean Monthly	0	0	0	0	0	0.4	1.3	1.1	0.5	0	0	0	
FOG FREQUENCY (DAYS/MONTH)													
<i>Bureau Of Meteorology Peats Ridge Station (No. 61351) – 24 Years of Records</i>													
Mean Monthly	0.3	1.0	0.7	0.4	1.5	1.7	0.5	0.5	0.2	0.1	0.2	0.1	
Source: As noted in table													

The highest monthly rainfall recorded at Peats Ridge Station was 620mm and the lowest 1mm. At the Project Site, the highest monthly rainfall recorded was 360mm and lowest 3.5mm. The annual average rainfall at Peats Ridge was 1267mm over the period (1983-2002), while the Project Site recorded a lower annual average of 967.2mm, possibly a result of the significant drought experienced in NSW between 2002 and 2007.

4.2.5 Evaporation

Table 4.1 presents the average monthly evaporation data showing the highest evaporation in December and least evaporation in June. In total, annual evaporation is approximately 1 200mm, a level comparable to average annual rainfall. It is noted from **Table 4.1** that evaporation exceeds rainfall during the months of September to January. For the remaining months, monthly evaporation is exceeded by monthly rainfall.



4.2.6 Wind

The most appropriate wind data for use in the assessment of air quality and noise impacts of the proposed Southern Extension of the Calga Sand Quarry has been drawn from the Calga Sand Quarry Meteorological Station and the Bureau of Meteorology's (BOM) Peats Ridge Station No. 61351. Based on the data from these two sources, PAEHolmes generated seasonal and annual wind roses for the Project Site (see **Figure 4.3**) and the BOM Station No. 61351. For both sets of data, the prevailing annual and seasonal wind directions were comparable with the dominant winds as follows.

Monitoring Location	Dominant Wind Directions				
	Spring	Summer	Autumn	Winter	Annual
Calga Sand Quarry Meteorological Station	SSW-WNW	NE	S-W	SSW-W	SW-NW
BOM Station No. 61351	W-NW	NE-E	WSW-W	WSW-W	WSW-W

4.2.7 Temperature Inversions

The likelihood of temperature inversions occurring on the Project Site are low, due to the high topographical position of the Project Site and the low fog frequency which has been recorded in this area (**Table 4.1**). Fogs have been recorded in most months of the year at Peats Ridge Station. The highest fog frequency occurs during June, with an average 1.7 fog days.

Discussions with local residents reveal that fog conditions on and surrounding the Project Site are different to those recorded at Peats Ridge Station. During autumn, winter and early spring, fogs that develop in the nearby valleys to the south rise rapidly across the area in early morning causing some visibility restrictions until they dissipate within 30 minutes to 2 hours.

4.3 LAND OWNERSHIP, LAND USE AND SURROUNDING RESIDENCES

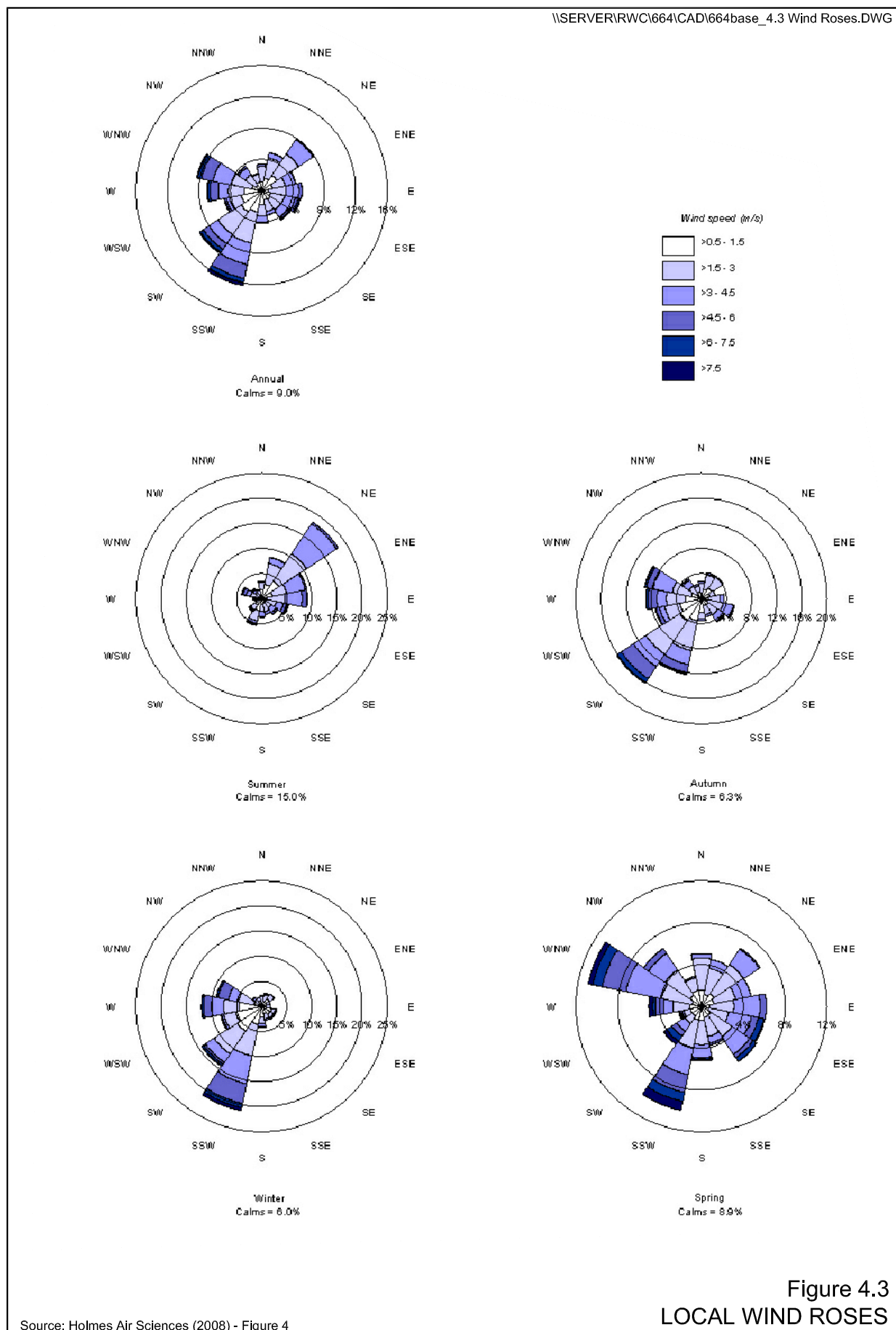
4.3.1 Surrounding Land Ownership and Land Use

