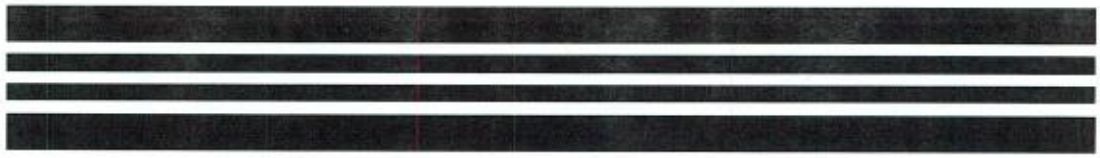

EIS 516

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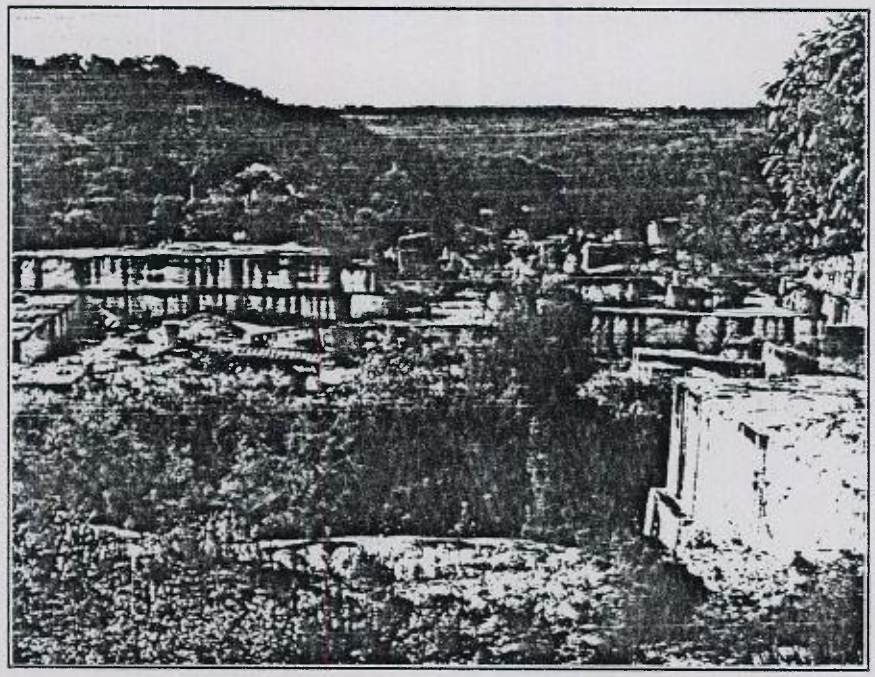
Mount White sandstone quarry : environmental impact statement

GOSFORD QUARRIES PTY LTD

ENVIRONMENTAL IMPACT STATEMENT

MOUNT WHITE SANDSTONE QUARRY



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September 1988

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ENVIRONMENTAL IMPACT STATEMENT

MOUNT WHITE SANDSTONE QUARRY

FORSITE
Landscape Architects and Planners.

September 1988

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MOUNT WHITE SANDSTONE QUARRY

ENVIRONMENTAL IMPACT STATEMENT

CLAUSE 59 CERTIFICATION

This is to certify that this Environmental Impact Statement has been prepared in accordance with Clauses 57 and 58 of the Environmental Planning and Assessment Regulation, 1980.

Signature

28/10/88.
Date

John W van Pelt AAILA AIFA MRAIPR
Director
Forsite Landscape Architects & Planners Pty LTd
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ULTIMO SYDNEY NSW 2007

Mount White Sandstone Quarry – EIS

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Mount White Sandstone Quarry - EIS

1. SUMMARY

This Environmental Impact Statement has been prepared to assess the effects of the proposed resumption of quarrying activities in a previously established dimension sandstone quarry at Mount White, just north of the Hawkesbury River within the City of Gosford. Construction of a track into the quarry is proposed to allow access.

The site at Mount White is recognised as a source of dimension sandstone of regional significance. It is gazetted under Regional Environmental Plan No. 9 (Extractive Industry). Permissive Occupancy of the site has been granted by The Department of Lands - P.O. 79.104.

The proposed development would encompass two activities. The initial step would be to construct an access track along a sandstone bench, which approximately coincides with the 170m contour level, down to the quarry. Once access has been gained, quarrying operations would begin. The quarry would be a very labour intensive, low volume operation using a frame mounted pneumatic hammer in conjunction with a hand held scabbler. The blocks of sandstone would be lifted out of the quarry and stored on site until needed for production, which would take place in their factory at Somersby.

Each element of the physical, cultural and social environment of the site was assessed in terms of interactions between the proposal and the existing environment. Beneficial effects would occur through the creation of employment opportunities and the continued supply of valuable building materials. Effects on the acoustic environment, air quality and traffic would be negligible. Of significance are the effects on the visual environment, vegetation and wildlife habitats.

It is recommended that ameliorative measures be implemented to stabilise soil and land movement and control the movement of sediment. This would protect vegetation communities and wildlife habitats downslope. Selective clearing would protect the visual quality of distant views onto the site. These measures will ensure that the impact of the proposal is kept within acceptable limits.

In light of the above, this Environmental Impact Statement supports the proposal for the Mount White Sandstone Quarry.

2. INTRODUCTION

2.1 PREAMBLE

Gosford Quarries Pty Ltd has historic connections with the City of Gosford.

Dimension sandstone quarrying commenced on the hill at the back of Gosford township in the early 1920's.

Sandstone is regarded as a particularly fine building stone and its uses are varied. It is widely used in landscaping, for pathways, feature and retaining walls, steps and swimming pool surrounds. In building, it is used for feature walls, fireplaces and even complete houses are still being built of sandstone. Historical buildings are being restored to their former splendour with sandstone from the Gosford district.

Gosford Quarries sponsors and supplies sandstone blocks to the Wondabyne Sculpture Symposiums, two of which have been held within the City of Gosford.

Gosford Quarries are now regarded as the leader in the supply of dimension sandstone throughout Australia.

The proposed development involves the resumption of sandstone extraction in a previously established dimension stone quarry at Mount White. Accompanying the quarrying operations is the proposed construction of an access track along the top of a sandstone bench, approximately coinciding with the 170m contour level, down to the quarry.

2.2 OBJECTIVES

This Environmental Impact Statement (E.I.S.) has been prepared to assess a proposal by Gosford Quarries Pty Ltd to resume quarrying activities in a previously established dimension sandstone quarry. The site lies to the east of Mount White, north of Sydney adjacent to the Hawkesbury River.

The objectives of the E.I.S. are to:

- describe the existing environment of the site and the area adjacent to the site, in terms of physical, cultural, social and economic elements;
- fully outline the proposed activities and consider feasible alternatives;
- evaluate the interactions between the proposed quarrying activities (including the access road) and the existing environment and assess potential impacts;
- establish measures to minimise all potentially detrimental impacts and ensure sound future management of the site.

2.3 STATUTORY REQUIREMENTS

This E.I.S. has been prepared in accordance with Part IV of the Environmental Planning & Assessment Act, 1979 (E.P.A. Act) and Clauses 26 (1)(b), 34 and 35 of the Environmental Planning & Assessment Regulation, 1980 (as amended).

Extractive operations are designated developments under the EPA Act because of their potential to affect visual amenity, generate heavy vehicle movements, raise dust and cause disturbance through noise and blasting. Therefore, these issues have been considered in this E.I.S.

Further, the proposed development is gazetted under Sydney Regional Environmental Plan No. 8 (Central Coast Plateau Areas) and Sydney Regional Environmental Plan No. 9 (Extractive Industry) and Planning Report (1986). REP No. 9 aims to facilitate development of identified extractive resources in proximity to the population of the Sydney Metropolitan Area and ensure activities are carried out in an environmentally acceptable manner.

The requirements and recommendations of the Department of Planning and other appropriate government authorities were sought and have been incorporated within the EIS (refer to Appendix A).

2.4 THE PROPOSAL

The proposed development includes two activities - extraction of dimension sandstone and construction and use of an access track into the quarry.

It is proposed to resume quarrying activities on the site, which suspended operations in the late 1970's. Extraction of dimension sandstone would be through use of a frame mounted, rotating pneumatic hammer in conjunction with a hand held scabbler. All material would be removed from the quarry, stored on site and transported to an existing factory at Somersby when needed for processing. Access from the quarry would be via a track proposed to be constructed approximately along the 170m AHD contour, southwest from the quarry to existing roads.

2.5 JUSTIFICATION OF THE PROPOSAL

Gosford Quarries have been leaders in the supply of dimension sandstone for over sixty years. As well as supplying to local, Sydney and Newcastle markets, Gosford Quarries supply stone to Victoria, South Australia, Australian Capital Territory and Queensland. Sandstone has also been exported to Japan, Hawaii, Fiji and Singapore. The proposed development at Mount White is essential to maintain current supply rates.

Quality dimension sandstone only occurs as a massive deposit free of all faults. Remaining known deposits of this type of sandstone are few. The Sydney R.E.P. No. 9 identifies seven dimensional sandstone quarries of regional significance. Mount White is recognised to be a significant quarry and hence would maintain the supply of quality sandstone.

2.6 THE SITE

The site for the proposed quarrying activities is identified as P.O. 79.104 (permissive occupancy) covering approximately 33 hectares within the township of Mount White in the City of Gosford. It is primarily bounded by vacant Crown land with Mount White to the west and freehold properties to the south and south west. A Public Reserve lies beyond the northern boundaries.

2.7 SCOPE OF THE STUDY

A range of physical, cultural, social and economic factors have been evaluated to identify the likely short and long term impacts of the proposal.

Factors that were identified and discussed in this Statement centre on:

- the quality of the standstone, its gazettal under Sydney REP No. 9 and the economic importance of this resource to both Gosford Quarries and the sandstone market;

- identification of the vegetation communities and any rare or restricted species within the communities likely to be affected by the proposal;

- generation of noise from quarrying activities and the effect of noise and vibration implications on the surrounding environment;

- diversity of fauna habitats available on site and the abundance of similar quality habitats surrounding the site;

- protection of aboriginal sites within the boundaries of the permissive occupancy;

- protection of the hydrological regime in tributaries off Kelly's Creek;

- the ability of the site's topography with restricted clearing along the perimeter, to reduce visual exposure;

- effect on local traffic resulting from truck movements to and from the quarry;

- specification of site rehabilitation measures.

Appendix B details the project team involved in the preparation of this Statement.

3. THE EXISTING ENVIRONMENT

3.1 LOCATION

The site is identified as Permissive Occupancy 79.104 within the County of Northumberland and the City of Gosford (latitude 33° 26'E, longitude 151° 11'S).

More specifically, the site is bounded by Public Reserve R89280 for public recreation and preservation of native flora and fauna in the north and east and private properties in the south and south west. Mount White is directly to the west. The site covers an area of approximately 33 hectares.

Mount White lies approximately 60 kilometres north of Sydney and 12 kilometres north of the Hawkesbury River on the north western side of the Sydney to Newcastle Freeway (F3).

Refer to Figure 3.1.

3.2 THE PHYSICAL SETTING

3.2.1 Climate and Air Quality

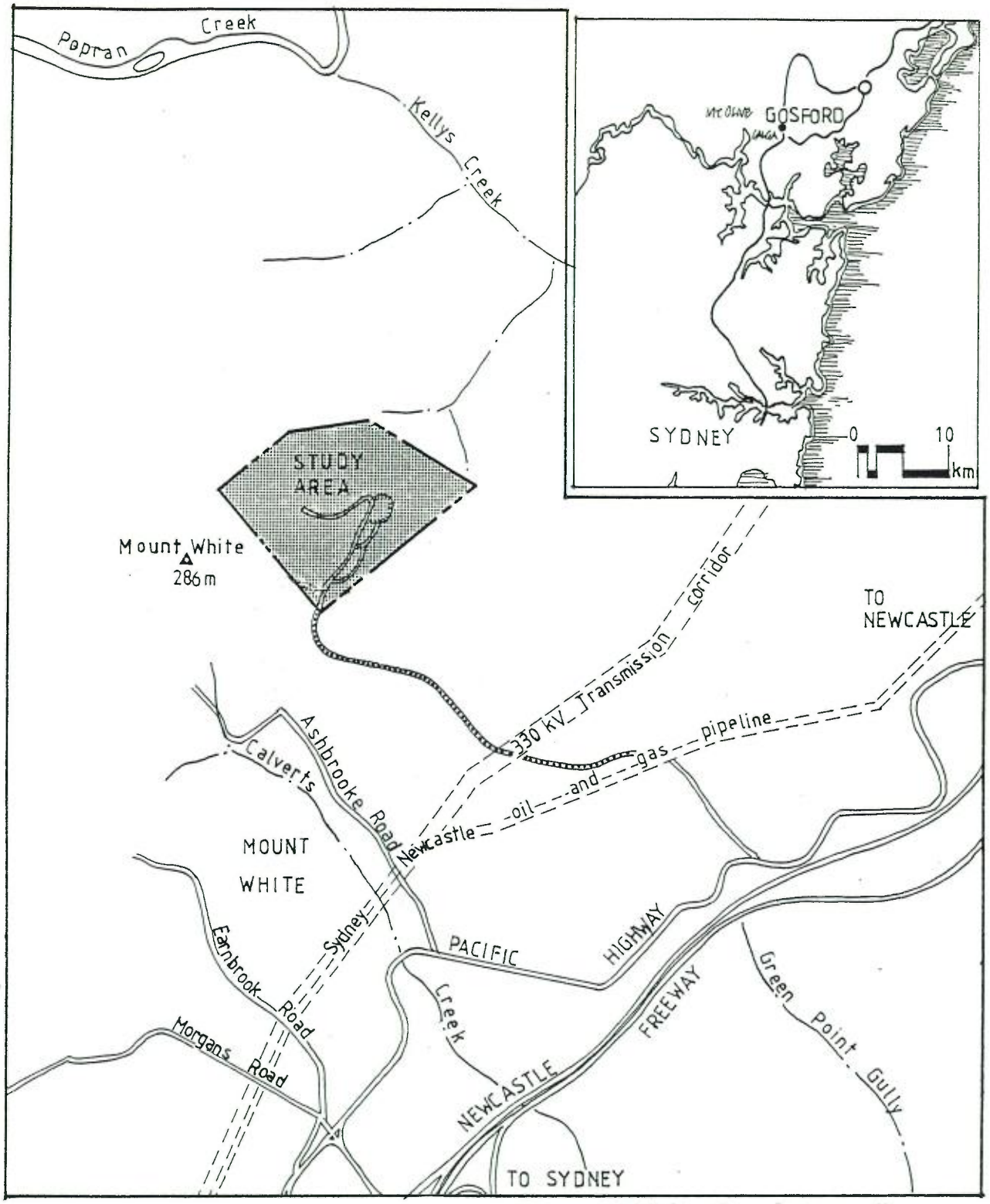
The climate of Mount White is temperate coastal, which is typical of the New South Wales Central Coast. However, the highly dissected nature of the topography creates a mosaic of microclimates. The position and north to north west aspect of the site exposes it to desiccating hot, dry summer winds. It receives high insolation and hence would have higher evaporation rates than Mount White in general.

The following data was derived from Bureau of Meterology (1988), Bureau of Meterology (1979) and Fitzpatrick and Armstrong (1972).

Mount White experiences warm (to hot) summers and mild winters. The mean maximum temperature ranges from 25.9°C in February to 16.5°C in July whilst the mean minimum temperature ranges from 7°C in July to 17°C in January. Early morning fogs occur in winter but frosts are rare.

Evaporation varies from a low of 39mm in July to a high of 135mm in December, with a total annual evaporation rate of 1000mm.

The mean annual rainfall is 1168mm. January is the wettest month while September is the driest. Rain is usually associated with winds from the south east and thunderstorms from the north and west in the summer.



Mount White Sandstone Quarry

Figure 3·1
CONTEXT

0 500 M

Prevailing winds are from north-east to north-west in summer and south-west to south-east in winter. During summer, hot dry tropical continental air from inland occurs as north-westerly winds, resulting in heat wave conditions with temperatures exceeding 30°C, often creating a serious fire hazard. 'Southerly Busters' occur as fast moving storm fronts relieving the hot, dry conditions associated with summer north-westerly winds.

Air quality is considered to be consistent with the land use and development in the area. Industrial operations produce higher than background levels of oxides of nitrogen and sulphur, particulate matter and other typical industrial pollutants.

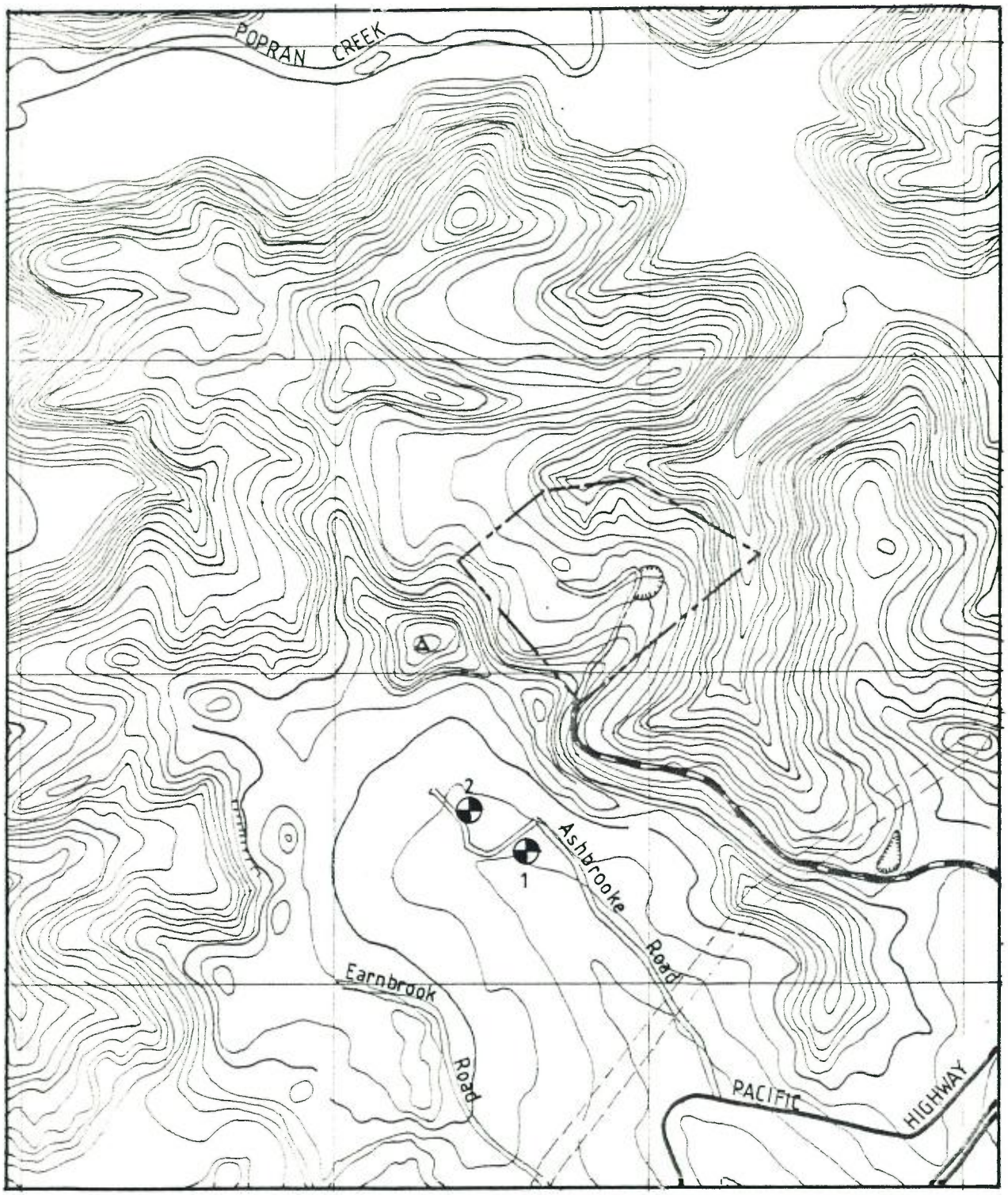
The air quality of Mount White, although it has not been recorded, would be enhanced by the extensive forested areas. Residential areas are small and in a semi-rural environment. No large industrial developments which are strong sources of odour emissions, such as meat works and food processing plants are present. The Highway and Freeway would generate some air pollution.

3.2.2 Acoustic Environment

To assess the existing acoustic environment of the study area, measurements of background noise levels were taken at two positions. These positions, identified in Figure 3.2, are considered to be representative of the nearest residents to the quarry. From the measurements, appropriate statistical A-weighted and octave band spectral data were produced (refer to Appendix C1).

All measurements were carried out utilising the statistical and octave band measurement equipment listed in Appendix C2.

The results of the statistical measurements of background noise levels revealed that the existing daytime background sound levels range between 38 and 41dB(A) during the early morning period. The area in which the quarry is located is an R1 zone in terms of the criteria specified by the SPCC Environmental Noise Control Manual (1980). Hence acceptable daytime noise level would be 45dB(A) between the hours of 7.00am and 10.00pm and 35dB(A) between the hours of 10.00pm and 7.00am.



MEASUREMENT OF BACKGROUND NOISE LEVELS

- 1 POSITION 1.
- 2 POSITION 2.
- BOUNDARY OF P.O. 79·104
- PROPOSED ACCESS TRACK.

Mount White Sandstone Quarry

Figure 3·2
ACOUSTIC ENVIRONMENT

0 500 M

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3.2.3 Topography

Regionally, the site lies within the distinctive dissected topography of the Hornsby and Central Coast plateau areas. Steep rises incised with deep river gorges are characteristic.

Locally, the proposed quarry site is situated on the mid slopes of an enclosed valley, overlooking Kelly's Creek in the north east (refer to Figure 3.3). It is a gently sloping rock platform that extends to an escarpment edge in the north east and a steep ridgeline with benches in the south west. Slopes of 2-5° dip to the north east on the quarry site with average slopes of 20° on the steep topography encompassing the site. Benching in the topography produces locally flat terrain, which the proposed access track will utilise. The local area is dissected by numerous undulations in the outcropping rock strata.

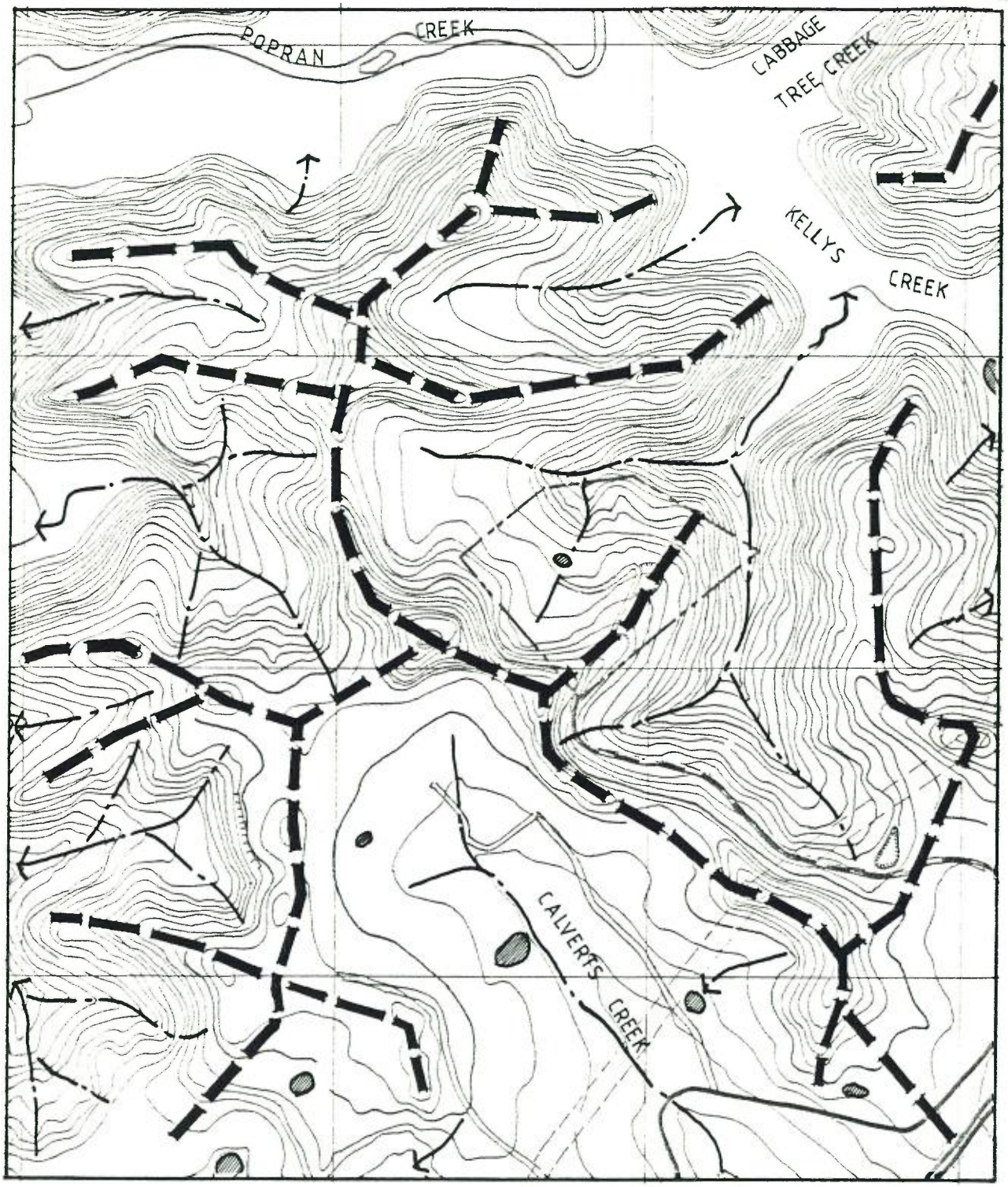
3.2.4 Geology and Soils

One geological unit underlies the site and proposed access track. The Hawkesbury Sandstone is massive in nature, suggesting a uniform depositional phase during the Triassic period. The geology comprises quartz sandstone with some interbedded siltstone, claystone and laminate, all of which were laid down in a freshwater alluvial environment. Pecover (1984) details the area's geology.

Outcrops of Narrabeen Group ~~geology~~ sediments occur adjacent to Kellys Creek and Popran Creek. Minor outcrops occur in the gully below the quarry site. This unit is generally comprised of lithic quartz sandstone frequently banded with siltstone, sedimentary breccia, claystone and conglomerate. Although this geology was similarily deposited during the Triassic, it is suggested that this phase had a more meandering alluvial origin.

The gully floor contains substantial areas of Quaternary silt, sand, clay and gravel, deposited as undifferentiated, waterlogged aluvium. Kellys and Popran Creeks are similarily lined with Quaternary alluvium.

Soils occupying the slopes and rock platforms on the Hawkesbury Sandstones are duplex types, described as sandy yellow to white earths. Invariably, soils are thin, being accumulations of weathered material together with humus, behind rock boulders and between intercises or as shallow accumulations on rock benches. In some areas soils are skeletal and thin, not being more than a few centimetres deep. At times the shallow soil layers are moist receiving drainage from upslope, which flows over the impervious surface of the rock bench, beneath the soil layer. Such soils tend to be more organic.



Mount White Sandstone Quarry

MAJOR DRAINAGE LINES
RIDGELINES
DAMS / WATER BODIES
100 EXISTING CONTOURS = 10m CONTOUR INTERVALS
BOUNDARY OF P.O. 79-104
PROPOSED ACCESS TRACK.

Figure 3-3
TOPOGRAPHY & HYDROLOGY

0 500 M

The skeletal soils on plateau tops and ridges often possess residual ferricrete nodules and stones throughout the soil profile, whilst the bare rock platforms in places possess shallow soil pans. Deeper soils with greater duplex soil development are evident on valley side slopes.

3.2.5 Hydrology

The hydrology of the site is defined by rainfall, evaporation, drainage lines and topography.

One major creek re-entrant drains from the site leading to a north-easterly flowing tributary of Kellys Creek. No major creek lines are present along the top of the main sandstone bench, in the vicinity of the proposed access track. Other re-entrant heads are evident below the sandstone bench, but remain as small runnels draining into further tributaries of Kellys Creek. All eventually join and drain into Popran Creek (refer to Figure 3.3).

West of the main rock outcrop a 'hanging swamp' (sedgeland) has formed from the head of the creek draining into the main gully.

3.2.6 Vegetation

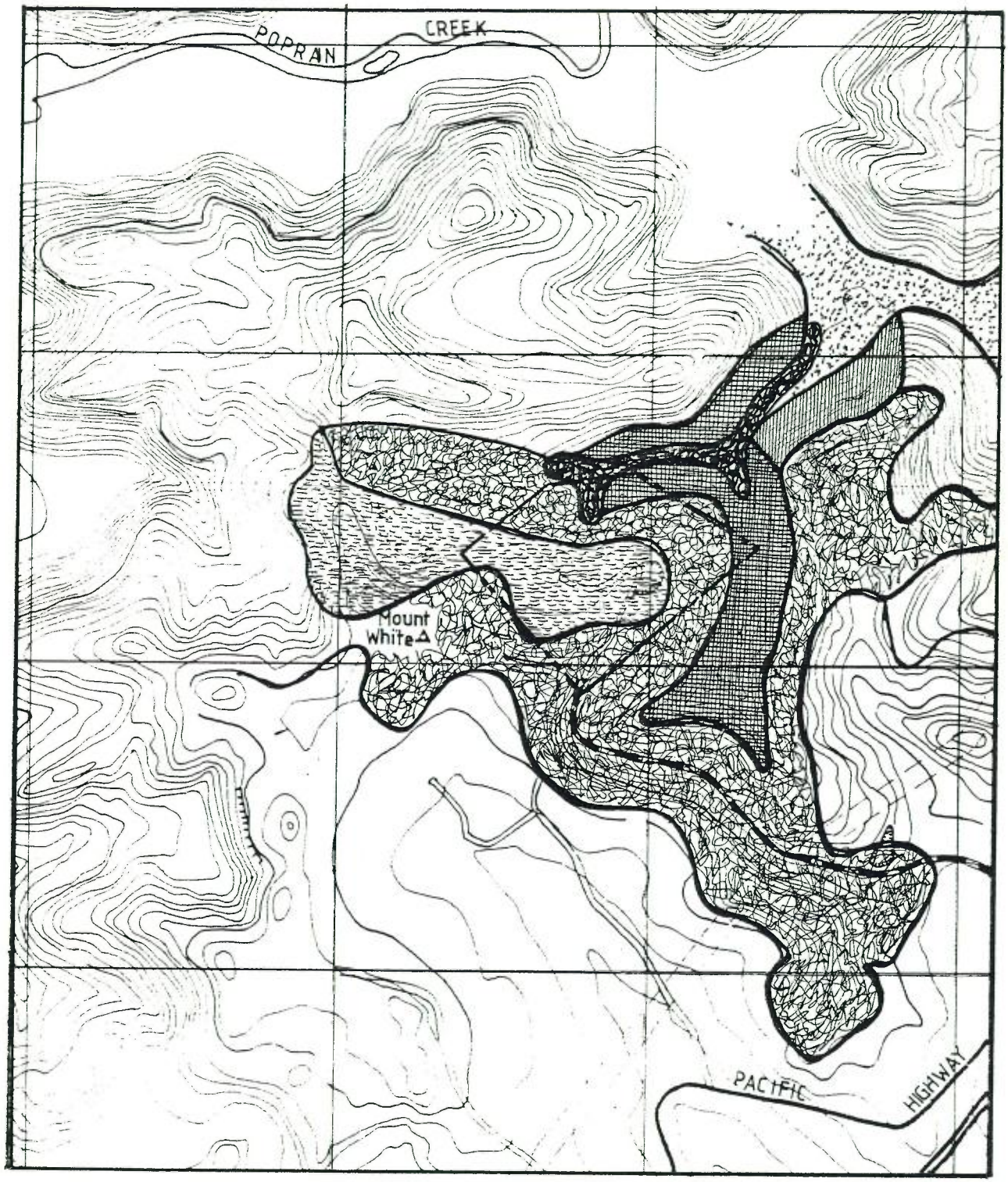
The vegetation of the study area is described according to the classification of Specht (1981) and the results of Benson (1979), Benson and Fallding (1981) and Clarke and Benson (1987). In conjunction with an on site inventory, a comprehensive species list was compiled (refer to Appendix D).

Five vegetation communities were identified in the study area - Gully Rainforest, Tall Forest, Woodland I, Woodland II and Shrubland/Sedgeland with Heath on Rocky Outcrops (refer to Figure 3.4 and Table 3.1). Only three communities are susceptible to potential impacts during sandstone extraction and hence these were investigated in more detail. Tall Forest on lower slopes below the main rock platforms and Woodland I at the bottom of the gully will not be affected. Similarly, the reclaimed grassland which drains the Gully Rainforest will not be affected.

P.O. 79.104 - Site

Three vegetation communities are within the site boundaries.

The rock platform of the proposed quarry site contains shallow depressions with small pockets of soil (under 1cm deep). Flora occupying these patches is Shrubland/Sedgeland with Heath (Community 5). A tree stratum is absent and the existing flora is able to withstand extended periods of drying out. Banksia ericifolia shrublands dominate, expecially in areas previously cleared for quarrying operations.



GULLY RAINFOREST

TALL FOREST

WOODLAND I: Eucalyptus piperita, Angophora floribunda

WOODLAND II: Eucalyptus eximia, E. gummifera

SHRUBLAND/SEDGELAND WITH HEATH ON ROCKY OUTCROPS

RECLAIMED LAND

PROPOSED ACCESS TRACK.

0 500 M

Mount White Sandstone Quarry

Figure 3·4

VEGETATION COMMUNITIES

TABLE 3.1 VEGETATION COMMUNITIES OF THE MOUNT WHITE AREA

COMMUNITY	STRUCTURE	DISTRIBUTION	HABITAT	MAIN SPECIES PRESENT
1. Closed Forest (Gully Rainforest)	Trees up to 20 or 30m high with dense to mid-dense canopy cover. Understorey dry to moist (depending on slope) generally with a cover of herbs, monocotylons and climbers.	Along creek re-entrants below proposed quarry site.	Sheltered gully re-entrants in Terrigal Formation strata and/or situated along alluvial flats. Composition generally determined by the degree of shelter/moisture and fire avoidance.	Trees: Backhousia myrtifolia, Trochocarpa laurina, Eucalyptus deanei (emergents), Acacia elata (fire pruned), Ceratopetalum apetalum (gully), Tristaniopsis laurina (gully). Herbs: Sticherus flabellatus, Adiantum silvaticum, Doodia aspera. Climbers: Morinda jasminoides, Smilax australia.
REMARKS: Equivalent to communities B1 and B2 of Clarke and Benson (op. cit.)				
2. Tall Forest	Trees up to and over 30m high with mid dense canopy cover. Understorey, dense to mid-dense, moist with cover of smaller trees, shrubs, climbers and herbs, 3-4m high.	Adjacent to and emerging with Community 1 around creek re-entrants below quarry site.	Lower hillslopes on Terrigal Formations around creek re-entrants on deeper clay soils in sheltered situations.	Trees: Eucalyptus deanei, Angophora floribunda, Syncarpia glomulifera, Acacia elata. Shrubs: Dodonaea triquetra, Glochidion ferdinandi, Breynia oblongifolia, Zieria smithii. Climbers: Clematis aristata, Eustrephus latifolius, Smilax australia, S. glyciphylla. Herbs: Dichondra repens, Adiantum aethiopicum, Calcita dubia.
REMARKS: As for the Community B5 of Clarke and Benson (1987). Not investigated for species list.				

TABLE 3.1 Continued...

COMMUNITY	STRUCTURE	DISTRIBUTION	HABITAT	MAIN SPECIES PRESENT
3. Woodland I	Trees up to 15m high with an open canopy cover. Understorey dry with a sparse understorey of smaller shrubs, trees and herbs.	Bottom of gully re-entrant, below proposed quarry site.	Dry north-western facing aspects on lower exposed slopes around creek re-entrants. Clay soils derived from shaley outcrops in Terrigal Formations.	Trees: Eucalyptus piperita ssp. piperita, Syncarpia glomulifera, Angophora floribunda, E. punctata. Trees and Shrubs: Acacia ulicifolia, Oxylobium ilicifolium, Trochocarpa laurina, Persoonia linearis, Banksia integrifolia. Herbs: Imperata cylindrica.
REMARKS: Sub-community of Community B7 of Clarke and Benson (op. cit.). Not investigated for species list. Understorey disturbed due to grazing activities.				
4. Woodland II	Trees up to 15m high with an open canopy cover. Understorey dense with a cover of shrubs, monocotyledons and herbs up to 2m high. Understorey varies from moist to dry depending on drainage.	Along proposed access road and surrounding the main quarry site.	Rocky slopes and ridgetops of Hawkesbury Sandstone on more exposed aspects.	Trees: Eucalyptus eximia, E. gummifera, Angophora costata, E. piperita ssp. piperita, E. punctata, E. agglomerata, E. haemastoma. Shrubs: Pultenaea ferruginea, var. ferruginea, P. rosmarinifolia, Dillwynia rudis, Woollsia pungens, Grevillea diffusa ssp. filipendula, Boronia ledifolia, Lomatia silaifolia. Monocotyledons: Dianella caerulla, Doryanthes excelsa, Lomandra obliqua Patersonia glabrata. Herbs: Actinotus minor, Lindsaea linearis.
REMARKS: Equivalent to Community C2 of Clarke and Benson (op. cit.). Community is variable in species composition due to past fire activity and moisture/shelter, the latter allowing a more mesophyllous understorey.				

TABLE 3.2 Continued...

COMMUNITY	STRUCTURE	DISTRIBUTION	HABITAT	MAIN SPECIES PRESENT
5. Shrubland/ Sedgeland with Heathland.	Medium to open cover of shrubs over 2m high with a dense to mid-dense cover of sedges up to 2m high. Understorey dry to moist depending on drainage conditions. Pockets of heathland comprising shrubs up to 2m high with understorey of monocotyledons and herbs.	On main rock platform within proposed quarry operation.	Found on large rock outcrops of Hawkesbury Sandstone where shallow soil depressions can accumulate and around creek lines where impervious drainage conditions occur.	Shrubland: Banksia ericifolia, Acacia oxycedrus, Angophora hispida. Sedgeland: Shrubs: Banksia ericifolia, B. robur, Acacia oxycedrus, Sprengelia incarnata, Bauera rubioides. Monocotyledons: Baumea rubiginosa, Cyathochaeta, diandra, Gymnoschoenus sphaerocephalis, Leptocarpus fenax, Schoenus brevifolius, S. melanostachys. Heathland: Shrubs: Baeckia brevifolia, Banksia ericifolia, Darwinia fascicularis, Kunzea capitata, Epacris microphylla, Leucopogon microphyllus. Monocotyledons: Ptilanthelium deustum. Herbs: Drosera auriculata, D. spathulata.

REMARKS: Equivalent to Communities, C3, C4 and C5 of Clarke and Benson (1987) and sometimes referred to as the 'moist shrubland complex'. At this site there is an integradation of all three communities and separation was not possible. Sedgeland not investigated for species list.

On the eastern and northern edges of the main rock platform, the deeper, more moist soils allow taller vegetation to establish. Angophora hispida of 2 metres in height dominates these areas.

Interspersed between and below the main rock platforms are impervious shale layers with impeded drainage conditions. Flora adapted to these situations contain a large Cyperaceous component.

Encompassing Community 5 is Woodland II (Community 4), which was found to have a reduced species diversity in close proximity to the main rock platforms, due to the limited available microhabitats.

Within the gully, fire pruned pockets of rainforest occur. This community (Gully Rainforest, Community 1) is only 50m wide in places, as it is restricted by the moisture conditions and steep side slopes of the gully. Species such as Backhousia myrtifolia and Trochocarpa laurina occur along the edges of this community, having adapted to drier conditions and fire. The upper gully section contains a greater diversity of species with large trees of Ceratopetalum apetalum (Coachwood) and Tristaniopsis laurina (Watergum). Along the full length of the gully is a pronounced fern flora - being mainly Sticherus flabellatus (Umbrella Fern), Blechnum nudum and B. cartilagineum. Rock outcrops on slopes contain large pockets of Pyrossia ruperstris (Rock felt-fern) and Microsorum diversifolium (Kangaroo Fern). Covering boulders within the creek are carpets of macroalgae mixed with the common filmy fern Hymenophyllum cupressiforme.