4.3.1.1 Introduction

The existing land ownership surrounding the Project Site is shown on **Figure 4.4** and summarised in **Table 4.2**.

Based on Rocla's consultation with the local community, the following land uses have been established for each of the properties identified on **Figure 4.4**. The properties have been grouped by the road on which the residence or property entrance fronts.





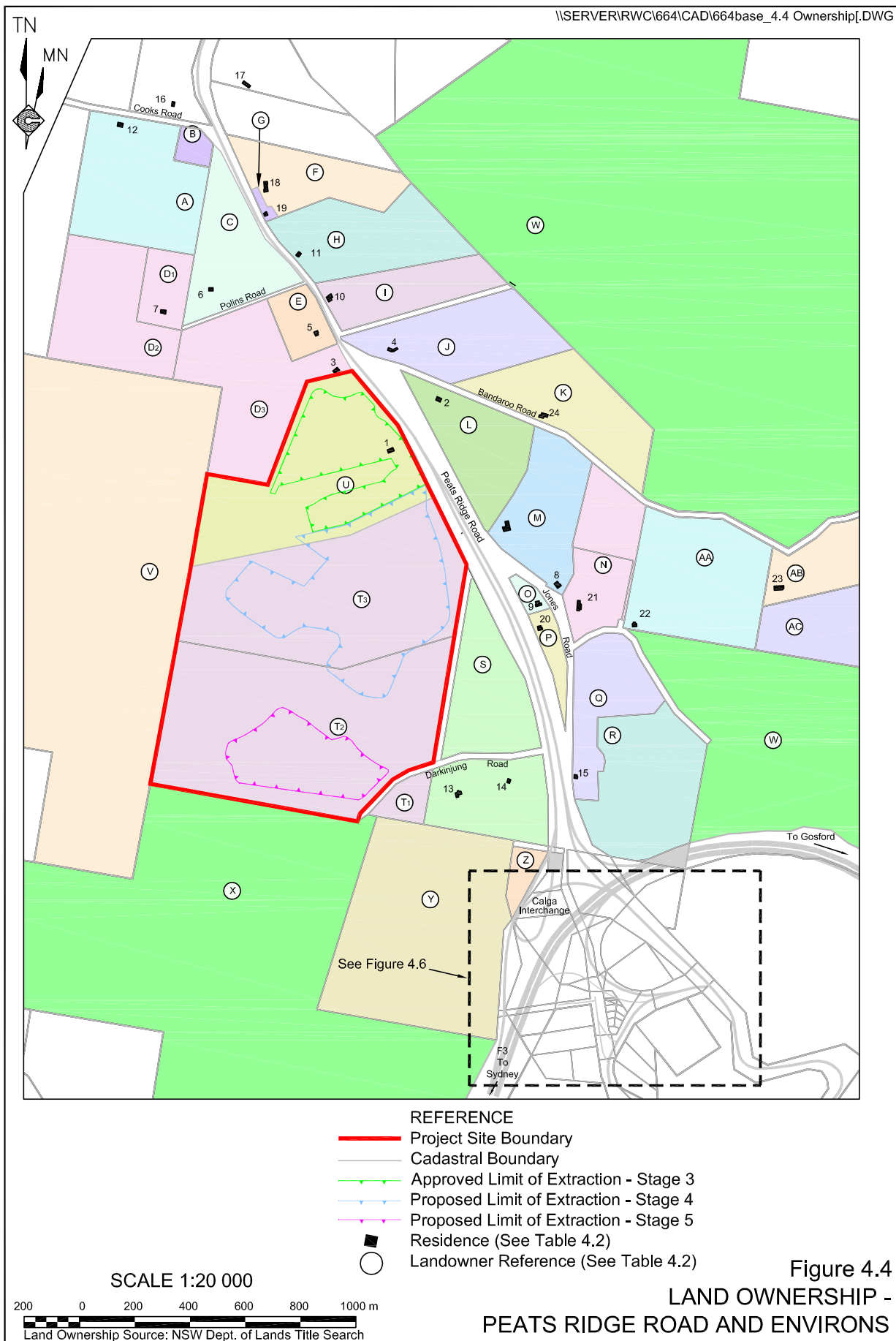


Table 4.2
Land Ownership and Residence Proximity – Peats Ridge Road and Environs

Property	Owner(s)*	Residence Reference	Distance from Residence to		
			Stage 3 (m)	Stage 4 (m)	Stage 5 (m)
A	G.D. & D.A. Marler	12	1 180	1 620	2 180
B	Airservices Australia	-	-	-	-
C	A.M. & R.A. Townsend	6	510	930	1 510
D1	F. & J. Gazzana	7	590	930	1 490
D2	F. & J. Gazzana	-	-	-	-
D3	F. & J. Gazzana	3	90	540	1 250
E	B. Kashouli	5	230	700	1 390
F	J.& A.V. Serou	18	780	1 240	1 920
G	D.A. & C.E. Buie	19	650	1 130	1 790
H	J. Hajje	11	500	960	1 650
I	C.A. Goding	10	320	730	1 480
J	R.D. King	4	210	510	1 370
K	G.B. & L.P. Miles	24	720	720	1 390
L	F. & G. Rozmanec	2	200	330	1 260
M	S, P.A. D.E & N.E. Cauchi	8	590	430	960
N	J. & H. Simmonds	21	690	470	930
O	W. White	9	600	320	800
P	D. O'Bryan	20	660	340	770
Q	N. Soulis	15	1 240	770	710
R	J.H. Hunt	-	-	-	-
S	C.J. Barnard	13, 14 [#]	1 070	440	270
T1	Rocla Materials Pty Ltd	-	-	-	-
T2	Rocla Materials Pty Ltd	-	-	-	-
T3	Rocla Materials Pty Ltd	-	-	-	-
U	Rocla Materials Pty Ltd	1	-	-	-
V	B.A. & B.J. Lawler	-	-	-	-
W	Brisbane Water National Park	-	-	-	-
X	Popran National Park	-	-	-	-
Y	C.J. Barnard	-	-	-	-
Z	C.J. Barnard	-	-	-	-
AA	Tokoloshe Pty Ltd	22	920	680	1 050
AB	J.R. & S.Y. Glover	23	1 340	1 210	1 570
AC	M.J. Lambert	-	-	-	-
* Land Ownership Source: Department of Lands Web Site.					
[#] No 14 is the location of the Visitors Centre at the Australia Wildlife Walkabout Park.					

4.3.1.2 Properties adjacent to Cooks Road

Property A (Residence 12): Lot A DP365595

Owned by G.D. & D.A. Marler, the “Goldern Valley” property includes a citrus orchard and other activities undertaken include cattle grazing and general agricultural activities.



Property B: Lot 1 DP554845, Cooks Road

This small property owned by Airservices Australia includes a meteorological station and electrical substation. There is no residence on this property, however, it contains a small shed, assumed to be for general maintenance activities on the property.