P.O. 79.104 - Track

One vegetation community occupies the full length of the proposed access track.

Along the extensive sandstone benches is a woodland with a dense xeromorphic understorey - Woodland II (Community 4). Canopy trees are mainly from the Woody-fruited Bloodwood group (Subgenus Corymbia), but there is considerable integradation and variation with other species, depending on soil, aspect and slope. Intermixing occurs with Stringybarks, Peppermints and Scribbly gums from subgenus Monocalyptus.

On plateau tops both Scribbly Gums, E. haemastoma and E. racemosa, occur together as the dominants with E. eximia. This community has adapted to survive under a fire regime and therefore understorey vegetation is extremely variable. More recent fires have led to an understorey dominance of Hakea dactyloides, Pultenaea ferruginea var. ferruginea, Isopogon anemifolius, Lomatia silaifolia and Conospermum longifolium ssp. longifolium. Areas showing a greater time period since the previous fire have a greater diversity of species but often dominated by Grevillea diffusa ssp. filipendula.

Drainage runnels change the understorey composition to that dominated by sedges from the Cyperaceae family (mainly Gahnia ssp. and Schoenus ssp.) and the coral fern Gleichenia dicarpa, which occur in dense pockets.

On rock faces where run off is prevalent, Dracophyllum secundum can be found occasionally with the King Fern Todea barbera. Moist sheltered pockets below the benches are often dominated by Leptospermum flavescens (Yellow scented Tea Tree) and Acacia terminalis (Sunshine Wattle).

A feature of this community is the conspicuous occurrence of the Gymea Lily, Doryanthes excelsa.

Rare and Restricted Species

Two species recorded on the site during the survey are classified by the National Parks and Wildlife Service (Leigh, et.al, 1981) to be rare or endangered species. These are:

Grevillea diffusa ssp. filipendula was recorded at the site and in the adjacent area. It has a local prolific distribution on slopes and ridges from Mount White north to the Hunter Range.

Tetratheca glandulosa is sporadically distributed along the route of the proposed access track.

Other rare and restricted species known to occur in the area but not recorded in the survey include:

Blechnum ambiguum - a harsh fern found under caves, waterfalls and rock ledges, usually on Hawkesbury Sandstone.

Austromyrtus tenuifolia - a small soft-leaved shrub present on rocky creek beds in inaccessible upper parts of the gully.

Leucopogon amplexicaulis - a small shrub found in gullies and along creek lines on Hawkesbury Sandstone.

Darwinia glaucophylla - a shrub sometimes occuring on rocky outcrops and ridgetops.

Darwinia procera - a shrub occuring on dry rocky outcrops under Eucalypt forests.

It should be noted that the communities which support these rare and restricted species are locally abundant, covering vast areas of Hawkesbury Sandstone.

Weed Species

The only obvious weed colony is present in the old quarry workings. Andropogon virginicus (Whiskey Grass) has colonised accumulated muds and sands. Some isolated specimens are present along the route of the proposed road and on rocky outcrops where sediment has accumulated in rock crevices.

Remnant grass patches are also present in the old quarry probably associated with old buildings. Grass species noted include Stenotaphrum secundatum (Buffalo Grass) and Cynodon dactylon (Couch grass).

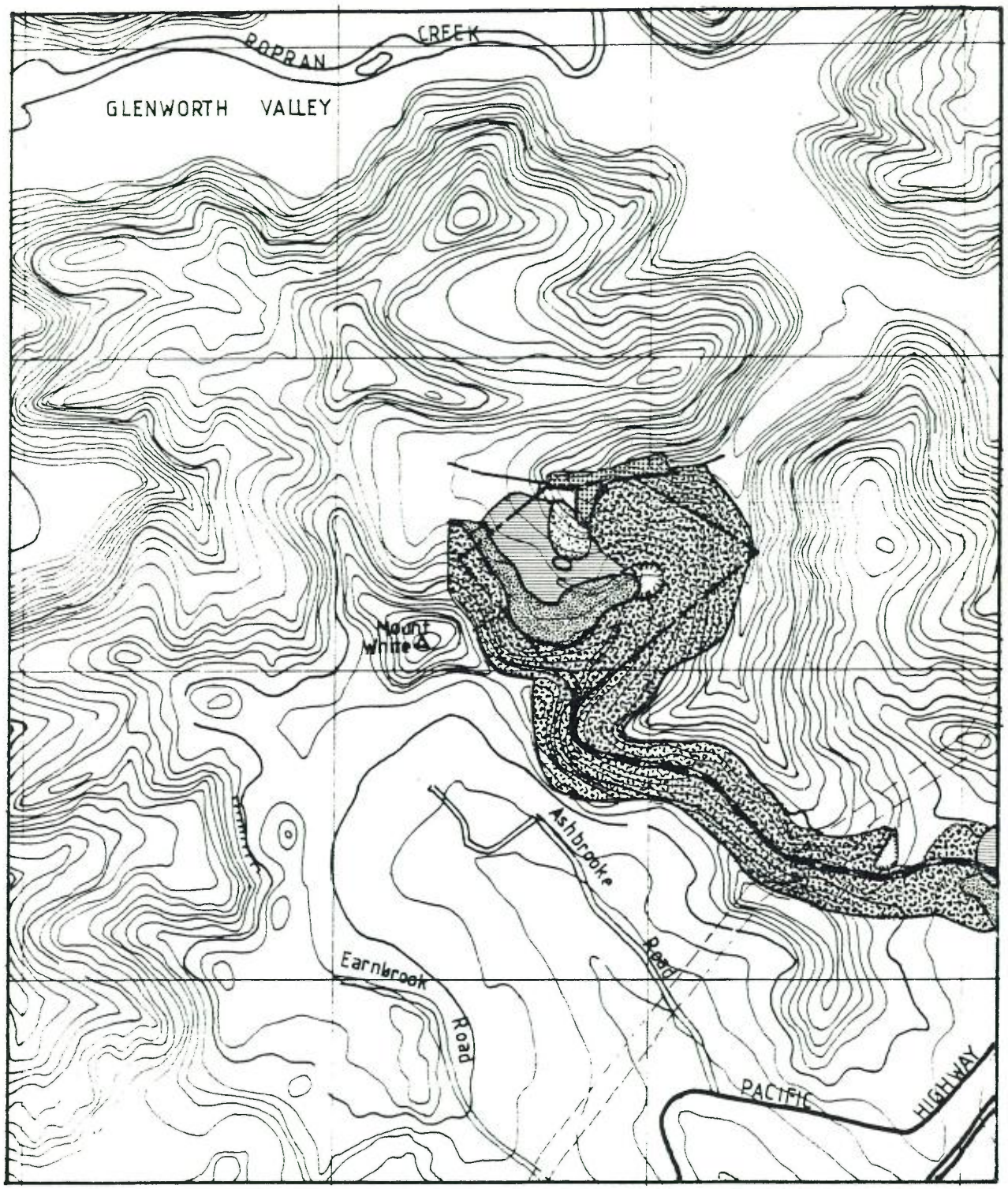
3.2.7 Wildlife

A review of the existing literature on the study area in conjunction with a field reconnaissance produced the list of wildlife species in Appendix E.

From the literature, possible faunal inhabitants were listed, based on known habitat requirements and reported sightings. This uncovered 21 species of terrestrial native mammals expected to inhabit the area. Of these, 19 (90%) have been observed in comparable habitats in the region. Similarly, 9 species of arboreal mammals would be expected, with 8 (89%) of these having been previously recorded in the region. Nine species of introduced mammals have been reported in the region. Nine species of bat may use these areas, although no other studies have investigated this group. A diverse avifauna with 126 species of birds have been reported from similar habitats in this locality. In addition, 45 species of reptile would be expected from the area with previous studies recording (69%) of these. Fifteen species of amphibians (frogs) have also been recorded.

From the field reconnaissance, five habitat classifications describe the wildlife (refer to Figure 3.5). The habitats reflect broad changes in vegetation (species composition and relative dominance) which are considered to reflect major changes in animal habitats. These are artificial divisions (based on floristic changes, aspect, slope, soil and hydrological differences), enable convenient classification but do not necessarily reflect sharp boundaries in faunal community composition. Highly mobile groups (such as birds) may move freely between habitats, while those with more specific ecological tolerances (eg., frogs) may be restricted to areas with reliable sources.

The area is considered to be very diverse floristically. The presence of several different layers of habitat (for example, dead logs, exfoliating rocks, small shrubs, mid-sized shrubs, tall shrubs, young eucalypts, and mature eucalypts) implies a high structural diversity. This diversity of vegetation structure provides a wide range of animal habitats, even within one vegetation community. This fact with the presence of several vegetation communities within the study area, suggests that the area may support a diverse fauna.



Mount White Sandstone Quarry

Figure 3·5
WILDLIFE HABITATS

FORSITE • Landscape Architects and Planners Pty Ltd

P.O. 79.104 - Site

Five different environments were identified.

1. Existing Quarry Site

   Past quarrying operations left a highly disturbed habitat with extensive loss of natural vegetation and other cover. Fallen blocks provide some reptile habitat (frogs, lizards) while the heath species provide a seasonal food source for nectar-feeding birds. The area of useable habitat is very limited and the extensive disturbance around the quarry perimeter (by man and foraging cattle), make the area of little value for fauna.

2. Open Forest Habitat

   Open forest forms the dominant habitat type in the north east, east and south east portion of the proposed quarry site (about 50% of total habitat). Within the forest, there are numerous open stony areas suitable for basking reptiles - patches of low dense shrubland, exfoliating sandstone, rocky outcrops and ridge crests. There is a good ground cover of litter and logs within the forest, while rocky areas support a low shrubland community.

3. Shrubland Habitat

   Open eucalypt forest fringing the south western boundary of the site changes quite sharply to shrubland (low dry heath to 1.5m) moving downslope. The shallow soils mean that there are numerous open rocky flat areas and exfoliating sandstone which provides excellent reptile habitat. The ground surface is however considerably disturbed and compacted by grazing cattle. Therefore, good surface habitats are restricted. The good mix of shrubland species provide an excellent range of food source and nesting habitats for birds.

4. Sedgeland Habitat

   A lack of defined drainage lines in an area of very shallow soils (north of the site) has led to the development of a "hanging swamp". The dam at the southern perimeter once provided a large source of open water, however, now only numerous ponds and streams exist within the vegetated areas. This environment, although not likely to support a particularly rich fauna, is unique in the local area. The reliable source of moisture combined with a variety of vegetation structure, means that a number of good frog habitats are to be found. Luxuriant plant growth provides a good seasonal food source for birds, and the dense foliage provides good cover and nesting habitat.

5. Closed Forest Habitat

The drainage lines at the northern boundary of the site support a eucalypt forest with a closed canopy containing some rainforest elements. The streams are fed from the sedgeland upslope, and the abundance of fresh water, large numbers of boulders and fallen logs, provide excellent animal habitats. This environment is particularly suitable for water-loving skinks, dragons and amphibians, and the surrounding dense vegetation is likely to support mammal species not found in other areas within the site.

P.O. 79.104 - Track

Along the length of the track three broad habitat types were encountered.

1. Shrubland Habitat

Initially, the track passes through a small section of shrubland (tall, dry heath) which lies between open forest to the north-east and pasture/commercial development to the south-west. This vegetation is dense and in good condition, however it is very limited in extent. It provides good habitat mainly for nectar-feeding and insectivorous birds.

2. Shrubland/Sedgeland Habitat

Approximately 0.5km from the start of the track, a small section of wetter vegetation (shrubland/sedgeland) is encountered. Although patchy in extent, the shrubland vegetation provides good small bird habitat, while the sedgeland would support a range of frog species. The area where the track crosses the sedgeland coincides with a section of land cleared for the underground gas pipeline. The habitat is highly disturbed at this crossing point.

3. Open Forest Habitat

The remainder of the route passes through open eucalypt forest. The multi-layered structure of understorey including the well established leaf litter provides good range of bird and mammal habitats, while extensive areas of bare rock and stony ground provide basking areas for reptiles. Rocky overhangs and exfoliating sandstone provide excellent habitat for crevice-dwelling reptiles and small mammals. There are large numbers of mature trees suitable for arboreal mammals, but the open nature of the forest may restrict the number of species and individuals present.

Along ephemeral drainage lines, and on east and south-east facing slopes (at the northern end of this section), the understorey becomes quite dense. Small patches of recently burnt vegetation here provide more diversity, floristically and structurally. As the proposed route nears the existing road on the ridge crest, the understorey becomes less dense and the diversity of habitats decreases.

3.2.8 Fire

Fire is a significant ecological component of much of the Australian environment. Much of the vegetation in environments similar to Mount White have evolved in the presence of fire and grow readily in fire-prone environments.

Most of the fires in the local area are influenced by the hot dry westerly winds of spring and summer. The combined effect of these winds, high summer temperatures and highly inflammable sclerophyllous vegetation produce a volatile environment.

The study area has a fire index of 9.8 (D.E.P., 1984). This indicates that the area's susceptibility to fire is high.

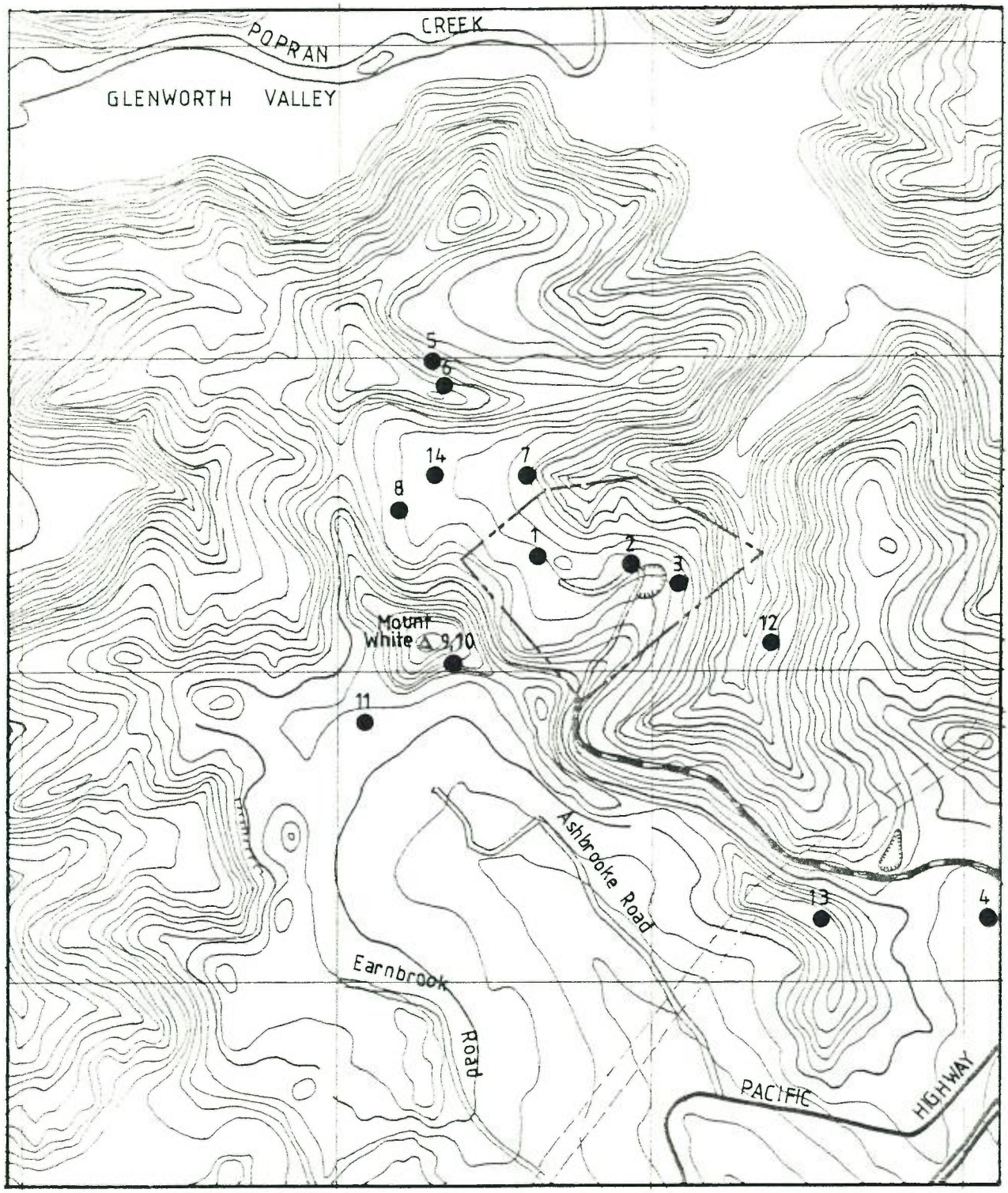
3.3 THE CULTURAL SETTING

3.3.1 Aboriginal Sites

Within a 2.5 x 2 km area encompassing P.O. 79.104 a total of 14 sites have been recorded. Only three sites are located within P.O. 79.104 - Bluff (1988) recorded #45-3-1670 with MW#1 and MW#2 being recorded in this archaeolgocial survey (refer to Figure 3.6).

Of the previously recorded sites, eight are rock engravings, two (#45-3-163 and #45-3-169) associated with axe grinding grooves. Three other axe grinding groove sites occur, including #45-3-167 at which 44 grooves occur in association with a shelter with drawings and over 28 engraved figures (refer to Appendix F for details).

Vinnicombe (1980) showed that because of the highly dissected nature of the topography, the mosaic of different vegetation and faunal populations and the consequent variety of ecosystems within a limited area, Aboriginal usage of the area was very flexible. Super-imposed on this flexibility she suggested there was an overall seasonal patterning oriented towards marine resources in summer and towards terrestrial resources in winter. A chronological context for this occupation has been provided by Attenbrow (1982).



Mount White Sandstone Quarry

- ● 1 # 45-3-1670
- ● 2 MW # 1.
- ● 3 MW # 2.
- ● 4 # 45-3-155
- ● 5 # 45-3-163
- ● 6 # 45-3-164
- ● 7 # 45-3-165
- ● 8 # 45-3-166
- ● 9 # 45-3-167
- ● 10 #45-3-168
- ● 11 #45-3-169
- ● 12 #45-3-161
- ● 13 #45-3-609
- ● 14 #45-3-1671

Figure 3·6
ABORIGINAL SITES

0 500 M

FORSITE • Landscape Architects and Planners Pty Ltd

#45-3-1670 was relocated, additional features identified and recorded. Two further sites were recorded. One site (MW #1) comprised three engraved figures, a narrow groove and an axe grinding groove, was identified west of the old quarry. The other site, a circle part of which at least appeared to be an Aboriginal engraving (MW #2), was identified east of the quarry. Apart from weathering factors all sites appeared to be in good condition, although trail bike tracks were visible on the surface of the rock at MW #1. Details of the sites are as follows.

#45-3-1670 Engraving Site

Map Ref: Gunderman 1:25,000 3/3167 62/9835

Location: This site is on an expanse of exposed sandstone west of the dam and about 190m west of the area likely to be affected by quarrying.

Description: In April 1988 this site was recorded as containing an engraving of a large mundoe or footprint of a mythical creature (32 x 17cm). Examination of the present occasion revealed another engraved mundoe (30 x 21cm) and a circular shape which may also have been engraved (21 x 18cm external, 12.5 x 13.5cm internal) Both mundoes are oriented towards the east and both have been abraded. Night recording would be required to identify whether other vague depressions on the rock surface were also Aboriginal engravings.

MW #1 Engravings and Axe Grinding Groove

Map Ref: Gunderman 1:25,000 3/3194 62/9834

Location: On an expanse of sandstone adjacent to and 67 - 105m south west of the old quarry.

Description: Two engraved circles, one (51 x 41cm) pecked and abraded, the other (30 x 28cm) abraded, particularly weathered and barely visible, and an abraded oblong shaped figure (41 x 10cm), together with a narrow groove (37 x 4cm), possibly the result of spear sharpening, make up the body of figures 67m from the north western corner of the quarry at 245 . A further 38m away at 258 from the engravings is an axe grinding groove (36x7cm) adjacent to a natural shallow depression in the rock which would hold water after rain.

MW #2 Engraving

Map Ref: Gunderman 1:25,000 3/3205 62/9830

Location: Twenty metres east of the old quarry and about 30m south of the edge of the rock platform.

Description: This site consists of an oval outline (150 x 69cm) part of which appears to be a pecked and abraded Aboriginal engraving, but the remainder of which is natural. The engraved section may have been added to the natural component to form the figure, or the natural component may be weathering consequent upon the engraving of the outline.

Sand in sections of the groove and in the centre of the figure has resulted in pale colouration and depressions in the rock, which is otherwise pitted and dark grey.

3.3.2 Heritage

No heritage sites, as listed by the Heritage Council of New South Wales, occur on or within close proximity to the proposed site and access road.

Dimension sandstone quarrying forms part of heritage of the Gosford area, with activities back in the 1920's.

In 1922, G.O. Hayward moved from a quarry at Springwood and commenced quarrying on the northern side of the main quarry workings in Gosford. This site had previously been worked. The value of Mr Hayward's weekly stone output was in the vicinity of 150 pounds per week and his wage bill was 40 pounds.

In the early 1920's, Charles Edward Gaites started quarrying on the eastern side of the same hill on a parcel of land called Dibbens Dairy.

In the same period a company called Freestone Pty Ltd commenced quarrying by tunnelling into the sides of the same hill on the western side.

Gosford Quarries Pty Ltd commenced quarrying in 1926 and gradually purchased various quarries until by approximately 1930 they had acquired all the surrounding quarries on the hill.

3.4 THE SOCIAL SETTING

3.4.1 Land Use and Adjoining Ownership

As identified under Interim Development Order No. 122 for the City of Gosford, the site and neighbouring areas are zoned 7(a) - Conservation. The area is primarily vacant Crown land bordered by freehold land in the south and Public Reserve R89280 for public recreation and preservation of native flora and fauna in the north (refer to Figure 3.7).

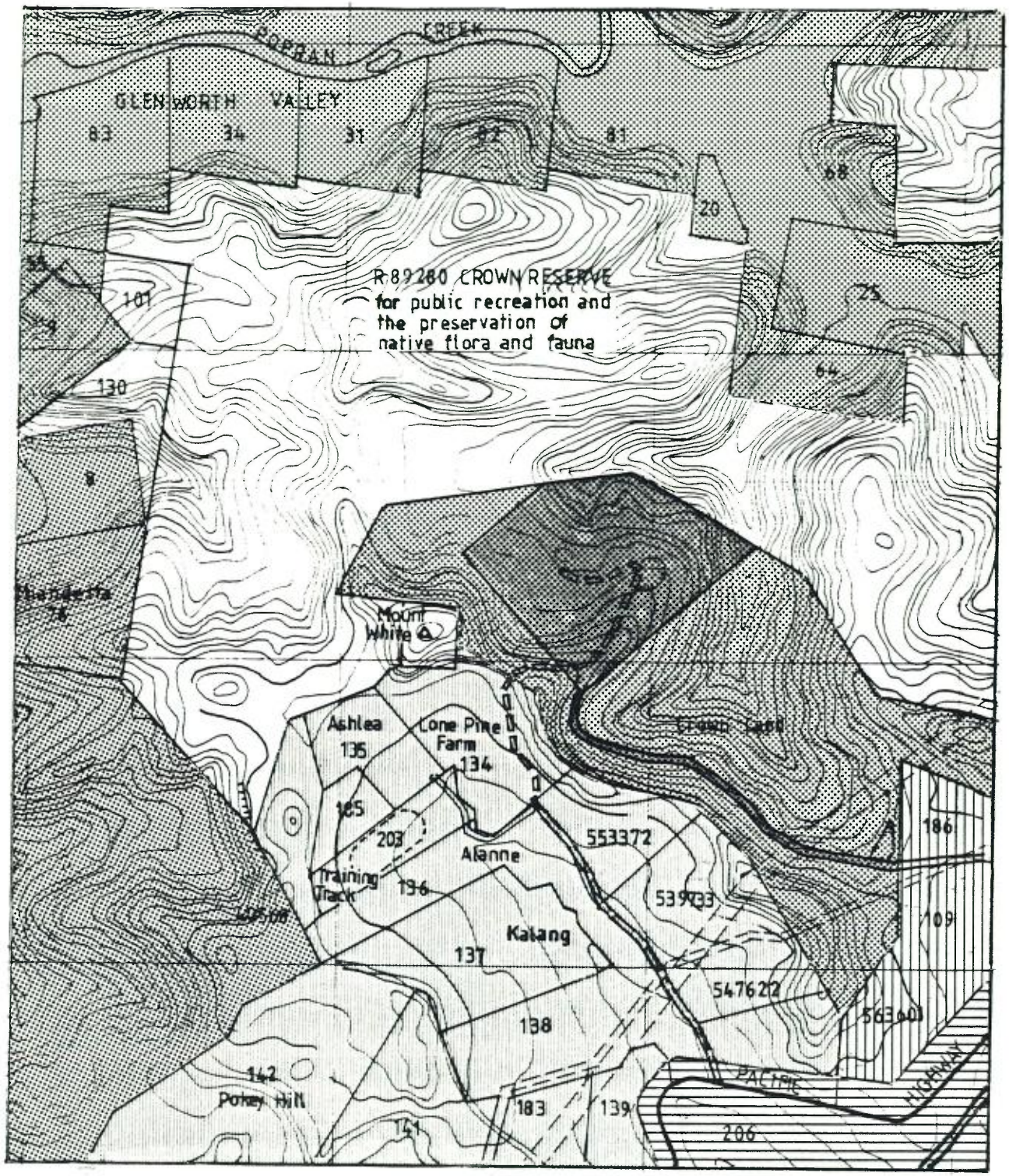
Permissive Occupancy P.O. 79.104 has been granted by the Department of Lands, NSW, pertaining to the site and access track (refer to Appendix G).

Within the boundary of the proposed site, a previously worked quarry is present. This was operated by Blue Metal Industries, and ceased operations in the late 1970's. Remaining lands are naturally vegetated. A private road traverses the site from Portion 134. Legal access to the site via this route is not now possible. Associated with the old quarry works is a dam, which has since been breached.

Both the Sydney-Newcastle oil and gas pipeline and the 330kV Munmorah to Sydney East transmission line cross the route of the proposed access road.

The site is gazetted under Sydney Regional Environmental Plan No. 8 (Central Coast Plateau Areas) and Sydney Regional Environmental Plan No. 9 (Extractive Industry). REP No. 8 provides for the environmental protection of the Central Coast Plateau Areas and encourages areas with a high agricultural capability, a regionally significant extractive resource, or high conservation status to be used for that purpose. R.E.P. No. 9 further isolates areas of extractive resources in close proximity to the Sydney Metropolitan Area considered to be of regional significance. The Plan facilitates the development of identified resources and ensures that extractive industries are carried out in an environmentally acceptable manner.

Encompassing the site, but mainly including the plateau and escarpment lands to the north and south (residual Crown land), is a current proposal to establish Mount Olive Nature Reserve. This proposal has been put forward by the National Parks Associations of NSW. The objects of the proposal are to protect ecologically important vegetation communities which are not conserved elsewhere and to incorporate remaining Crown lands along the drier plateau ridgelands. The broad concept was to bridge the gap between Dharug and Brisbane Water National Parks and to provide a wildlife corridor for any coastal-escarpment migration pattern.



ZONING

- 1a · RURAL
- 1b · HIGHWAY PROTECTION
- 6b · SPECIAL PURPOSES
- 7a · CONSERVATION & SCENIC PROTECTION
- 7b · SCENIC PROTECTION
- PO 79-104 / R.E.P. No. 9.
- NEWCASTLE OIL & GAS PIPELINE
- MUNMORAH - SYDNEY 330kV TRANSMISSION LINE
- PRIVATE ACCESS TRACK

Mount White Sandstone Quarry

Figure 3.7
LANDUSE & ZONING

0 500 M

3.4.2 Population and Employment

The estimated resident population of the City of Gosford in 1986 was 116,450 with an annual population growth rate of approximately five percent (Australian Bureau of Statistics, 1987). This growth rate has steadily increased over the past ten years. The highest concentration of people are along the coastline and foreshores of Brisbane Water.

The population of Mount White is small, consisting of a few residences in a semi-rural situation.

Unemployment in the City of Gosford is recorded in 1988 at 9.1% for the over 25 years age group. The unemployment rate for the same group stands at 5.7% in Sydney.

3.4.3 Traffic

Traffic in the Mount White area is primarily generated through local residents and specific users. Traffic flowing north from Sydney without a particular reason to stop in Mount White remain on the Sydney-Newcastle Freeway for convenience. Similarily, traffic flowing south from Newcastle or Gosford preferrably use the Freeway.

Traffic counts in 1985 indicate that the bulk of traffic use the freeway. Counts of the annual average traffic volume taken north of Berowra (south of the freeway entrance) were 28,845 and at Berowra on the Pacific Highway were 4,095 (Hallam, 1988). Counts on the Pacific Highway on the Brooklyn Bridge were 2,527.

3.4.4 Other Quarrying Operations

No dimension sandstone quarries lie within close proximity to the proposed operations.

Two smaller split stone quarries are operated in the Mount White area. Different extraction methods are utilised. Extraction in each is by the sole operator and production is small.

Within the City of Gosford various dimension sandstone quarries are present. In addition to the six quarries held by Gosford Quarries there are two other quarries - Central Coast Sawn-Stone Quarries, Somersby; Melocco, Somersby.

3.4.5 Visual Character

The landscape of Mount White has an identifiable character that is established by a series of factors.

Mount White Sandstone Quarry - EIS

The area consists of dissected Hawkesbury Sandstone topography of moderate to strong relief with deep gorges, limited plateaux and drowned river valleys. The dissected topography is largely forested while the plateaux tops have been cleared for residential development. The river valleys incised into steep slopes are meandering creeks with large floodplains. The Sydney-Newcastle Freeway (F3) and the Pacific Highway play major roles in the visual character of the area.

The site is situated in an enclosed valley and hence the visual catchment is partially enclosed. All views but north east facing views are limited by the steep forested dissected slopes. Mount White is the highest local peak directly to the west. To the north east, views can be gained down onto the river flats of Kelly's Creek, a tributary of Popran Creek. This is primarily reclaimed wetland, now used for cattle grazing. Forested ridgelines and valleys of the same visual character encompassing Mount Olive form the backdrop to north east facing views.

4.0 THE PROPOSED DEVELOPMENT

4.1 GENERAL

The proposed development has two components. First, Gosford Quarries Pty Ltd propose to resume quarrying activities in a previously established dimension sandstone quarry at Mount White. Second, access must be gained to the site, so the construction of an access track from the quarry to the main road is essential.

4.2 GOSFORD QUARRIES PTY LTD

Quarrying of dimension sandstone in the Gosford area has a history which goes back to the early 1920's. Gosford Quarries Pty Ltd commenced quarrying in 1926 and by 1930 had purchased various quarries in the area.

The Gosford Quarry produced a light grey stone very much favoured for monumental work and it eventually became the largest dimension stone quarry in Australia.

The Piles Creek Quarry at Somersby started in 1948. This produced, from different sections, a white stone that turned buff on exposure to the atmosphere after quarrying and a coloured or banded stone that is the type of stone preferred today. This type of stone is quarried at Somersby Quarry. The Sydney - Newcastle Freeway now dissects the Piles Creek Quarry.

Gosford Quarries took over Hawkesbury Sandstone Co. in the early 1950's acquiring Wondabyne Quarry, Maroubra Quarry (since closed) and a depot and sales yard at Annandale.

The Wondabyne Quarry produces the best carving grade sandstone in Australia and the stone is used mainly for the restoration of historic buildings.

The Somersby Quarry began operations in 1962 and is the company's main bulk source of sandstone blocks.

Due to the expansion of Gosford township, operating a quarry and works near the town's centre became increasingly difficult and in 1974 the works were relocated to a site adjoining Somersby Quarry.

Today, Gosford Quarries is regarded as the leader in the supply of dimension sandstone. They supply to local, Sydney and Newcastle markets as well as Victoria, South Australia, Australian Capital Territory and Queensland markets. Sandstone has also been supplied to Japan, Hawaii, Singapore, Fiji, Hayman Island and Norfolk Island.

The company also has a team of highly skilled stonemasons who work intricate shapes in the sandstone by hand. Stone masonry is traditional craft and is often carried out in exactly the same manner as our pioneers did many years ago.

4.3 RESOURCE TYPE & QUALITY

The resource is dimension sandstone which would be extracted from the quarry as large blocks free of any faults.

Although Hawkesbury Sandstone outcrops extensively within a 100km radius of Sydney, known deposits of sandstone suitable for quarrying as dimension stone are very few. Other deposits have been incorporated into areas which are managed by the National Parks and Wildlife Service or sterilised by urban development.

This resource is recognised to be of regional significance and hence is gazetted under R.E.P. No. 9.

A massive deposit free of all faults is required and the stone must have acceptable physical characteristics. To establish whether the deposit is suitable for extraction, it is necessary to actually quarry it, as no other methods of investigation are conclusive. Hence a deposit that has been previously quarried, such as Mount White, can be examined and the quality of the stone partially determined.

4.4 EXTENT OF WORKS AND SITE LAYOUT

The extent of quarrying activities would be limited to within the boundaries defined by P.O. 79.104 and within a 5m band either side of the centre line of the proposed access track (refer to Appendix G).

The layout of the site cannot be determined prior to investigation of the extent of the deposit by core drilling. The drilling would outline the boundaries of sandstone suitable for quarrying. Thence, the positions of the quarrying and associated equipment would be finalised.

A setting pond and supply pond would be positioned to the east of the existing dam, in the western portion of the site.

The outer boundary of the site would remain vegetated to confine all activities to within the site and increase the visual amenity of the site.

4.5 SITE PREPARATION

The initial step would be to construct an access track into the quarry along the route set aside by the Department of Lands and depicted on Appendix G.

Once access has been gained, it would be necessary to remove overburden and prepare a level pad approximately 30m x 30m for quarrying. Two ponds would be excavated adjacent to the existing dam, one for the collection and settling of cutting fines and the other for collection of water for recycling.

Portable amenities buildings would be located adjacent to quarrying site and a stiff leg crane will be erected to lift blocks out of the quarry.

4.6 DESCRIPTION OF QUARRYING OPERATIONS

The proposed quarrying operation is a very labour intensive, low volume operation. Following the levelling of the site, a frame mounted rotating pneumatic hammer traversing along a set of rails approximately 11m long, cuts a continuous vertical slot into the stone 1.4m deep on three edges. The isolated block measures 10m x 1.8m x 1.4m. The block is then split off along the bed at the base by cutting a vee groove with a hand held scabbler, inserting steel wedges into the groove and tapping them with a sledge hammer. Once the block is completely free on all six faces hand held rock drills are used in conjunction with plugs and feathers to break this 70 ton block into smaller blocks approximately 2.3 x .9 x 1.4m in size and weighing up to 7.5 ton (refer to Figure 4.1).

These blocks are then lifted out of the quarry with a stiff leg crane and stored until required at Gosford Quarries' Somersby factory.

4.7 HOURS OF OPERATION

Quarrying would be carried out between 7.00am and 5.00pm over the Monday to Friday period and between 6.00am and 12.00 noon on Saturdays.

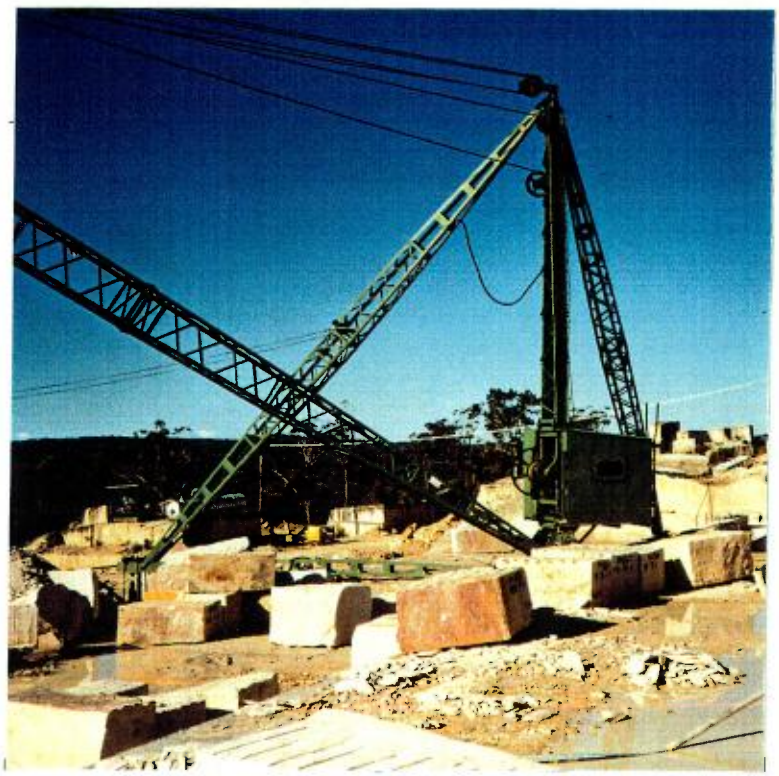
The movement of trucks delivering stone to the factory would be restricted to within these time frames.

4.8 WASTE MANAGEMENT

Tailings and overburden removed from above the quarriable stone would be stored on site and deposited back into quarried areas.

Cutting fines collected in the settling pond would be periodically cleaned out and also deposited back into the quarry. The second of the two ponds from which water is recycled would only discharge water during periods of extremely heavy rain.

A.



B.

A. A FRAME MOUNTED PNEUMATIC HAMMER TRAVERSING ALONG A SET OF RAILS CUTS A CONTINUOUS SLOT INTO THE STONE ON THREE EDGES.

B. THE SMALLER BLOCKS, BROKEN BY HAND-HELD ROCK DRILLS, ARE LIFTED OUT OF THE QUARRY WITH A STIFF LEG CRANE.

Mount White Sandstone Quarry

Figure 4·1
QUARRYING OPERATIONS

4.9 ENERGY REQUIREMENTS

The energy requirements for the operation would be a 65kVa diesel driven generator and a 350 L/sec compressor powered by a 168 Kw diesel engine.

4.10 ACCESS AND TRANSPORTATION

Access would be from the Pacific Highway, Mount White and along the proposed track to the quarry (refer to Appendix G).

Quarried blocks would be transported to the factory on trucks. A total of ten trips per week is envisaged (one trip equals two truck movements along the road - to and from the factory).

4.11 WORKFORCE

The quarry site would directly employ six people. However, as other sources exhaust their reserves, the sixty people employed by Gosford Quarries would be totally dependent on the raw material being extracted from the Mount White site.

4.12 PRODUCTION CAPACITY

The site has the capacity to produce up to $120m^3$ of dimension sandstone per week. While other quarries within the area are still operating, it would be necessary to produce approximately $40m^3$ per week.

4.13 LIFE OF THE PROJECT

The expected life of the quarry is about twenty years, although this would be directly related to the rate of extraction.

4.14 THE VIABILITY OF THE PROJECT

Gosford Quarries have been leaders in the supply of dimension sandstone throughout Australia for the past sixty years. The prime market lies in building projects and the restoration of historic buildings. The development at Mount White is essential to maintain the operation of the business.

The continuity of employment for the sixty people employed by Gosford Quarries, as well as a large proportion of the tradespeople in the Gosford and Sydney areas, is also entirely dependent on the availability of raw material from quarries. Without access to extensive deposits such as at Mount White, the industry faces a strictly limited life span and would not be capable of increasing employment opportunities.

4.15 END USES

After completion of quarrying and removal of associated machinery, the remaining overburden would be replaced and a rehabilitation programme would be implemented. It has been approximately ten years since previous quarry operations ceased. Natural regeneration of the vegetation has been good, although diversity in floristic structure is limited.

4.16 ALTERNATIVE SITES

Most of the sandstone in the surrounding area is bedded and jointed or contains defects. Examination of faces in the cuttings along the Sydney - Newcastle Expressway shows that none of this stone is suitable for dimension stone quarrying. Thus, alternative sites are virtually non-existant.

No further sites in the area are protected under R.E.P. No.9.

5. INTERACTIONS WITH THE ENVIRONMENT & ASSESSMENT OF IMPACT

5.1 GENERAL

The range and nature of the proposal's likely interactions, which would produce impacts on the Mount White area were determined by systematically relating all characteristics of the proposal to the physical, cultural and social elements of the environment.

Effects on the environment from the quarrying operations on the site are considered to be greater than those resultant from the construction of the access track.