4.3.1.3 Properties Adjacent to Polins Road

Property C (Residence 6): Lot 120 DP755221

Owned by A.M. & R.A. Townsend, it is understood that there is no commercial or agricultural activities undertaken on this property and it is solely a rural-residential block.

In accordance with conditional requirements of the Stage 3 Calga Sand Quarry Development Consent (DA 94-4-2004), Rocla undertakes noise monitoring at the residence on this property on an annual basis. Noise monitoring conducted at this residence since 2006 has indicated the Stage 3 Quarry is operating in compliance with noise criteria at this residence.

Property D1 (Residence 7): Lot C DP382358

This is a rental property owned by F. & J. Gazzana. There are no commercial or agricultural activities undertaken on the property.

Property D2: Lot 1 DP660459

There is no known agricultural or commercial activity undertaken on this property owned by F. & J. Gazzana, and it is understood to be used as a small hobby farm.

Property D3 (Residence 3): Lot 121 DP755221

Sharing a southern and southeastern boundary with the existing Calga Sand Quarry, the primary activity on this property owned by F. & J. Gazzana is the extraction of groundwater for commercial sale. Other activities undertaken on the property include a pine tree plantation.

A residence on this property (Residence No. 3) is located less than 100m from the northern boundary of the Project Site and less than 250m from sand extraction activities of the Stage 3 quarry.

Notably, significant groundwater modelling and monitoring has been undertaken both prior to and following the approval of the Stage 3 quarrying activities to predict and measure the level of impact (if any) on the commercial groundwater extraction activities undertaken on this property. The modelling predicted minimal impact and monitoring to date has validated this prediction.

4.3.1.4 Properties Adjacent to Peats Ridge Road

Property E (Residence 5): Lot 188 DP755221

Various activities are undertaken on this property owned by B. Kashouli. These include an avocado plantation, poultry sheds and horse stabling. The owner of this property operates



several groundwater bores for “stock and domestic” purposes and inhabits a residence approximately 600m from the northern boundary of the Stage 3 Quarry and 40m from Peats Ridge Road.

Groundwater modelling and monitoring has also been undertaken to establish the level of impact (if any) on the groundwater bores of this property. Modelling undertaken for the Stage 3 Quarry predicted minor impacts on several of these bores, however, monitoring has yet to establish whether these impacts are occurring. In any event, Rocla has committed to mitigating any impact on the yield from these groundwater bores.

In accordance with conditional requirements of the Stage 3 Calga Sand Quarry Development Consent (DA 94-4-2004), Rocla undertakes noise monitoring at the residence on this property on an annual basis. Noise monitoring conducted at this residence since 2006 has indicated the Stage 3 Quarry is operating in compliance with noise criteria at this residence.

Property F (Residence 18): Lot 991 DP748725

With a residence set back in excess of 200m from Peats Ridge Road this property owned by J.& A.V. Serou and includes a small tree plantation but appears to be a rural-residential property.

Property G (Residence 19): Lot 990 DP748725

This small property, owned by D.A. & C.E. Buie, includes a single residence and is solely a residential property.

Property H (Residence 11): Lot 4 DP247550

Owned by J. Hagie and bordering the Brisbane Waters National Park to the northeast, this property has in the past operated poultry sheds and horse stabling facilities. At present, the poultry sheds are non-operational, however, the horse stabling facilities are maintained. The residence (Residence No. 11) on this property is located close to Peats Ridge Road (less than 50m) and approximately 600m north of the Project Site.

Property I (Residence 10): Lot 5 DP247550

The “Taltai” property of C.A. Goding contains two residences and horse stabling facilities. The owner of the property works from this location in equine management and agistment.

To the immediate south of this property, a road reserve is aligned between Peats Ridge Road and the Brisbane Waters National Park. This road is understood to be closed.

Property Q (Residence 15): Lot 71 DP826801

This property is owned by N. Soulis and fronts Peats Ridge Road, although the property is bounded primarily by Jones Road to the west, north and east. A residence is present on the property and activities on site include water extraction and citrus orchards.



Properties T1 and T2: Lots 1 & 2 DP805358

Owned by Rocla, the proposed southern extension of the Calga Sand Quarry would be undertaken on these two properties. Whilst largely undisturbed, a power line and gas pipeline easement is maintained through the properties with native vegetation periodically cleared to maintain access to these. The previous owners of the properties (NSW RTA) undertook some minor gravel extraction operations towards the northeastern boundary of Property T2.

Property U (Residence 1): Lot 2 DP229889

Rocla Materials Pty Ltd owns this property on which the Calga Sand Quarry (Stages 1 to 3) is located. The residence on the property is to be demolished to allow for the development of Stage 3 (as approved).

4.3.1.5 Properties adjacent to Bandaroo Road

Property J (Residence 4): Lot 143 DP755246 (4 Bandaroo Road)

The owner of this property and residence (Residence No. 4), J. King, is retired and a small number of horses are managed on the property (which borders Brisbane Waters National Park to the northeast).

In accordance with conditional requirements of the Stage 3 Calga Sand Quarry Development Consent (DA 94-4-2004), Rocla undertakes noise monitoring at the residence on this property on an annual basis. Noise monitoring conducted at this residence since 2006 has indicated the Stage 3 Quarry is operating in compliance with noise criteria at this residence.

Property K (Residence 24): Lot 162 DP755246

This property of G.B. & L.P. Miles contains significant areas of remnant native vegetation and is a rural-residential property. Little is known about other pursuits undertaken on this property, however, at an elevation of approximately 200m AHD on the eastern side of Peats Ridge Road and surrounded by vegetation, it is considered significantly removed from impacts associated with the Project and further investigation of land use was considered unnecessary.

Property L (Residence 2): Lot 1 DP559892

Previously operated as the Calga Nursery, the owners of this property, F. & G. Rozmanec, have closed this operation and use the property solely for residential purposes. The greenhouse facilities, however, are maintained and it is understood the owners are attempting to sell the property and nursery facilities.

In accordance with conditional requirements of the Stage 3 Calga Sand Quarry Development Consent (DA 94-4-2004), Rocla undertakes noise monitoring at the residence on this property on an annual basis. Noise monitoring conducted at this residence since 2006 has indicated the Stage 3 Quarry is operating in compliance with noise criteria at this residence.

Groundwater modelling undertaken for the Stage 3 Quarry application predicted a small impact on a registered groundwater bore on this property. Rocla currently monitors the groundwater levels in this bore to establish whether there is a decrease in groundwater level in this bore that may affect its yield. In any event, Rocla has committed to mitigating any impact on this bore.



4.3.1.6 Properties Adjacent to Jones Road

Property M (Residence 8): Lot 2 DP559892

The owners of this property (“Rocky Ridge Farm”) S., P.A., D.E, & N.E. Cauchi, operate greyhound breeding facilities, veterinary surgery and boarding kennels. There are three residences on this property.

Property N1 and N2 (Residence 21): Lots 111 & 112 DP1045210

Operated as a single property, there are two residences on N1 of the “Rowan Park” property. The owner, J. Simmons, runs a small number of goats on the property.

Property O (Residence 9): Lot 11 DP263267

Owned by W. White and K. Eaton, this is primarily a residential property, although, the owners breed German Shepherds with a small caravan repair operation also undertaken.

Property P (Residence 20): Lot 10 DP263267

Owned by D. O’Bryan, this is solely a residential property.