5.2 THE PHYSICAL ELEMENTS

5.2.1 Air Quality

The quality of the air will not alter as a consequence of the proposed development. Dust generated from quarrying operations is primarily through blasting activities. This will not have an impact on the Mount White environment as no blasting will occur with the proposed works.

During quarrying operations, water is used to flush out the fines from the slot cut by the pneumatic hammer. Wet fines will not generate dust. Water is not used with the hand held scabbler, however, it is generally worked on a moist sandstone surface and hence very little dust will be generated.

The transportation requirements for only a small workforce (six), in conjunction with the low number of truck movements (maximum of ten truck trips per week) means that no significant amount of dust could be created by the minimal traffic involved.

5.2.2 Acoustic Quality

The effects of the quarry operations on the acoustic environment were assessed by conducting a series of octave band measurements on equipment of the type proposed to be utilised at Mount White. Noise emissions from equipment at Tydd's Quarry in Somersby (now held by Gosford Quarries), taken in 1980 and checked in 1988, were considered to be accurate. Table 5.1 presents an aggregate set of measurements from the two surveys in the form of relevant sound power emission in terms of dB re 10^{-12} watts.

Mount White Sandstone Quarry - EIS

TABLE 5.1 SOUND POWER EMISSIONS AT TYDD'S QUARRY

Equipment	Sound Power Level dB re 10^{-12} watts								
Octave Band Centre Frequency (Hz)	63	125	250	500	1k	2k	4k	8k	A
Ingersoll Rand Channelling Machine	75	87	89	96	98	104	104	102	111
Broomwade Compressor full load	100	101	93	105	104	105	102	96	110
Ingersoll Rand Rock Drill (Type RHS71/3L with air compressor)	100	103	100	108	109	111	117	109	120
Luffing Crane lifting 5 tonne load									103
Luffing Crane squeaking									117
Quarry Truck 20 tonnes maximum RPM	113	107	114	105	107	104	96	83	111

TABLE 5.2 COMPUTED DISTANCE ATTENUATION AND BARRIER LOSSES

Octave Band Centre Frequency (Hz)	63	125	250	500	1k	2k	4k	8k
Distance attenuation dB	-66	-66	-66	-67	-68	-73	-81	-90
Barrier attenuation dB	+20	+20	+20	+22	+24	+26	+28	+30

To further assess the effects, distance attenuation and barrier losses which would be produced as a result from the spacing between the proposed quarry and the nearest resident properties under both normal and abnormal propogation conditions (temperature inversion), were computed. The results are presented in Table 5.2.

The cumulative attenuation provided by distance and barrier effects will thus result in more than 80dB of attenuation and the resulting component of propogated sound would be less than 34dB(A) under all normal circumstances. Under conditions of temperature inversion, an approximate 10dB increase in sound propagation could be expected to result and, consequently, the resulting noise level under such circumstances may rise to approximately 40dB(A). Intrusive noise components of this magnitude would still be less than the normal background sound levels in the absence of a temperature inversion (the presence of which would be expected to increase background sound level and specifically noise from the Pacific Highway and the F3 Freeway) (refer to Section 3.2.2).

The proposed route for the new access track into the quarry lies at least 30 metres below the lowest point on the intervening ridge line, which separates the access track from Ashbrook Road. As a consequence, the physical and acoustical separation between this access route and the residential properties flanking Ashbrook Road will also ensure an extremely effective level of attenuation which would be difficult to achieve by other means (refer to Figure 5.3).

As the proposed access track follows a route below the north-eastern flank of the ridge line separating Mount White from the Pacific Highway, the operation of the proposed quarry will not result in any significant noise impact on the adjacent residential properties at Mount White (refer to Figure 5.3.).

5.2.3 Topography

The quarrying activities on the site will remove large quantities of rock, with the potential to alter the topography. As the proposed site is positioned within an enclosed valley, only the local topography will change and views of these alterations will be restricted due to the steep slopes on the north and south of the site.

Works will not occur on lands with slopes in excess of 18 degrees (Protected Land under Soil Conservation Act, 1938) (refer to Appendix A).

The depth of quarrying activities will not normally exceed 10 metres. However it is dependent on the extent of the resource, which cannot be determined until core drills have been taken.

Construction of the proposed track will only require minor cut and fill operations to level the route on the sandstone bench for the access track (refer to Figure 5.3). The one section of the track

where the sandstone bench is absent (due to a creek re-entrant, just north west of the track's junction with the 330kV transmission line), will require cut and fill works to stabilise the track. All effects on the topography will be localised to within a ten metre band along the route of the track.

5.2.4 Geology and Soils

For quarrying operations, all overburden is first removed and a pad approximately 30 x 30 metres is levelled. It is anticipated that the first pads to be quarried will have little overburden. Pads quarried in later stages of the operation will have large quantities of overburden, which will be stored on the site and later back filled into quarried areas. Erosion from these stockpiles will be prevented with appropriate measures.

5.2.5 Vegetation

The proposed development is considered to have few interactions which would lead to potential impacts on the existing vegetation communities.

P.O. 79.104 - Site

The Shrubland/Sedgeland with Heathland (Community 5) is conserved in both Ku-ring-gai Chase and Brisbane Water National Parks. However their occurrence as tiny isolated units makes their total conserved area not great, but due to the disjunct nature of distribution of the many isolated units, the community would be considered well represented throughout the area (refer to Figure 5.3).

The Gully Rainforest (Community 1) is well conserved in adjacent National Parks (Brisbane Water and Dharug). However the best developed examples in the area are found around the ranges of Mt. Elliott and Ourimbah Creek valley (Payne, 1987), which are mainly conserved in Gosford City Council reserves. Although this community type would be considered to be of low significance, this community is highly sensitive to disturbance and therefore would be considered to be of high significance on a regional level. In Community 1, no rare and restricted species were recorded; none are usually present in the gully rainforests of this district except for isolated occurrences around the Ourimbah Creek Valley (e.g. Callistemon shiressii).

Community 2 is well represented in Dharug National Park and is present in Brisbane Water National Park but the status of Community 3 is unknown. Both communities are not directly affected by the proposal and are not considered to be of high significance in the local region.

P.O. 79.104 - Track

Woodland II (Community 4) is also well conserved in both the adjacent Dharug and Brisbane Water National Parks. This community is not considered to be of high significance in the local area because of its abundance, but it is of regional significance with respect to the presence of rare and restricted species.

Rare and Restricted Species

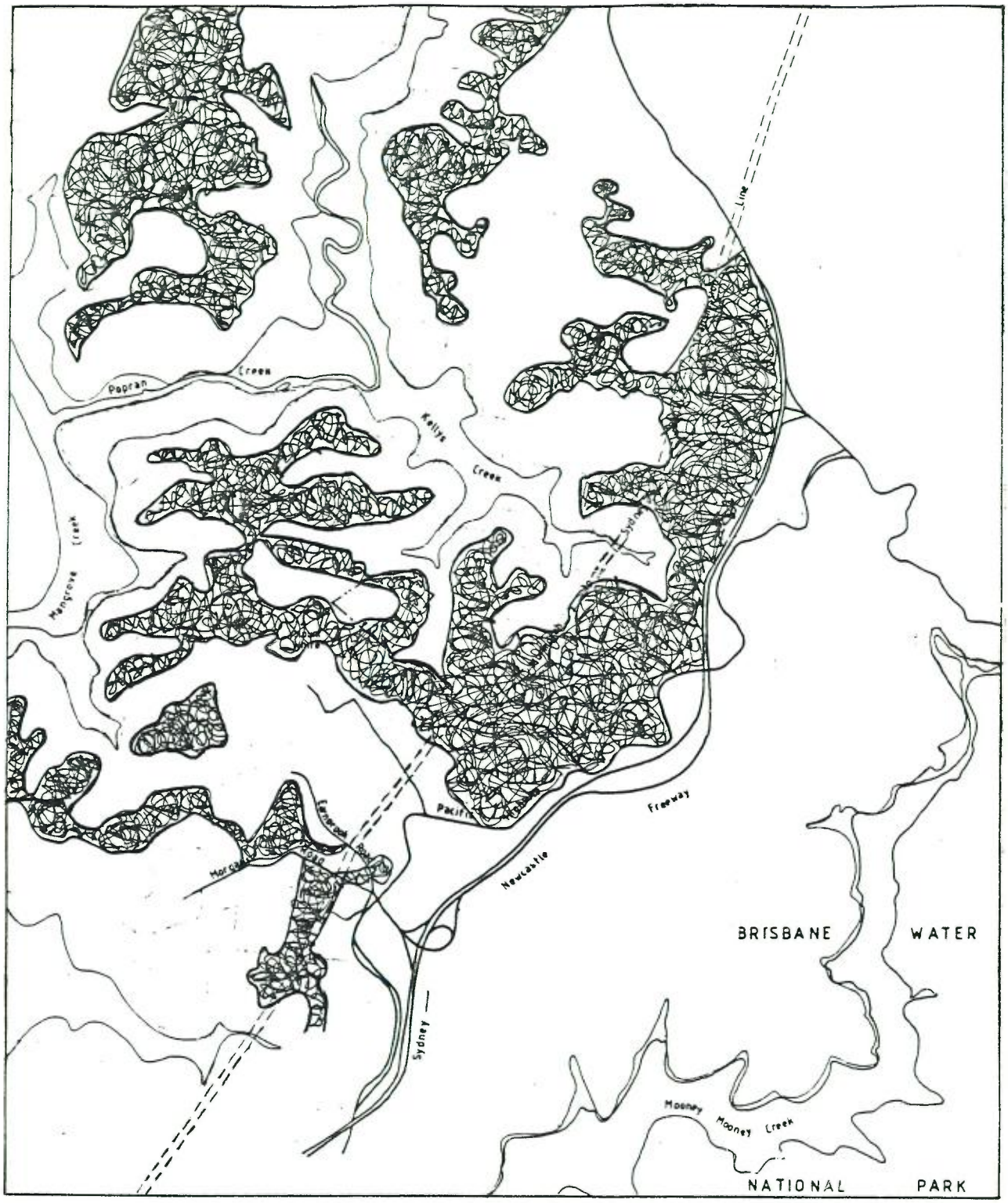
Grevillea diffusa ssp. filipendula is coded 2RC by Leigh et. al (1981). This coding indicates a distribution range of less than 100km in Australia and hence is a rare species. However, this species is not considered endangered and is known to be represented in National Parks and other reserves. Its distribution on the Central Coast extends from Mount White north along the Hunter Range with communities also recorded at Mount Elliot and on the Bouddi Peninsula (Payne, 1988). Figure 5.1 indicates the distribution of Grevillea diffusa ssp. filipendula in the vicinity of the site. In light of its prolific local distribution, the impact from the proposed operations is considered to be minimal, inducing no effect on the population of this species.

Tetratheca grandulosa is also coded 2RC (Leigh, et. al, 1981). The distribution of this species has not been recorded but is assumed to occur as sporadic clumps within Woodland II (Community 4). This woodland has a vast distribution across Hawkesbury Sandstone plateau areas on the Central Coast. The impact on the population of the species as a result of the proposed quarry access track would be small, considering the width of the track, the number of plants eliminated and the assumed distribution of the species.

The five other rare or restricted species were not recorded within the vicinity of the quarry or along the route of the proposed track even though they have been recorded to occur in the area. It is therefore considered that the proposed activities will have a negligible effect on the distribution or population numbers of these species.

5.2.6 Wildlife

While this area contains potentially good quality habitats, few of the animal species can be considered as having particular conservation importance. Nearly all are widespread and common throughout the region and state, although they may be locally rare or uncommon.



EXTENT OF WOODLAND II CONTAINING GREVILLEA DIFFUSA SSP PILIPENDULA

Mount White Sandstone Quarry

Figure 5·1
EXTENT OF WOODLAND II

0 500 1000 M

Mount White Sandstone Quarry - EIS

The low impact of this proposal on wildlife hinges on the small scale of operations and the presence of similar good quality habitats nearby. Should these parameters change, greater consequences on the regional fauna may occur.

The main potential impacts of the proposed development include deaths of individual animals, direct destruction of habitat and indirect disturbance of habitat by sedimentation of eroded material and changes to the hydrological regime. The degree of impact has been assessed for each component of the proposed development for each habitat within that component.

P.O. 79.104 - Site

1. Existing Quarry Site

Renewed quarrying operations at the site of the present quarry are unlikely to have any major effect on the fauna in the immediate locality. The existing habitat is highly degraded and regeneration since previous quarrying activities has a limited floristic structure (refer to Figure 5.3). The area of heath regeneration and sedgeland within the quarry are insignificant as fauna habitats. The major potential impacts from quarrying are likely to be a consequence of an extension of operations into adjoining previously unquarried areas.

2. Open Forest Habitat

This habitat, with its variety of micro-habitats is likely to support a diverse fauna. However, it is widespread and well conserved within the region rendering the loss of habitat to be small.

Displacement of populations through habitat destruction may lead to greater competition in the remaining habitat areas. This could lead to some subsequent loss of individuals as populations adjust to the reduced area of habitat. Such displacement and subsequent losses should not be significant in terms of the total populations of the diversity of the area.

The most important impact of renewed quarrying operations concerns the habitats downslope from the quarry itself. There was a tendency in past operations to dump waste rock material on the perimeter of the quarry, from where it moved downslope. The area to the south-east of the existing quarry is steeply sloping, with a number of rocky outcrops. There is at least one very large rocky overhang. This cave (4m high, 5m deep and 40m long) provides potentially good habitat for wallabies, is a local source of water, and supports a dense fern environment. These localised and restricted habitats will not be affected, as all waste will be kept within the boundary of the worked quarry. In addition, vegetation along the edge of the rock platform will be maintained to act as a buffer, protecting habitats below.

The noise from the quarrying operations, although considered to be minimal for human communities, may interfere with the behaviour of faunal groups that use audible communication for the establishment of breeding territories and in competition for food. No relevant information is readily available on the impact of noise on Australian faunal groups.

3. Shrubland Habitat

The area of shrubland to the west of the existing quarry provides an excellent range of food sources and nesting habitats for birds. Extension of quarrying operations into this area would reduce the size of this already small habitat, although it is well represented and conserved by much larger areas within the region. Noise from the quarrying operations could affect the diversity of sensitive bird species. The acoustic assessment indicates minimal noise impacts on human communities but the effect of noise on Australian birds has not been recorded. It is likely that sensitive species would disperse to other habitats in the local region if the noise was too high.

A potentially major impact would be through alterations to the hydrological regime impinging the sedgeland downslope.

4. Sedgeland Habitat

This environment, although not likely to support a very rich fauna, is unique in the local area. Good quality environments such as this one are not well represented and conserved in the region, and provide excellent habitats for numerous frog species and good food sources and nesting habitats for small birds. Sedgelands also act as a filtering mechanism and therefore influence water quality (and other habitats) downstream.

Quarrying operations are not proposed to be conducted in this area. In addition, the hydrological regime will be protected through location of the settling and supply ponds between the quarry and the existing dam. Water entering the dam and hence the sedgeland would only be during peak rain periods when some overflow could occur. The water would be clear, and free of fines.

5. Closed Forest Habitat

While the area of closed forest lies largely outside the northern boundary of the site, its position downslope and downstream allow it to be directly influenced by any activities within the site. It is a unique habitat within the region and is widely separated from any similar habitat. Downstream extensions of this habitat have been cleared for grazing, and presently cattle are allowed to wander freely along the creekline. The narrow nature of this habitat would mean that the impact of any quarry-related activities could be detrimental.

The potential impacts on this habitat are considered to be minimial through implementation of measures to protect the hydrological regime. These measures include location of the quarry ponds above the dam and maintenance of the sedgeland habitat.

P.O. 79.104 - Track

1. Shrubland Habitat

While this shrubland is a valuable habitat, it is limited in extent here, and well represented elsewhere in the region. The track and associated traffic (whether remaining as is, or upgraded) is unlikely to have any major impacts on this area as a fauna habitat.

2. Shrubland/Sedgeland Habitat

The small area of sedgeland forms a potentially good wetland habitat in an area of increasing development. At the track crossing point the habitat is heavily degraded, mainly due to coincidence with the pipeline, and lack of proper drainage works. The crossing point needs to be upgraded to prevent siltation and preserve water and habitat quality in the sedgeland and in environments downstream. If these improvements are made, then it is unlikely that the usage of the track would have any major impact on the shrubland/sedgeland as a fauna habitat.

3. Open Forest Habitat

The track construction and usage is likely to effect this environment more than any other in the study area. The open forest is floristically and structurally diverse, providing a wide range of animal habitats. It remains presently in a natural state, on the western boundary of a large area of similar character.

Track development is likely to result in the death and displacement of individuals from a wide range of faunal groups. However, this environment and its habitats are well represented in local conservation areas. The actual area involved is small, and the nature of the track and planned patterns of usage are unlikely to disrupt faunal movements within the habitat. Disturbance to habitats by dust and noise would be locally significant during construction, but would be minimal during normal quarry operations. It is unlikely that traffic will be a significant danger (wildlife casualties) to fauna except the occasional loss of basking reptiles or grazing macropods.

There is no evidence to suggest that the open forest is functioning as a significant component of a wildlife corridor, as it largely adjoins cleared and developed land. Thus, the track will not interupt major fauna routes that help populations survive environmental changes.

The most environmentally sensitive areas are the ephemeral creeks, and adequate crossings would need to be provided to cope with large but short-lived flows after rain, and to reduce sediment movement to habitats downslope. The junction with the former road involves traversing the ridge-crest with its abundance of rocky habitats. This habitat is however, widespread and care during construction of the track will minimise and restrict damage.

5.2.7 Fire

The potential for fires in the local environment is high. Bushfires could have a disastrous effect on the local residential area as it is situated on top of the ridgeline and fires tend to burn upslope.

The proposed quarry would produce a break in the vegetation cover, thereby creating a fire break and protection to Mount White residential areas. Thus, fires moving up the slope could be partially inhibited by the presence of the quarry. In addition, the proposed access track will provide access for fire fighters and water from the supply dam would be available for use.

Activities associated with the quarrying operation would not increase the potential risk for fire.

5.3 THE CULTURAL ELEMENTS

5.3.1 Aboriginal Sites

Within the context of sites occurring at Mount White and the wider region, the three sites within P.O. 79.104 are not of particularly high scientific or educational value. However, they are to be valued as components of the cultural heritage embodied in the region.

Sites which show a vivid tapestry of large culture heroes, rainbow serpents, humans, animals, birds, weapons and other figures on sandstone exposures on the ridges and slopes close to Mount White, constitute a rich and visible Aboriginal heritage. The engravings of footprints, circles and unidentified figures recorded at #45-3-1670, #MW1 and #MW2 are an important if undistinguished component of this heritage.

Grinding grooves resulting from the sharpening of axes or spears indicate that processes of tool manufacture or maintenance were undertaken at sites at which they occur. Within the Mount White area they occur at over 40% of the sites now recorded, sometimes in large numbers.

Of the three sites, #MW1 and #MW2 lie within the potential extraction area. Site #45-3-1670 is located to the west of the existing dam and hence will remain undisturbed by the proposed quarrying activities.

5.4 THE SOCIAL ELEMENTS

5.4.1 Land Use and Adjoining Ownership

The proposed activities are permissible and supported under REP No. 9, subject to economic and environmental constraints. These activities are also consistent with the schedule of conditions for Permissive Occupancy.

The road that was used for access for previous quarrying activities dissects various private properties. Right-of-way was refused by the owners of Por. 134 during these previous activities, which caused the cessation of quarrying. Negotiations between Gosford Quarries and the owners of Por. 134 have continued since 1981. Efforts to gain either legal right-of-way on the road or to purchase the property at above market value have been unsuccessful. In addition, the owners of the other local properties have expressed concern of truck movements in close vicinity to their properties. Thus, use of the existing road would induce various social impacts.

The agricultural viability of the site and immediate area will not be affected by the proposed development. The land is classified as Class 4 land by the Department of Agriculture rendering it not to be good agricultural soil (refer to Appendix A2).