Property R: Lot 72 DP826801 (104 Jones Road)

Owned by T. Thompson and J.H. Hunt, the property is a residential one. Part of the property is signed a Flora and Fauna reserve, however, on consulting the property owner, there is no affiliation with NSW National Parks and Wildlife or any other government agency to formalise this as an official reserve.

Property AA: Lot 2011 DP1071004 (49 Jones Road)

Owned by Tokoloshe Pty Ltd, the primary function of this property is for horse stabling and selling. An occupied residence and sheds are also on the property.

Property AB Lot 2013 DP1071004 (69 Jones Road)

The owner of this property, J.R. & S.Y. Glover, reside in the residence. The owners run a small number of cattle on the property, although the primary function is residential.

Property AC Lot 2013 DP1071004 (59 Jones Road)

The “Faraway Ridge” property owned by M.J. Lambert does not as yet contain a residence and is operated as a hobby farm at present by the owner.



4.3.1.7 Properties Adjacent to Darkinjung Road

Properties S, Y and Z (Residences 13 & 14): Lot 4 DP1006218, Lot 235 DP822125 & Lot 32 DP713664

The Australia Wildlife Walkabout Park is operated on these properties owned by C.J. Barnard. The Australia Wildlife Walkabout Park markets itself as an authentic Australian nature experience allowing tourists to view native flora and fauna in a near natural context (along a constructed and maintained walkway through the property), Aboriginal artworks, as well as a “bush tucker” experience. The operators have commenced the re-introduction of some native fauna, notably Bennett’s Wallaby, as well as establishing habitat for threatened amphibian species including the endangered Red-crowned Toadlet. The property includes a visitor’s centre (Residence No. 14) and land owner residence (Residence No. 13), with a veterinary clinic proposed to be operational near the entrance to the Wildlife Park in the near future.

The property is surrounded by an electrified, feral proof fence and is considered an important wildlife sanctuary by the owners given the land has never been farmed or otherwise disturbed in a major way by European settlers.

The operators of the Wildlife Park employ between three and four full-time staff, two part-time staff as well as employing a number of local volunteers on a periodic basis. Visitors to the Wildlife Park include school children, overseas tourists on packaged tours, eg. Australian Pacific Coaches and local tourist coaches typically average 3 to 4 buses per week, (pers. comm. C. Barnard).

Figure 4.5 presents the internal layout of this Australia Wildlife Walkabout Park as provided to visitors to the park. **Plates 4.1 to 4.4** illustrate the natural and constructed aspects of the Australia Wildlife Walkabout Park and **Plates 4.5 and 4.6** provide photos taken from vantage points on the northern side of the Australia Wildlife Walkabout Park to the proposed southern extension of the Calga Sand Quarry (see **Figure 4.5** for location of photo-points).

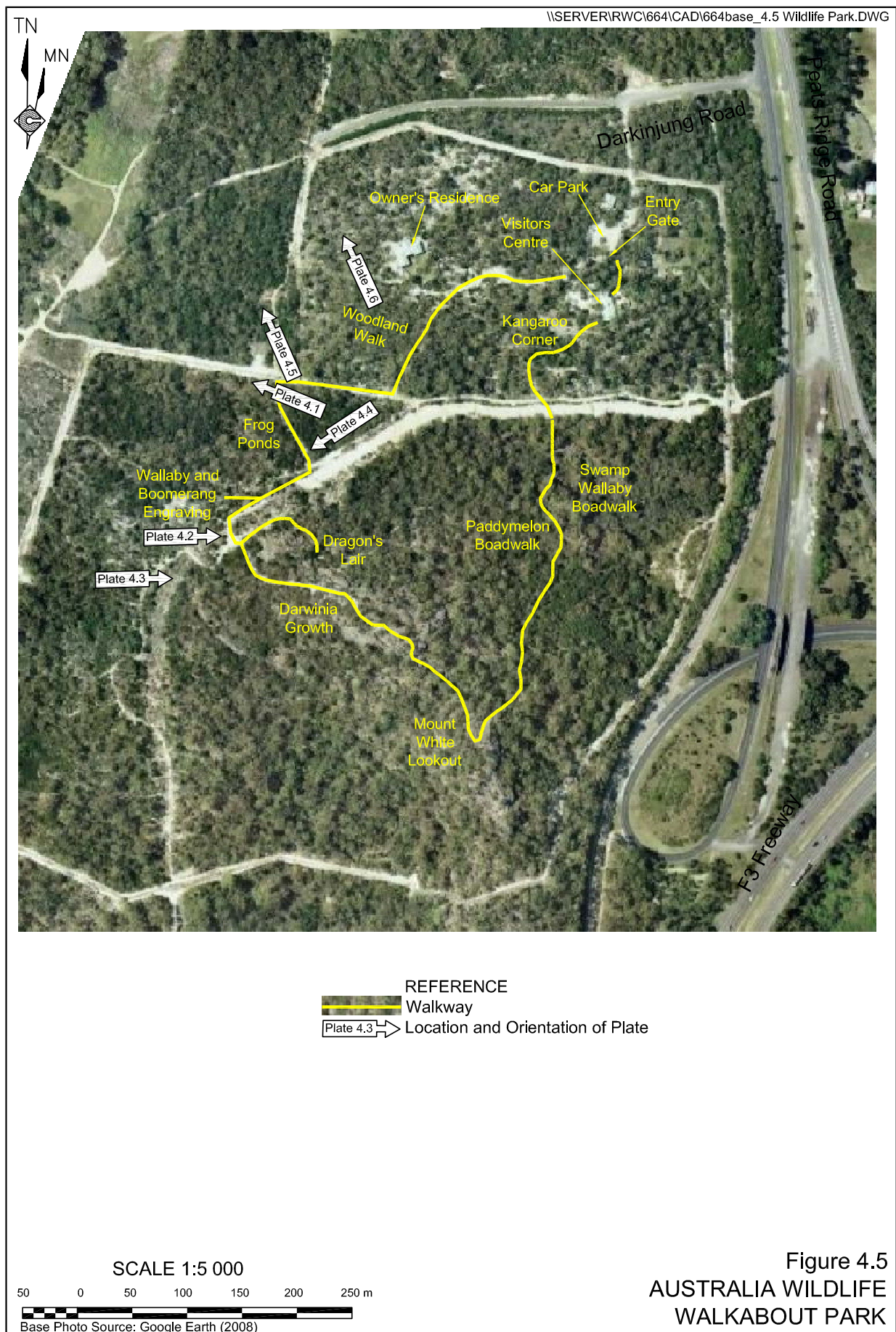
4.3.1.8 Other Properties Surrounding the Project Site