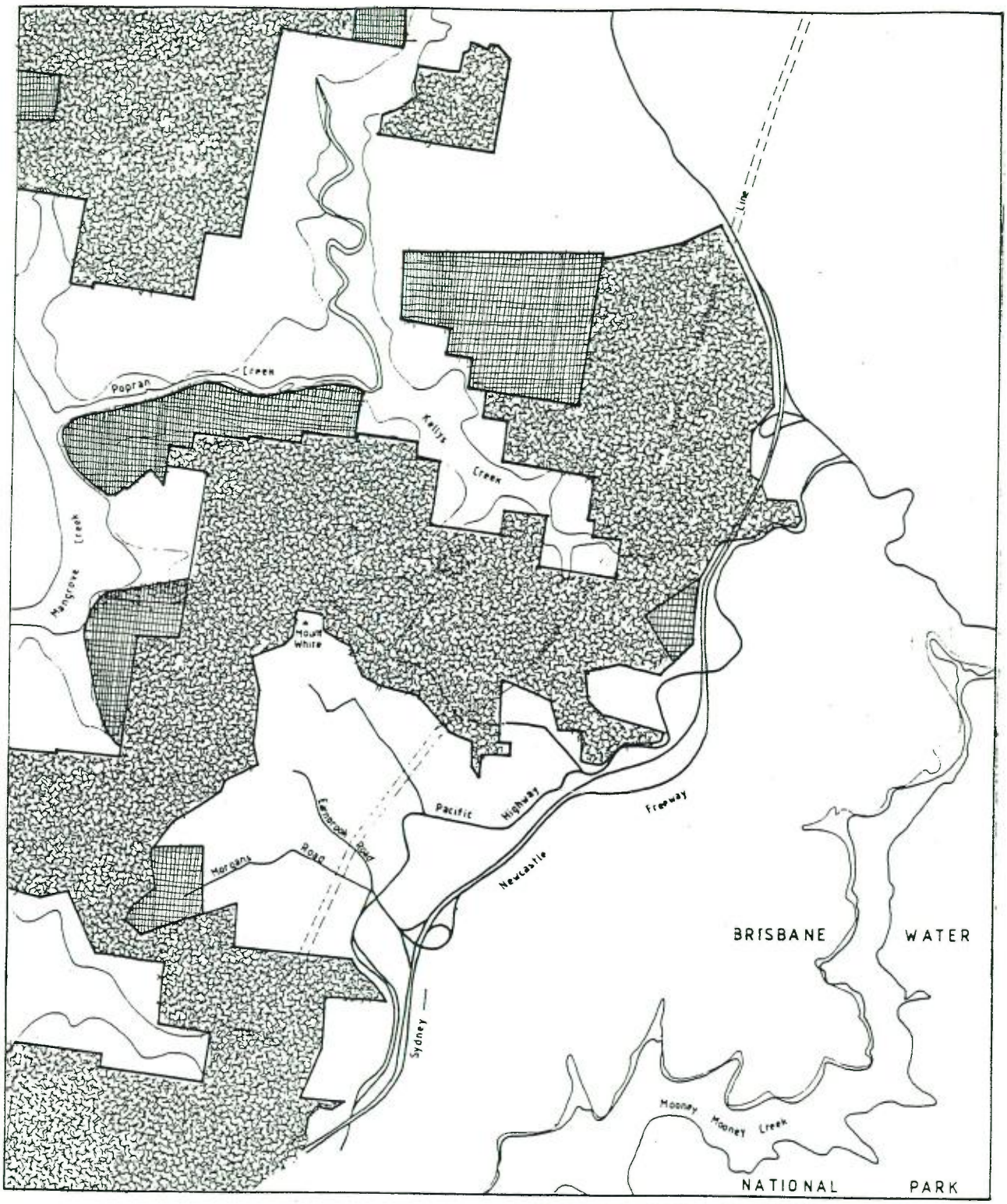
The proposed activities will not induce effects on adjacent land uses, particularly private properties. The topography restricts visual and acoustic impacts and the proposed access track directs traffic away from the immediate vicinity of properties.

The proposed Mount Olive Nature Reserve covers an extensive area incorporating plateaux and escarpments to the north and south of the site (refer to Figure 5.2). The site lies on the edge of one of the boundaries of the Nature Reserve. In view of the presence of the existing quarry and area proposed to be incorporated in the Nature Reserve, only minimal effects on land use would occur. The capacity of the Reserve for scientific, conservation and limited recreation purposes would remain.

5.4.2 Employment

Various employment opportunities will be made available with the proposed activities. The quarry site would employ six people directly as well as construction workers for the proposed road.

As other resources held by Gosford Quarries become exhausted, the 60 people employed in total, as well as various tradespeople in the area, will be dependent on the production from Mount White.



PROPOSED MT. OLIVE NATURE RESERVE (PROPOSED BY NATIONAL PARKS ASSOC. OF NSW.)

PROPOSED ADDITIONS TO NATURE RESERVE (RECOMMENDED BY THE SYDNEY HERBARIUM)

Mount White Sandstone Quarry

Figure 5·2
PROPOSED NATURE RESERVE

0 500 1000 M

5.4.3 Traffic

Traffic generated from the proposed operations will comprise a maximum of 10 trips per week in either 8 tonne or 12 tonne table top trucks. This is envisaged to have a minimal impact on the traffic of Mount White. During larger extraction phases, semi-trailers may be necessary to transport blocks to Somersby. However the number of truck trips would not increase, nor would effects on traffic flows in the area.

The small table-top trucks have a design turning circle of 20 metres and a minimum turning circle of 14.4 metres during slow speeds. Semi-trailers have a design 25m turning circle and a minimum 16.2 metres turning circle during slow speeds (Traffic Authority of NSW, 1984). In view of these criteria and the design of the roadways between the site and Somersby, these vehicles should not create any traffic hazards.

5.4.4 Other Quarrying Operations

The two small quarrying operations in the vicinity of the site will not be adversely affected by the proposed development. Their market is not in dimension sandstone. In addition, P.O. 85.21, which is located adjacent to the entrance of the proposed access road, will benefit from the improved access needed for the proposed activities.

The other dimension sandstone quarries in the City of Gosford will continue to extract sandstone unaffected by the activities at Mount White.

5.4.5 Visual Character

A quarry would generally be viewed as a cleared patch amongst the forested ridges and valleys of the area. Primarily the visual impacts would be through changes to the colour and form of the existing environment.

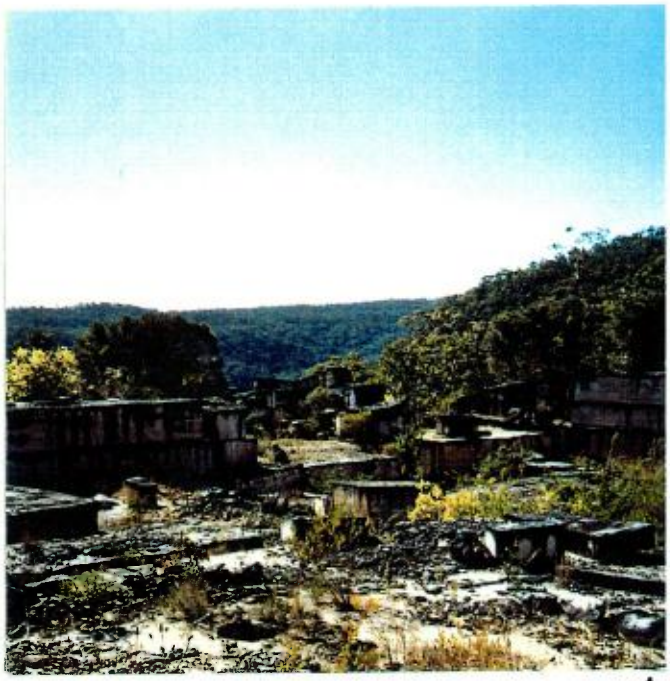
Clearing the vegetation from within a predominantly forested environment would create an immediate colour contrast. The freshly cut pale sandstone is visually exposed in the grey-green colour scheme of eucalypt forests.

Quarrying rock alters the local topography of the environment, allowing views to focus on the altered topography.

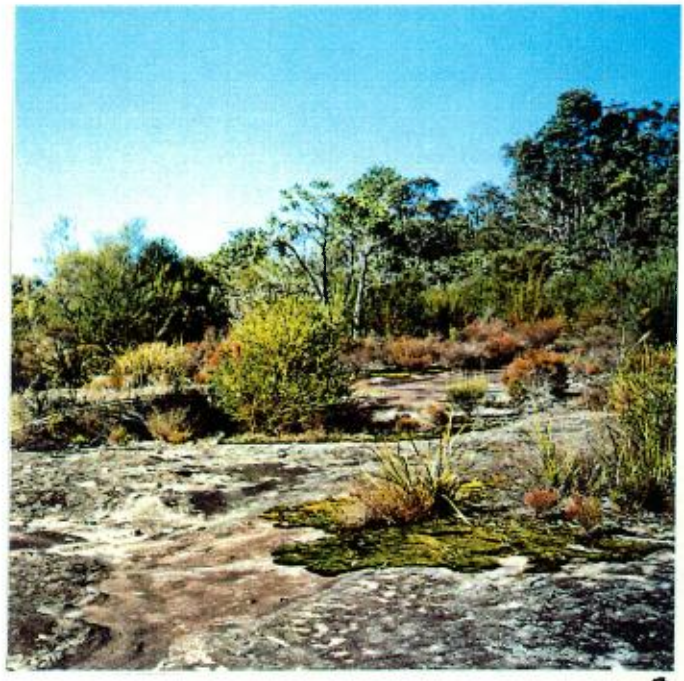
Additional forms to the site such as cranes, buildings and stockpiles introduce further contrasting elements to the existing environment.

The visual isolation of the Mount White site will reduce the interations resultant from quarrying operations (refer to Figure 5.3). Impacts will still be evident in the local environment but will not be vastly different from those resultant from the existing quarry. Restricted clearing will further reduce impacts on the visual character of Mount White.

Impacts from the proposed access road are reduced because the route of the road follows the line of the topography, matching the slope and form of the existing environment (refer to Figure 5.3.). Colour differences between the road and the surrounding environment will be reduced through restricted clearing.



A.



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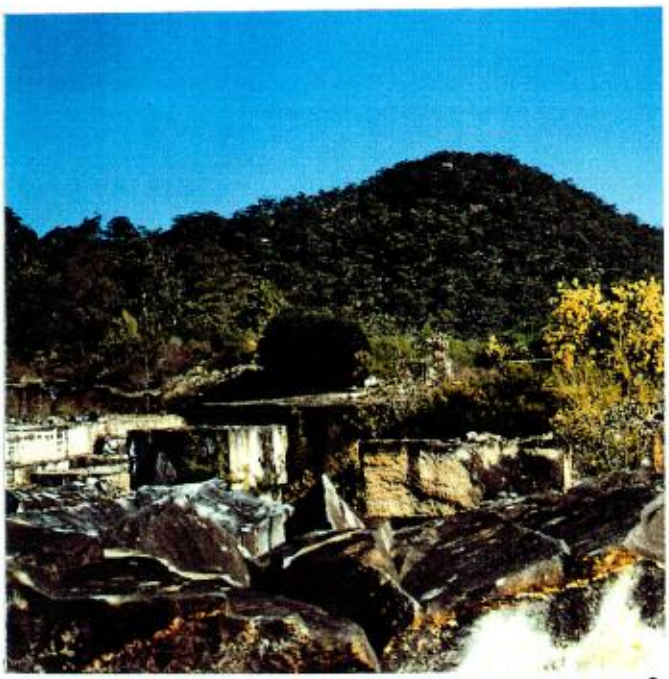


C.

D.

A. NATURAL REGENERATION OF THE VEGETATION IN THE PREVIOUSLY ESTABLISHED QUARRY IS LIMITED IN FLORISTIC STRUCTURE.

B. THE SHRUBLAND/SEDGELAND ON THE QUARRY ROCK PLATFORM IS WELL REPRESENTED IN THE NEIGHBOURING NATIONAL PARKS.

C. THE LOCALLY STEEP RIDGELINES & MOUNT WHITE REDUCE IMPACTS ON THE VISUAL & ACOUSTIC ENVIRONMENTS.

D. THE PROPOSED ACCESS TRACK WILL BE CONSTRUCTED ALONG THE NATURALLY LEVEL SANDSTONE BENCH. THIS WILL REDUCE BOTH DISTURBANCE TO THE TOPOGRAPHY & VISUAL EXPOSURE OF THE TRACK.

Mount White Sandstone Quarry

Figure 5·3
PHOTOGRAPHIC ASSESSMENT

6. PRIORITIES AND RECOMMENDATIONS

6.1 GENERAL

Some benefits will result from the proposed development, particularly the creation of employment opportunities and the continued provision of valuable building materials. Several elements will remain unaffected or affected to a negligible degree. These include the acoustic environment, air quality and traffic. Of importance are the effects on the visual environment, vegetation and wildlife habitats.

Measures to mitigate against erosion and the downwash of sediment are of prime importance. Techniques to meet requirements of soil and land stability are necessary.

6.2 THE PROPOSED QUARRY SITE

Recommended Staging of Operation

Although detailed assessment of the extent of the sandstone resource has not been completed, it is evident that there would be two stages in the quarry operation (refer to Figure 6.1).

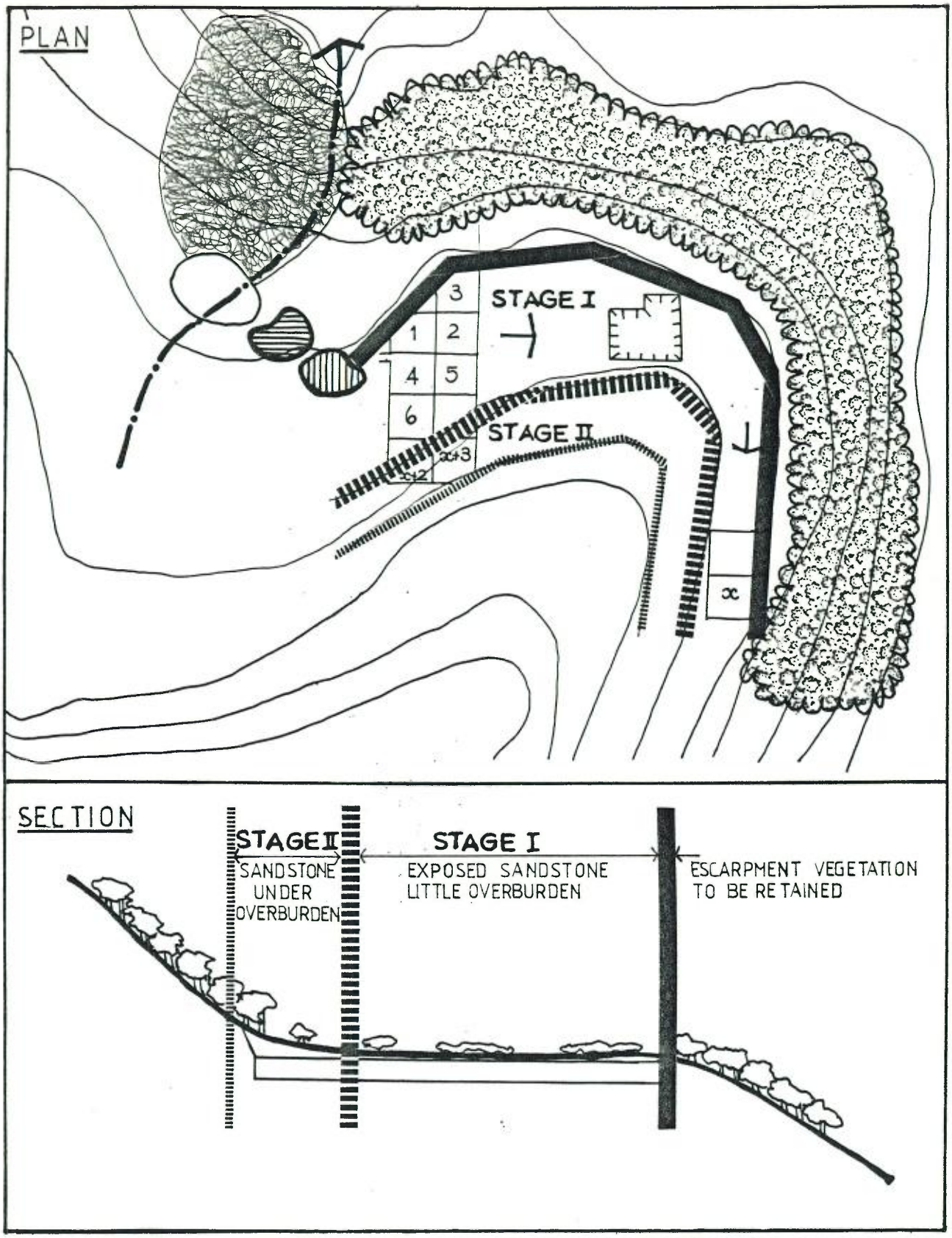
Stage I would occupy the exposed rock platform and hence there would be little overburden. This area would be quarried first, working in pads from west to east and then south to the limit of the resource. The pads would be drained to the west into the settling pond. The fines would settle and clear water would be stored in the supply pond. Any overburden would be deposited in quarried pads along the northern boundary of the quarry, allowing drainage to continue to the ponds.

Stage II would be quarried on completion of Stage I. This area would involve the removal of larger quantities of overburden, which would be deposited in the quarried areas of Stage I without interrupting drainage flows into the ponds.

Sediment Control

Of highest priority is the need to minimise silt deposits that could accumulate downslope. Implementation of the following measures would prevent silt movement.

(1) Sedgeland communities downslope of the existing dam would be retained. This community would continue to filter water thereby protecting the gully rainforest.



NOTE. THIS FIGURE IS DIAGRAMATIC, BEING DEPENDENT ON THE EXTENT OF THE RESOURCE.

- EXISTING QUARRY
- EXISTING DAM
- SEDGELAND COMMUNITY
- DRAINAGE LINE
- VEGETATION BUFFER
- STAGE I
- STAGE II
- 1 2 QUARRY PADS
- SETTLING POND
- SUPPLY POND

Mount White Sandstone Quarry

Figure 6·1

RECOMMENDED STAGING OF OPERATION

(2) Sediment from quarry workings would be deposited in a settling pond and suspended sediment allowed to settle. The design criteria set out by Urban Run-Off Working Group et.al. (1987) in conjunction with recommendations from the State Pollution Control Commission (refer to Appendix A2) should be incorporated.

(3) Periodic inspections of the sediment traps in the settling pond are necessary to ensure they are functioning adequately. Routine cleaning of traps is essential.

(4) Filtered water would be stored in the supply pond. Overflow would occur only during peak rainfall periods. The water would disperse downslope through the understorey vegetation of Woodland II (Community 4). This water would not be channelled directly into runnels or creek lines but allowed to filter across the surface area of the pond.

(5) Vegetation along the edge of the escarpment and the escarpment face would remain undisturbed.

Protection of Aboriginal Sites

All three sites within the boundaries of the proposed works should be preserved. In addition, sites within close proximity to the site, particularly those downslope should be protected from degradation.

Site #45-3-1670 will remain undisturbed by all operations, with the sediment traps protecting it. However, MW#1 and MW#2 lie within the path of potential operations. These should be identified through the use of barriers and quarry workers should be informed of their location and the need for protection.

If either of the two sites overlie valuable sandstone, then detailed recording, such as night recording, tracing and possibly photogrammetry would be a prerequisite to consent for removing the block and handing it to the National Park & Wildlife Service. If the site cannot be successfully removed from the quarry as a sandstone block, Consent to Destroy must be gained from the NPWS, in agreement with the Darkinjung Local Aboriginal Land Council.

Maintenance of Wildlife Habitat

Due to the ecological value of the Sedgeland, this community should remain free of both direct and indirect disturbance from quarrying operations. The location of the ponds between the quarry and the existing dam will protect the hydrological regime in the sedgeland.

An appropriate revegetation programme should be implemented to create useable habitat for native fauna. Revegetation should aim to create an environment as realistic as possible, with a diversity of structural layers to provide habitats for a variety of fauna.

Visual Quality

To largely reduce the visual exposure of the quarry site, the front face should remain intact, complete with vegetation. This will screen distant views from the north and north east and prevent observation of the high colour contrast between the vegetation and fresh rock surface. In addition, if work is started at the southern extremity of the quarry and an irregular face is left, regrowth of vegetation will occur introducing further green elements to the quarry.

All built elements, machinery and equipment as well as stockpiles should be screened from direct views onto the site. Restricted clearing on the site to accommodate such elements should occur. Elements that project above the height of the vegetation, such as the crane, will be colour coordinated to blend with the environment. A green crane will blend with the forested ridgelines enclosing the quarry, thereby further improving the visual quality.