Property V: Lot 108 DP755221 (Glenworth Valley Horse Riding Facility)

This property which borders Popran National Park to the south is operated as the Glenworth Valley Horse Riding Facility. The owner of the property, B.A. & B.J. Lawler, owns two residences on the property near Polins Road and also operates several agistments for horse selling and stabling.

The owner of the property has requested that Rocla provide access from Peats Ridge Road via Darkinjung Road and Rocla’s property (T2) to the Glenworth Valley Horse Riding Facility. Rocla has provided for this access as part of the Stage 4 and 5 quarry development.







\\SERVER\RW\664\CAD\664base_Plates 4.14.4.DWG

Plate 4.1: Electrified Fence along the northern property Boundary (See **Figure 4.5** for location)
(Ref: E664-C008)

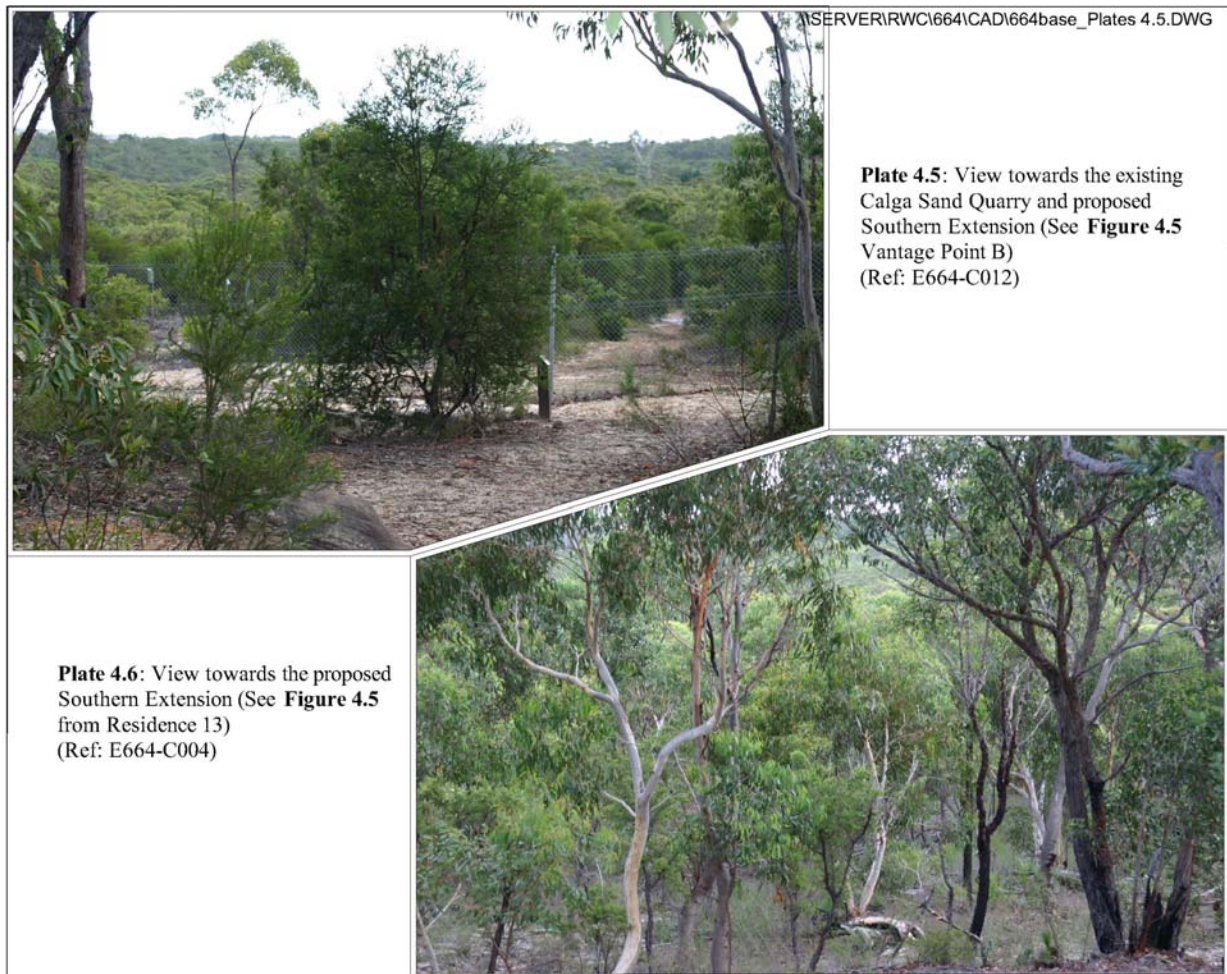
Plate 4.2: Aboriginal Artwork (See **Figure 4.5** for location)
(Ref: E664-C016)



Plate 4.3: Constructed path (See **Figure 4.5** for location)
(Ref: E664-C017)

Plate 4.4: Constructed Frog Habitat (See **Figure 4.5** for location)
(Ref: E664-C014b)





Property W: Brisbane Waters National Park

The Brisbane Waters National Park is managed by NSW National Parks and Wildlife Service for the conservation of native flora and fauna and Aboriginal heritage.

Property X: Popran National Park

The Popran National Park is managed by NSW National Parks and Wildlife Service for the conservation of native flora and fauna and Aboriginal heritage.

4.3.1.9 Properties of Calga Village (Adjacent to Pacific Highway and F3 Freeway Ramps)

Figure 4.6 displays the land ownership and locations of 11 residences within the Calga Village southeast of the Calga Sand Quarry. The bulk of the residents within Calga Village reside on small residential and lifestyle blocks, some on which support considerable native vegetation. **Table 4.3** lists the relative proximity of each of the residences in Calga Village to the Pacific Highway F3 southbound on-ramp used by trucks travelling in a southerly direction from Calga Sand Quarry and Stages 3, 4 and 5. It is noted that the F3 Freeway itself is located between each of the residences in Calga Village and the Calga Sand Quarry.



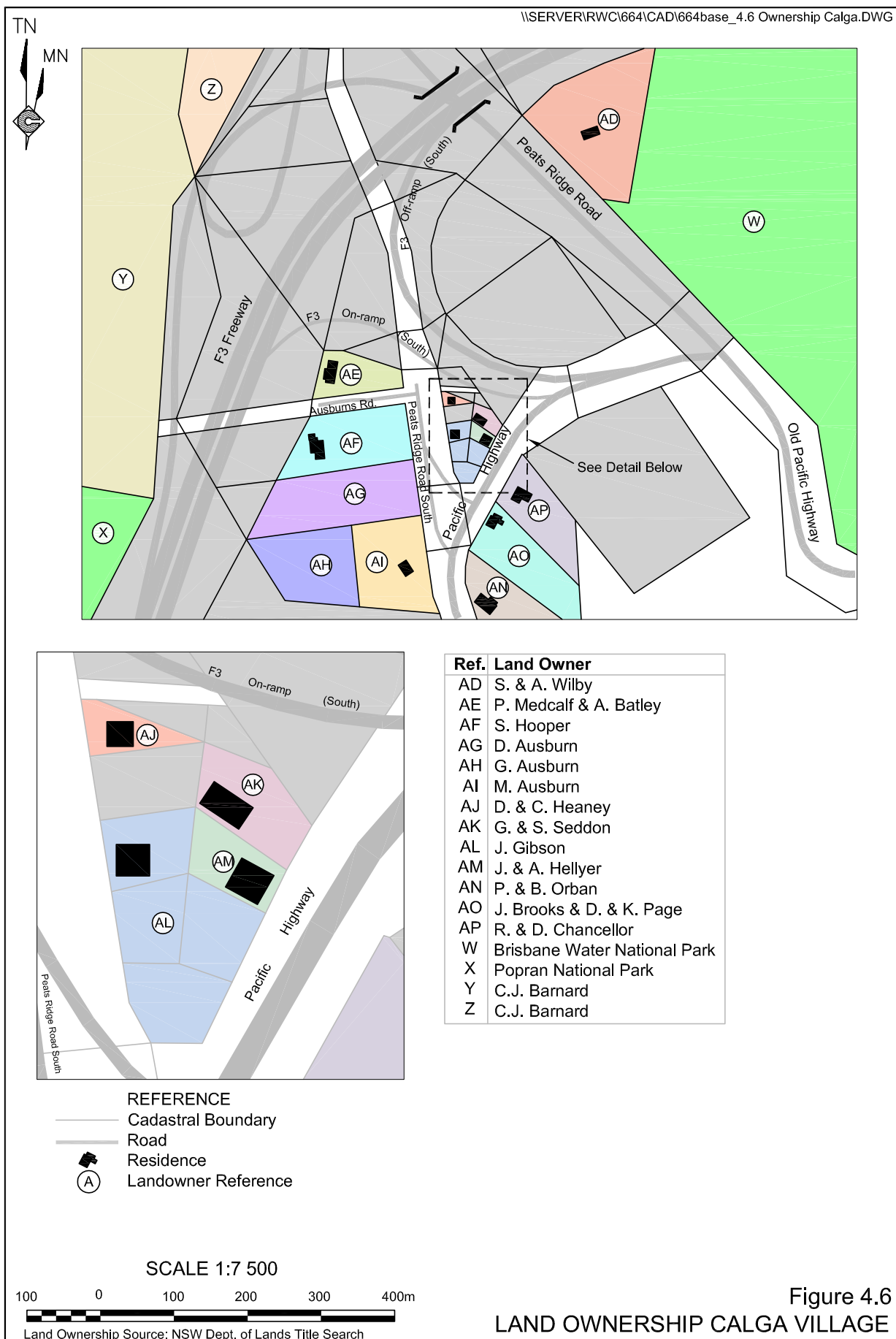


Table 4.3
Land Ownership and Residence Proximity – Calga Village

Property	Owner(s)*	Distance (m) from Residence to:				
		F3 on-ramp	F3	Stage 3	Stage 4	Stage 5
AD	S. & A. Wilby	365	110	1 750	1 240	1 090
AE	P. Metcalf & A. Bailey	70	90	1 870	1 250	1 015
AF	S. Hooper	140	110	1 970	1 325	1 080
AG	D. Ausburn	#	#	#	#	#
AH	G. Ausburn	#	#	#	#	#
AI	M. Ausburn	260	280	2 170	1 530	1 290
AJ	D. & C. Heaney	30	260	1 975	1 370	1 155
AK	G. & S. Seddon	40	300	2 015	1 415	1 200
AL	J. Gibson	70	280	2 020	1 410	1 190
AM	J. & A. Hellyer	60	320	2 040	1 440	1 220
AN	P. & B. Orban	280	395	2 250	1 625	1 390
AO	J. Brooks & D. & K. Page	170	370	2 150	1 540	1 310
AP	R. & D. Chancellor	130	390	2 130	1 530	1 310
Source: NSW Department of Lands Title Search		# No residence				

4.3.2 Surrounding Residences

Figure 4.4 also identifies the residences on the properties surrounding the Project Site. The distance of these to the existing and proposed activities is identified on **Table 4.2** and **4.3**.

4.4 BUSHFIRE HAZARD

In order to assess the existing bushfire hazard of the Project Site, a Type A assessment for bushfire prone areas (NSW RFS/Planning NSW, 2001) was undertaken. It is noted that this type of assessment was designed to assess specific building requirements of residential dwellings proposed adjacent to vegetation, however, it is considered a useful tool for considering the relative bushfire hazard posed by the location. In completing the assessment, parameters influencing bushfire hazard were determined as follows.

Vegetation