Site Rehabilitation

An appropriate site rehabilitation programme should be implemented during suitable stages of quarrying operations. This will assist rehabilitation of the site as a whole.

Rehabilitation of Stage I should be initiated during quarrying of Stage II, ensuring that drainage lines to the ponds are kept free. The overburden from Stage II should be deposited in Stage I and utilised. The overburden could be supplemented with a weed free soil imported to spread over the base.

6.3 THE PROPOSED ACCESS TRACK

Erosion Control

Soil erosion and subsequent downslope wash of sediment needs to be prevented along the route of the access track. Construction should incorporate the land and soil stability techniques of the Soil Conservation Service through their guidelines (SCS, 1985) and on site detailed planning. It is essential to maintain the present drainage regime to allow plant species to perpetuate their existing habitats.

Special requirements are necessary in the one section of the proposed road where the sandstone bench is absent. Sensitive soil conservation measures need to be implemented to ensure minimal amounts of silt enter the creek re-entrant downslope. Sediment traps at the head of the creek, hay bale barriers across disturbed slopes, revegetation of banks where necessary and road stabilisations would be necessary. On site discussions with the Soil Conservation Service would further define the necessary measures.

Maintenance of Vegetation and Protection of Wildlife Habitats

The clearance and destruction of vegetation should be restricted to the width of the proposed track. Similarily, all movement of heavy machinery should be restricted to this area. All vegetation should be felled on to the track and operations should be staged to minimise the area under construction at any one time. These measures will minimise vegetation and habitat destruction.

Access to natural vegetation areas along the track and through the quarry by introduced animals such as cattle and dogs should be prevented. Entrances should be fenced and grates installed so as to exclude cattle and to discourage foraging dogs (which tend to use roadways when available).

Visual Quality

Viewing the break in the vegetation across the slope will be minimal. However, this can be further reduced by maintaining the escarpment edge of the track, maintaining a minimal vegetation cover along the route of the track and maintaining tall vegetation behind the track.

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Mount White Sandstone Quarry - EIS

A P P E N D I C E S

APPENDIX A

A1 GOVERNMENT AUTHORITIES CONTACTED

Department of Planning

Department of Agriculture, Gunnedah.
Department of Main Roads, Sydney.
Department of Mineral Resources, Sydney.
Department of Water Resources, Parramatta.
Electricity Commission of NSW, Sydney.
Gosford City Council, Gosford.
Lands Office, East Maitland.
National Parks & Wildlife Service, Central Region.
National Parks & Wildlife Service, Hawkesbury Region.
Public Works Department, North Gosford.
Soil Conservation Service, Newcastle Region.
State Pollution Control Commission, Newcastle Region.

ADDITIONAL CONTACTS

National Parks Association of NSW.
Gosford District Environment Foundation.

APPENDIX A

A2 REQUIREMENTS AND RECOMMENDATIONS OF GOVERNMENT AUTHORITIES

New South Wales Government

Department of Planning

Remington Centre
175 Liverpool Street, Sydney 2000
Box 3927 G.P.O. Sydney 2001
DX. 15 Sydney

Telephone: (02) 266 7111 Ext. 7235
Fax No: (02) 266 7599

Contact: V Thomson

Our reference: EHU 88/1971

Your reference: 88070/TS

Forsite Landscape Architects
& Planners
PO Box 433
BROADWAY NSW 2007 210

Dear Sir

Proposed Sandstone Quarry
P.O. 79/104, Mt White

Thank you for your letter of 4 August 1988 indicating that you are consulting with the Director with regard to the preparation of an environmental impact statement (EIS) for the above development.

2. As development consent is required for the proposal and it is a designated development within the meaning of Schedule 3 of the Environmental Planning and Assessment Regulation, 1980, as amended, an EIS must accompany the development application to the Gosford City Council. The EIS shall be prepared in accordance with clause 34 of the Regulation and shall bear a certificate required by clause 26(1)(b) of the Regulation (see Attachment No.1).

3. In addition, pursuant to clause 35 of the Regulation, the Director requires that the following matters be specifically addressed in the EIS:

- Account of noise and vibration implications to existing and proposed major developments near Mt White - Calga;
- Specification of site rehabilitation measures;
- Traffic implications, visual amenity protection, effects on water quality in downstream waterways, bushfire risk at the site;
- Account of Sydney Regional Environmental Plan No. 8, clause 7, Sydney Regional Environmental Plan No. 9, clauses 6, 8, 11, 12 and relation to Sydney REP - Extractive Industry Planning Report (1986).

4. Attachment No. 2 is a guide to the type of information most likely to be relevant to the development you propose; not all of the matters raised therein may be appropriate for consideration in the EIS for your proposal; equally, the guide is not exhaustive.

5. In preparing your EIS you should approach Gosford City Council and take into account any comments Council considers may apply to its determination of the proposal.

6. Should you require any further information regarding this matter please do not hesitate to contact us again.

Yours faithfully

R Hamilton
for

K Sullivan
Acting Manager, Assessments Branch
As Delegate for the Director

DEPARTMENT OF PLANNING
ATTACHMENT No.1

STATUTORY REQUIREMENTS FOR ENVIRONMENTAL IMPACT STATEMENTS.

In accordance with Part 1V of the Environmental Planning and Assessment Act,1979, an environmental impact statement (EIS) must meet the following requirements:

Pursuant to clause 34 of the Environmental Planning and Assessment Regulation,1980, as amended, the contents of an EIS shall include the following matters:

(a) full description of the designated development proposed by the development application;
(b) a statement of the objectives of the proposed designated development;
(c) a full description of the existing environment likely to be affected by the proposed designated development, if carried out;
(d) identification and analysis of the likely environmental interactions between the proposed designated development and the environment;
(e) analysis of the likely environmental impacts or consequences of carrying out the proposed designated development (including implications for use and conservation of energy;
(f) justification of the proposed designated development in terms of environmental, economic and social;
(g) measures to be taken in conjunction with the proposed designated development to protect the environment and an assessment of the likely effectiveness of those measures;
(g1) details of energy requirements of the proposed development and measures to be taken to conserve energy;
(h) any feasible alternatives to the carrying out of the proposed designated development and reasons for choosing the latter; and
(i) consequences of not carrying out the proposed development.

The EIS must also take into account any matters required by the Director of Planning pursuant to clause 35 of the Regulation, which may be included in the attached letter.

The EIS must bear a certificate as required by clause 26(1)(b) of the Regulation.

DEPARTMENT OF PLANNING
ATTACHMENT No.2

ADVICE ON THE PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR AN EXTRACTIVE INDUSTRY.

A definition of extractive industry may be found in paragraph (n) to Schedule 3 of the Environmental Planning and Assessment Regulation, 1980, (as amended). These industries are operations undertaken for the purpose of winning sand, gravel, clay, turf, soil, rock, stone or similar substances. The definition of extractive industry specifically excludes coal, petroleum or minerals which are prescribed under the Mining Act, 1973. Extractive industries may take the form of dredging operations, quarrying operations, turf farms or various forms of land excavation etc. Processing of extracted material on the same site as the winning of the material may also constitute an extractive industry.

Extractive industries have prompted considerable public controversy in the past since, among other things, they affect visual amenity, generate heavy vehicle movements, raise dust and cause disturbance through noise and blasting. This is the prime reason for designation of extractive industries under the Environmental Planning and Assessment Act,1979.

The purpose of this paper is to outline various issues relevant to the preparation and consideration of an EIS for extractive industries. It is intended to assist the preparation of the EIS. However, it is the applicant's responsibility to identify and address as fully as possible the matters relevant to the specific development proposal in complying with the requirements for EIS preparation (see Attachment No.1).

The matters nominated in this paper are not intended as a comprehensive identification of all issues which may arise in respect of an extractive industry. Some of the issues nominated may not be relevant to a specific proposal. On the other hand, there may be other issues, not included, that are appropriate for consideration in the EIS.

Information provided should be clear, succinct and objective and where appropriate be supported by maps, plans, diagrams or other descriptive detail. The purpose of the EIS is to enable members of the public, the consent authority (usually the Council) and the Department of Environment and Planning to properly understand the environmental consequences of the proposed development.

2/...

1. Description of the proposal.

The description of the proposal should provide general background information on the location and extent of the works proposed, an indication of adjacent developments, and details of the site, land tenure, zonings and relevant forward planning proposals and any other land use constraints.

The EIS should address the compatibility of the proposal with any regional strategy for extractive industries in the area and with the provisions of the Local Environmental Plans for existing and proposed development.

This section should provide specific information on the nature, intent and form of the development. It should, as far as possible, include such details as the processes involved (highlighting any proposed crushing or blasting), disposal of wastes, landscaping and site rehabilitation. A description should also be provided of associated operations such as the transport of materials and use of the end product if likely to have environmental implications.

Particular details that may be relevant include:

- Characteristics and economic significance of the resource
- Possible availability of alternative resources.
- Quantity of materials to be extracted.
- Methods of extraction / plans of operations.
- Details of any blasting and/or crushing.
- Effects of vibrations.
- Type of machinery and equipment to be used.
- Expected life of the operation.
- Number of persons to be employed.
- Hours of operation.
- Details of necessary stockpiling.
- Access arrangements - truck routes, truck numbers etc.
- Site drainage and erosion controls.
- Proposals for rehabilitation.

2. Description of the Environment.

This should provide details of the environment in the vicinity of the development site and also of aspects of the environment likely to be affected by any facet of the proposal. In this regard, physical, natural, social, archaeological and economic aspects of the environment should be described to the extent necessary for assessment of the environmental impact of the proposed development.

3. Analysis of Environmental Impacts.

Environmental impacts usually associated with extractive industries are listed below. Where relevant to the specific proposal, these should be addressed in the EIS, taking into account the adequacy of safeguards proposed to minimise them.

- The flow of any affected rivers or watercourses.
- The effect of the extraction on the sediment transport rate of any affected rivers or watercourses.
- The bed and bank stability of any affected rivers during and after completion of the operations.
- Any possible siltation, sedimentation or downstream effects of the operation.
- Any likely cumulative effects of the proposed operation when considered together with other operations in the vicinity.
- Details of floods and any likely effects of the operation on flood liability of surrounding lands.
- The possible effects of flooding on the operation.
- Effects on flora and fauna.
- The agricultural viability of the landholding.
- Likely noise/vibration disturbance caused by the operations, including transport operations, on nearby residences.
- Other impacts of trucking movements, including access over railways and onto highways.
- Dust nuisance likely to be caused.
- Effects on water quality of nearby watercourses.
- Disposal of waste material.
- Effects on the visual environment.
- Any likely affectation of sites of Aboriginal archaeological or European heritage value if located in the vicinity of operations.

In addition, any potential for hazard or risks to public safety and any proposals to monitor and reduce environmental impacts should be included.

4. Contact with relevant Government Authorities.

In preparing the EIS, it is suggested that authorities, such as those listed below, should be consulted and their comments taken into account in the EIS.

- The State Pollution Control Commission in regard to air, water and noise impacts and relevant pollution control legislation requirements;
- The Soil Conservation Service regarding appropriate erosion control and rehabilitation procedures;
- The Department of Agriculture if prime agricultural land may be affected by the proposal; and
- The Heritage Council of NSW if the proposal is likely to affect any place or building having heritage significance for the State; the National Parks and Wildlife Service if aboriginal places or relics are likely to be affected.

It is the responsibility of the person preparing the EIS to determine those Departments relevant to the proposed development.

NSW Agriculture & Fisheries

DAS.16/18
(Reg. 2)

Mr John van Pelt
Director
Forsite Landscape Architects
and Planners Pty Limited
P.O. Box 433
BROADWAY NSW 2007

Dear Mr van Pelt,

Environment Impact Statement, Proposed Sandstone Quarry at Mount White

I refer to your letter (ref 88070/JS/jrc) dated 5 August 1988 addressed to our Gunnedah office and referred onto our Gosford office for further comment.

Soil classification maps indicate that the quarry in question is located on class 4 land which is not regarded as good agricultural soil. Consequently the proposed development of the 33 ha quarry site will not affect the agricultural viability of the immediate area. Consideration, however, should be given to the proposed route of the access road so as not to interfere with any viable agricultural land. The proposed route roughly drawn on the contour map provided would indicate that this should not be a problem. This Department considers the main potential problems with this development would be with neighbouring property owners from noise and dust pollution stemming directly from quarrying activities and the movement of heavy vehicles and equipment along the access route.

The wellbeing of adjacent and nearby property owners is of primary importance and a necessary consideration. As a consequence it would be necessary to contact neighbouring landholders to gauge their reaction to the proposed development as part of your environmental impact statement.

FORSITE
Received
-7 SEP 1988

Yours faithfully,

for **K.P. SHERIDAN**
Director General
1/9/88

Level 11, McKell Building, Rawson Place, Haymarket, Sydney
PO Box K220, Haymarket, NSW 2000, Australia Phone (02) 217 5366 Fax (02) 217 5484 Telex AA 72418

DEPARTMENT OF MAIN ROADS NSW

HUNTER VALLEY DIVISION

59 Darby Street Newcastle NSW 2300

DX 7813 Newcastle
Telex 28048
Facsimile (049) 293818
Telephone (049) 272200

The Director
Forsite Landscape Architects
and Planners P/L
PO Box 433
BROADWAY 2007

Our reference
184.5375A
BB0959LW.2
Further enquiries
Mr Bradley
(049) 272 223
Your reference
88070/JS/jrc

29 SEP 1988

STATE HIGHWAY 10. PACIFIC HIGHWAY. CITY OF GOSFORD. ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED SANDSTONE QUARRY AT MT. WHITE.

Dear Sirs

I refer to your letter of 5 August 1988 requesting comments on the above sandstone quarry at Mt. White.

The proposed access onto the existing Pacific Highway could not be determined accurately during a recent site inspection.

Any access proposed must satisfy NAASRA standards for sight distance and the junction should be designed in accordance with the NAASRA publication 'Interim Guide for the Design of Intersections at Grade'. Design plans for the proposed junction are to be submitted to and approved by this Department before any work commences.

Comprehensive traffic data is to be provided in conjunction with plans when submitted to the Department.

Yours faithfully

P J Gallagher per
P J Gallagher
Divisional Engineer

FORSITE
Received
04 OCT 1988

TO	DATE	TO	DATE
IO			
KM			
JVP			
GP			
RB			
NG			
DM			

New South Wales Government

Department of Mineral Resources

8-18 Bent Street
Sydney
Postal Address:
G.P.O. Box 5288
Sydney, N.S.W. 2001
Telex AA74875
Facsimile: (02) 233 7017

Forsite Landscape Architects & Planners Pty Ltd
PO Box 433
BROADWAY NSW 2007

Our reference: L88/0492

Your reference:

ATTENTION: MS J SAVET

For further information ring: Steve Lishmund

Telephone: 231 0922
Extension: 4618

Dear Ms Savet,

EIS - PROPOSED SANDSTONE QUARRY AT MT WHITE

I refer to your letter dated 5th August, 1988 addressed to Mr Graeme McIlveen, Senior Geologist (Environment), seeking advice on the preparation of an Environmental Impact Statement (EIS) for a proposed sandstone quarry at Mt White. I regret the delay in replying to your letter.

Firstly, it should be noted that this deposit is designated as a regionally significant resource in Sydney Regional Environmental Plan No 9 (Extractive Industry); this should be stated in the EIS.

It is also noted that sandstone is not a designated mineral under the Mining Act (1973), and hence the Department of Mineral Resources has no statutory responsibility for the proposed operation other than responsibility for safety matters associated with extraction under the Mines Inspection Act (1901). However, the Department is the principal Government authority responsible for providing advice on the planning/management of extractive resources. The sandstone resources at Mt White are part of the Triassic Hawkesbury Sandstone. The deposit may also contain some lenses of light-firing clay/shale.

I enclose a "hand-out" on guidelines the Department uses for mining proposals which may be of assistance to you. The Department would appreciate receiving a copy of the EIS for this proposed operation, when it is prepared.

Yours faithfully,

N L Markham
Director
Geological Survey of New South Wales

15th September, 1988.
GGH/MF

DEPARTMENT OF MINERAL RESOURCES

INFORMATION SHEET

NUMBER 130

23rd Floor, Legal & General House, 8 - 18 Bent Street, Sydney
GPO Box 5288, Sydney, NSW 2001

ENVIRONMENTAL IMPACT ASSESSMENT PROCEDURES FOR THE GAINING OF APPROVAL TO MINE UNDER THE ENVIRONMENT PLANNING AND ASSESSMENT ACT, 1979 AND THE MINING ACT, 1973

SECTION 1.

Introduction

Community expectations in New South Wales for the protection and preservation of the environment have resulted in the past two decades in legislative and administrative measures which take into consideration both the demands on the mining industry to supply society's essential raw materials, and the community's aspirations for a clean, healthy and pleasant environment.

Successive New South Wales Governments have legislated widely in the fields of conservation and protection of the environment through the Clean Air Act (1961), the Clean Waters Act (1970), the State Pollution Control Commission Act (1970), the Waste Disposal Act (1970), the Noise Control Act (1975), the National Parks and Wildlife Act (1974) and the Environmental Planning and Assessment Act (1979).

The Mining Act (1973) also contains procedures for environmental protection (Sections 117-120). No mining activities authorised under the provisions of mining legislation may be carried out except in accordance with pre-determined operating conditions including conditions for prevention of pollution and protection of the environment. Holders of mining titles are also bound by the other Acts referred to above.

The Department of Mineral Resources (M.R.D.) administers some aspects of the State Government's environmental policy. The principles of this policy require that adequate attention must be given in planning a mining project to its impact on the environment and that the responsibility rests with the decision making authority for ensuring that any necessary environmental studies are undertaken. Under the Environmental Planning and Assessment (E.P.A.) Act, administered by the Department of Environment and Planning (D.E.P.), such studies are known as Environmental Impact Statements (E.I.S.) and are required to be prepared for most mining operations. The Minister for Mineral Resources also has the power to request environmental impact studies to enable him to decide whether or not to grant a mining authority (Section 117 of the Mining Act).

The administration of the Mining Act is influenced by the Environmental, Planning and Assessment Act. Before the Minister for Mineral Resources can grant a mining lease for the requirements of the E.P.A. Act must be satisfied by the applicant.

This Information Sheet explains to an applicant for a mining lease the procedures that must be followed in gaining approvals under the E.P.A. Act.

Section 2 includes a flowchart of these procedures. This flowchart and associated notes are intended as a guide and not a substitute for a reading of the relevant legislative provisions. The provisions of the environmental and mining legislation should be strictly followed from an early stage so that the processing of the mining lease application is not unduly delayed.

The features described in Section 2 essentially concern the differences between Park IV and Part V of the E.P.A. Act. In summary, under Part IV (where mining requires planning consent) most mining operations are classified as "designated developments" and require the preparation of an E.I.S. before D.E.P. Under Part V (in circumstances where mining does not require planning consent) the M.R.D. becomes the authority from which approval is required. An E.I.S. must be prepared under Part V if the Minister for Mineral Resources determines that the mining operation will have a "significant effect on the environment".

Section 3 discusses the E.I.S. and provides a list of matters that should be addressed in such a document.

SECTION 2.

Guide to Procedures to be Followed in Gaining Approvals Under The Environmental Planning and Assessment Act, 1979

The following notes should be read in conjunction with the flow chart (figure 1). The numbers correspond to those on the flow chart.

1. An "environmental planning instrument" means a State environmental planning policy, a regional environmental plan, or a local environmental plan. It also means a former planning instrument such as a local planning scheme or an interim development order. A decision as to whether or not an environmental planning instrument applies to the land in question, can be obtained from the local council.

   Part IV of the Environmental Planning and Assessment Act, 1979

2. Where the land in question is subject to the development control provisions of the E.P.A. Act (1979), by virtue of the fact that an environmental planning instrument applies to the land, and under such planning instrument mining may only be carried out with the consent of the local authority, then development consent is required to be obtained from the "consent authority".

In those parts of the State where a planning instrument is not in force or where the particular mining proposal does not require planning consent then the requirements of Part V of the Act must be met (see note 11 later).

The existence of an environmental planning instrument for the land must be ascertained from the local council.

For mining activities, local councils will be the consent authority in most cases. In some cases, mining or non-mining, the Department of Environment and Planning will be the consent authority, depending on the decision of the Minister for Planning and Environment.

A mining lease cannot be granted over such land until development consent is obtained by the applicant.