A survey of the Project Site completed by Cumberland Ecology (2009) identified a number of vegetation community types on the Project Site including:

- hanging and other swamp type vegetation;
- heath;
- woodland; and
- rainforest.

The dominant vegetation type on the Project Site, however, was woodland type vegetation, covering approximately 75% of the undisturbed vegetation of the proposed Southern Extension.



Distance to Vegetation

Clearing in advance of quarry development activities would generally provide a buffer of at least 30m between the undisturbed vegetation and the quarry operations. Internal transport, stockpiling of soil and bund construction would occur within this buffer.

Slope

The slope of the proposed Southern Extension varies between 5° and 20° (see Section 4.2). However, the slope of those areas to be disturbed by the proposed Southern Extension would not exhibit a slope of greater than 15°.

Table A3.3 of NSW RFS/Planning NSW (2001) has been reproduced below as **Table 4.4** to illustrate the bushfire hazard associated with the development of the proposed Southern Extension.

A review of the three critical parameters for assessing the category of bushfire attack for a site on **Table 4.4** suggests that the proposed Southern Extension displays a high hazard rating. NSW RFS/Planning NSW (2001) define the ‘high’ hazard category as follows.

“significant ember attack, possible flame contact, radiation heat greater than $16kWm^{-2}$ and no greater than $21kWm^{-2}$.”

On the basis of the high hazard category, appropriate precautions and controls should be implemented to ensure the risk of asset damage or harm to individuals is minimised.

Table 4.4
Determination of Category of Bushfire Attack for a Site

Distance from vegetation	Less than 20m	From 20m but not greater than 30m			Greater than 30m but not greater than 50m			Greater than 50m but not greater than 80m			Greater than 80m but not greater than 100m		
Slope	All slopes	Greater than 15°	Greater than 5° but not greater than 15°	0° to 5°	Greater than 15°	Greater than 5° but not greater than 15°	0° to 5°	Greater than 15°	Greater than 5° but not greater than 15°	0° to 5°	Greater than 15°	Greater than 5° but not greater than 15°	0° to 5°
Vegetation	Category of Bushfire Attack												
Forest	FZ	FZ	FZ	Ext	FZ	Ext	High	Ext	Ext	Med	Ext	High	Low
Woodland	FZ	FZ	Ext	Med	Ext	High	Low	Ext	Low	Low	Med	Low	Low
Shrub/Heath	FZ	FZ	FZ	Ext	FZ	Ext	High	Ext	High	Med	High	High	Low
Mallee/Mulga	FZ	Med	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Rainforest	FZ	High	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Grassland	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Non-vegetated	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Low = Low Medium = Med High = High Extreme = Ext Flame Zone = FZ													
Source: Table A3.3 – New South Wales – Determination of Category of Bushfire Attack for a Site													