3. Various types of development are declared as "designated development" in Schedule 3 of the Environmental Planning and Assessment Regulation, 1980. An Environmental Impact Statement must be prepared for a designated development.

In respect of mining, Schedule 3 lists the following as designated development:

(ma) mining, being mining that causes the disturbance of the surface of land, where the total area of the surface of land disturbed is greater than 2 hectares, including any such disturbance caused by:

i. the clearing or excavation of land;

ii. the placing of tailings, overburden or minerals on the land; or

iii. the erection or construction of buildings or dams on the land;

but excluding development involving alterations or additions to any existing development, which alterations or additions in the opinion of the consent authority, are of a minor nature and do not, to any significant extent, change the scale, size or degree of that existing development.

Paragraph (ma) of Schedule 3 will be generally applied where the area of surface rights to be granted in the lease is greater than 2 hectares. Other designated developments can also be declared in the environmental planning instruments themselves.

4. An environmental planning instrument may provide that a particular type of development is prohibited.

5. Where the application is not in respect of designated development, an E.I.S. is not required; however, the development application must:

   i. embody such information as the applicant considers suitable to demonstrate that he/she has given appropriate consideration to the impact that the development will have on the environment.

   ii. set out the steps that he/she proposed to take to mitigate any likely adverse impact.

6. The development application is lodged on Form 3 of the Environmental Planning and Assessment Regulation, 1980 accompanied by information as to the impact of the proposes (note 5.)

7. Where the application is in respect of designated development, it must be accompanied by an Environmental Impact Statement in the prescribed form prepared by or on behalf of the applicant.

   Regulation 34 requires the contents of an E.I.S. to include the following matters:

   a. a full description of the designated development proposed by the development application

   b. a statement of the objectives of the proposed designated development

   c. a full description of the existing environment likely to be affected by the proposed designated development, if carried out

   d. identification and analysis of the likely environmental interactions between the proposed designated development and the environment

   e. analysis of the likely environmental impacts or consequences of carrying out the proposed designated development (including implications for use and conservation of energy)

   f. justification of the proposed designated development in terms of environmental, economic and social considerations

   g. measures to be taken in conjunction with the proposed designated development to protect the environment and an assessment of the likely effectiveness of those measures

gl. details of energy requirements of the proposed development and measures taken to conserve energy

h. any feasible alternatives to the carrying out of the proposed designated development and reasons for choosing the latter

i. consequences of not carrying out the proposed designated development

A list of suggested detailed matters that should be covered in any E.I.S. for a mining operation is given in Section 3.

8. The person preparing the E.I.S. must consult with the D.E.P. in terms of the form and content of the statement. Each document should be suitably bound and contain a signed certificate by the applicant (Form 4 - Environmental Planning and Assessment Regulation, 1980).

9. The applicant will be informed by the consent authority of the number of copies of the E.I.S. required to accompany the development application sufficient for the purposes of making the statement available for public comment.

10. The consent authority will arrange for the E.I.S. to be placed on public display for at least 30 days at nominated locations. (This period may be extended over Christmas/New Year in some circumstances).

11. The development application is lodged on Form 3 of the Regulations.

The consent authority notifies all adjoining property owners and others who use and enjoyment of the land might be affected, that such development is proposed and that all documents accompanying the application will be on public display for at least 30 days. A notice of the development will be placed on the site.

12. Part V of the Environmental Planning and Assessment Act, 1979

Where an environmental planning instrument does not apply to the land in question, or though applying to the land does not require development consent for mining, a development application is not required to be submitted to the local council.

The development however, falls within the ambit of Part V of the E.P.A. Act (1979), being an "activity" for which the approval of a Minister or public authority is required in order to be carried out. In the case of a mining lease application, the Minister for Mineral Resources is the "determining authority".

13. The Minister for Mineral Resources cannot give approval to an activity that is "likely to significantly affect the environment", unless he has obtained and examined an environmental Impact Statement in respect of the activity.

13. (a) The factors (Regulation 56) that the Minister for Mineral Resources must take into account when considering the likely impact of an activity on the environment include whether that activity may cause:

a. any environmental impact on a community;

b. a transformation of a locality;

c. any environmental impact on the ecosystems of the locality;

d. a diminution of the aesthetic, recreational, scientific or other environmental quality or value of a locality;

e. any effect upon a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations;

f. any endangering of any species of fauna or flora;

g. any long-term effects on the environment;

h. any degradation of the quality of the environment;

i. any risk to the safety of the environment;

j. any curtailing of the range of beneficial uses of the environment;

k. any pollution of the environment;

l. any environmental problems associated with the disposal of waste;

m. any increased demands on resources, natural or otherwise, which are, or are likely to become, in short supply; and

n. any cumulative environmental effect with other existing or likely future activities.

14. In order to be able to make a proper decision as to the requirement for an E.I.S., the Department may request from the applicant basic information about the proposed mining operation (this may be informally called a "Renew of Environmental Factors"). Some of the necessary information (items 1. and 2. below) will have already been supplied by the applicant at the time of completing the lease application form. Additional information, for example items 3. to 6. below, may be requested, although the precise nature of the information required may vary with each particular mining proposal. The data rquested should be brief and concise.

A. i. A map indicating the boundaries of the area applied for and the topographical and aesthetic features including:

- contours at 10 metre intervals or less
- rivers, streams and watercourses
- vegetation communities, eg. forests, grasslands, grazing and agricultural land

ii. A map at a scale of 1:4000 or larger (eg. 1:2000) indicating the location of all works, buildings, facilities, roads, shafts, excavations, overburden dumps, etc. proposed under the mining operations

B. A detailed description of the works to be undertaken on the area including works and activities relating to:

- the preparation of the land for mining
- the reinstatement of the land either during the carrying on of mining operations or after they have ceased.

C. The mining methods and equipment to be used, the estimated rate of extraction, the maximum depth of any open cutting, the total area to be disturbed by mining operations, water requirements, the expected life of the operation, the number of persons to be employed.

D. The method and route of product transport from the mine.

E. Any significant natural or developed features of the area.

F. Methods to be used for minimising the following impacts:

- dust
- noise
- blasting
- water pollution and erosion
- waste disposal
- visual impact
- impact on flora and fauna

15. Following his consideration of the above aspects the Minister decides if the activity is "likely to significantly effect the environment". If he decides that it is likely to, then an E.I.S., prepared by or on behalf of the applicant, is required.

16. The contents of an E.I.S. required under Part V for an activity are identical to those required under Part IV for designated development - see note 7.

17. The person preparing the E.I.S. must consult with the Director of the D.E.P. in respect of the form and content of the statement. Each document should be suitably bound and must bear a certificate signed by the person who prepared the statement to the effect that it has been prepared in accordance with the requirements set out in the Regulations. It is also advisable to consult at the same time with the M.R.D.

18. The applicant will be informed by the M.R.D. of the number of copies of the E.I.S. required for public display.

19. The M.R.D. will give notice in at least two newspapers that such an activity is proposed and that the E.I.S. will be on public display for at least 30 days at nominated locations. (This period may be extended over Christmas/New Year in some circumstances).

SECTION 3.

The Environmental Impact Statement

The Environmental Impact Statement is the means by which the general public and government authorities can be provided with sufficient information to evaluate a project, the alternatives to it, the existing environment and likely environmental impacts; in relation to the project's public benefit.

An E.I.S. must be in written form. It need not be a lengthy, elaborate or expensive document; but it must contain all of the essential information that a consent or determining authority needs to make an environmentally sound decision. The preparation of an E.I.S. is left completely to the proponent and subject to the regulations on format, he/she is entitled to make as strong a case as possible on behalf of his/her project.

If the proponent is unable to prepare the E.I.S. using his/her own resources he may engage the services of environmental consultants. There are a number of small and large consultant firms that specialise in the preparation of E.I.S's. A list of potential consulants for the carrying out of such studies can be obtained from the Department of Mineral Resources.

Once an E.I.S. has been requested, the responsibilities lie with the proponent to see that the objectives of the proposal are specified, all alternatives are considered, and a statement of how to minimise environmental impacts is pepared. Although the detailed content of an E.I.S. is left largely to the proponent, it is advisable to submit a draft copy to the consent or determining authority (council, D.E.P. or M.R.D.) as it is their responsibility to ensure that the E.I.S. is adequate and accurate before formally accepting it for public display. The proponent should accept any advice on changes or additions to the document that these authorities may suggest. This will ultimately result in a quicker and more successful processing of the application.

In addition to the broad content requirements of an E.I.S. mentioned in the notes for Section 2, the following specific matters should be addressed in regard to a mining application (where applicable for any particular case). Note that the Minister for Mineral Resources may require some of this information whether or not an E.I.S. is required:

1. General description of the proposed development including its location.

2. Description of the existing environment:

    a. topography

    b. regional geology and geology (including the mineralogy and geochemistry) of the ore deposit

    c. soils

    d. flora and fauna

    e. landscape/visual aspects

    f. hydrology - catchments, streams, other waterbodies, downstream uses (surface and groundwater), background water quality

    g. current land use

    h. natural characteristics of the area

    i. land ownership

    j. background noise levels.

3. Specific Features

    a. unusual vegetation types or other plant communities

    b. rare or endangered species

    c. rare or significant faunal occurrences

    d. aquatic life

    e. caves or other geological formations

    f. aboriginal sites or relics

    g. sites of historical significance

    h. use for recreation.

4. Detailed description of the proposal:

a. prospecting methods and results used to define minerable ore

b. estimate of the available resource (eg. tonneage, grade) and extent of mineralization

c. proposed methods of extraction

d. rate of production of each metal, mineral or concentrate

e. quality of waste rock, shaft spoil, or overburden to be excavated and methods of handling and disposal, both as total quantities and rates of production

f. type of machinery and equipment to be used

g. if open cut methods to be used:

- . total surface area to be excavated (in hectares)
- . the typical dimensions of cuts, trenches or pits (including depth)
- . the area (in hectares) of land to be under open cut and rehabilitation at any one time

h. expected life of operation

i. number of persons to be employed and their likely places of residence

j. hours of operation

k. sources and quantities of processing and potable water required

l. detailed water balance

m. transport of product from mine, trucking and traffic movements/routes, internal and external roads required

n. current market trends and industry demand for product

o. drainage and water pollution controls

p. methods for sewage disposal

q. quantity of mill tailings/methods of handling

r. buildings and plant to be erected

s. blasting methods/times

t. rehabilitation procedures, during and on completion of extraction/mining operations:

- . regarding and stabilising of site
- . removal of buildings and structures
- . topsoil handling and storage
- . revegetation procedures/species to be used
- . fertilising, watering, maintenance

5. Consideration of alternatives:

   a. methods of extraction

   b. siting of headworks, processing plants, waste disposal areas

   c. transport options

6. Assessment of impacts/safeguards to minimise impacts:

   a. visual impact and dust nuisance

   b. control of runoff and erosion

   c. prevention of water pollution and water treatment methods

   d. anticipated noise levels from extraction, milling and haulage operations

   e. disposal of waste material/overburden

   f. impacts on nearby residents or communities

   g. effects on areas of cultural, historical, recreational, scientific, social, aesthetic or conservation significance

   h. effects on local ecosystems, flora and fauna

7. The document should include as a minimum the following two plans:

   a. locality plan at a suitable regional scale (eg. 1:25,000) to include:

      . boundary of the proposed mining lease
      . contours at 10m intervals or less
      . rivers, creeks and other waterbodies
      . towns and villages
      . roads
      . land tenue; particularly crown land such as state forests, national parks; planning scheme zonings, agricultural land, other land use constraints

   b. mining plan at a suitably detailed scale (eg. 1:2,000) to include:

      . boundary of the proposed mining lease
      . areas to be mined
      . location of each open cut, strip or pit and the sequence of extraction
      . location of shafts, adits, headframes
      . overburden, waste rock, shaft spoil disposal areas
      . mill tailings disposal areas
      . ore stockpile areas
      . topsoil stockpile areas
      . location of plant, machinery, buildings
      . internal formed roads

. water supply dams
. sediment control dams
. drainage channels or other runoff control methods
. vegetation communities of the lease area
. location of nearest residences

8. Photographs of the existing site should be included in the document.

In addition to this listing, applicants would be advised to consult the following:

a. the Department of Mineral Resources for advice on proposed mining methods and rehabilitation objectives

b. the Soil Conservation Service for advice on rehabilitation techniques. (Note that lease conditions for rehabilitation must be approved by the Service under Section 53(6) of the Mining Act)

c. the State Pollution Control Commission for advice on requirements under its pollution control legislation

---

G. Toyer
AU14

FLOW CHART OF ENVIRONMENTAL ASSESSMENT PROCEDURES FOR THE GAINING OF APPROVALS UNDER THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979 AND THE MINING ACT, 1973

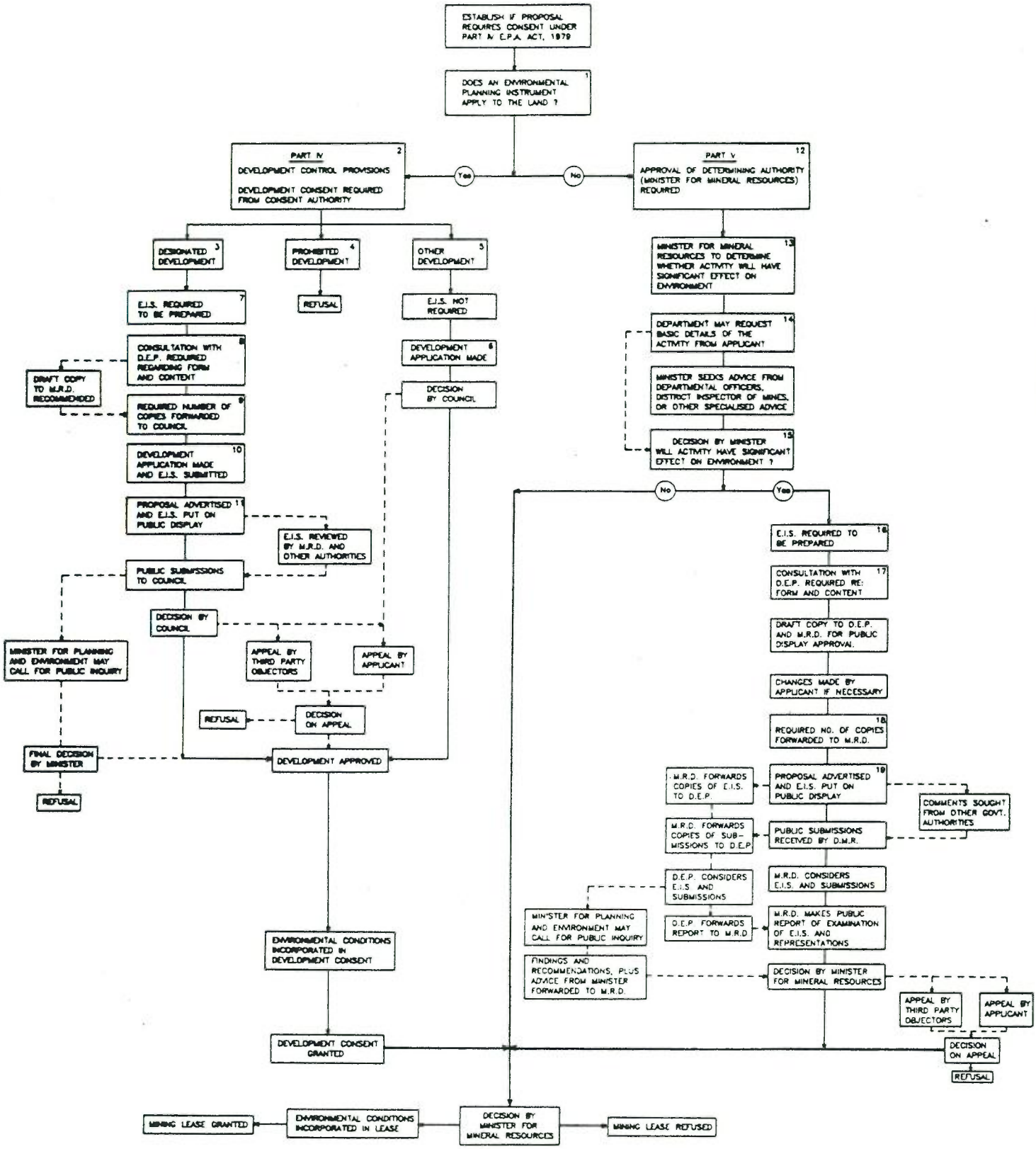

FIGURE 1

NOTES

NUMBERS REFER TO ADDITIONAL INFORMATION IN TEXT

D.E.P. – DEPARTMENT OF ENVIRONMENT AND PLANNING
M.R.D. – DEPARTMENT OF MINERAL RESOURCES
E.I.S. – ENVIRONMENTAL IMPACT STATEMENT

PROUDLY PRINTED IN AUSTRALIA
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THE ELECTRICITY COMMISSION OF NEW SOUTH WALES

Hyde Park Tower
Park and Elizabeth Streets Sydney
Postal Address:
G.P.O. Box 5257, Sydney N.S.W.
2001

Telegrams: Electricom Sydney
Telex: 20454 Telephone: 268 6111
Extension:

JP

Ms J Savet
Forsite Landscape Architects
and Planners Pty Limited
PO Box 433
BROADWAY NSW 2007

Your Ref:
Our Ref: 40051, 6511 P&D/JJ

Dear Ms Savet

ENVIRONMENTAL IMPACT STATEMENT
PROPOSED SANDSTONE QUARRY AT MOUNT WHITE

Reference is made to your letter of the 5th August, 1988, regarding the above proposal.

The Commission's Munmorah to Sydney East 330 kV transmission line passes approximately 750 m south east of the quarry site and across the route of the proposed access road (refer to attached map). The security of this line is critical to the State's electricity network and the following comments are made in relation to the possible impact of the quarry and access road on this line.

DUST GENERATION

Although in this case it is not expected to be a problem, dust generated during construction and during the subsequent quarrying operations can settle on insulators and lead to a short circuit condition occurring during periods of light precipitation. If it is necessary to clean the insulators considerable expense is involved. The Commission requests that close attention be paid to dust control. It has been found sometimes necessary, in similar circumstances, to increase the number of insulators used to support the line. Any remedial action of this nature, or the redirecting of the line to enable the extraction of resources, would not be to the Commission's account.

BLASTING AND USE OF EXPLOSIVES

With major transmission lines and installations this Commission would normally specify an upper limit of tolerable peak particle veloctiy of less than 25 mm per second in regard to any nearby blasting operations. For higher values of peak particle velocity approval should be sought from the Commission. Additionally the Commission would want assurance that the stability of any transmission line structure is not compromised by the blasting, that the conductors and fittings are protected from flying debris, and that excessive dust is not generated. It is also suggested that the proponent should approach the Sydney County Council, if they have not already done so, to find out if Council has similar limits and safeguards for their lines.

MS J SAVET
FORSITE LANDSCAPE ARCHITECTS
AND PLANNERS PTY LTD

CLEARANCES

In order to avoid the possiblity of dangerous conditions arising, the Electricity Commission requires that the standard clearance beneath transmission lines is not reduced. The maximum permissable height of vehicles (including antenna if fitted) passing under transmission lines is 4.3 m. Special care should be taken with large construction equipment, particularly if ground levels have been altered by construction activities.

EXCAVATION NEAR OR UNDER TRANSMISSION STRUCTURES OR EASEMENTS

Transmission structures generally have buried conductors attached to them. Excavation should not be carried out within 16 m of a transmission structure base and care should be taken not to undermine the structures or jeopardise them in any way. Construction or quarrying operations which could in any way affect the integrity of the transmission line must not proceed until agreement is reached with the Commission on ways of securing continued electricity supply.

ACCESS TO THE EASEMENT

It is important that Electricity Commission plant and personnel have access to all parts of the easement at all times. This should be taken into account both during the construction activities associated with the quarry and in the final operation of the quarry.

POSSIBLE LINE RECONSTRUCTION

While there are no firm plans to reconstruct the line, future development of the Commission's system could be expected to require the upgrading of the line to a high capacity 500 kV double circuit line. It is likely that the line would be reconstructed on or near the existing easement and would involve a slight widening of that easement.

It is the Commission's practice to uprate existing lines for achieving increased capacity rather than constructing additional lines as this avoids the unnecessary proliferation of transmission lines in an area.

OTHER LINES IN THE AREA

It should also be noted that the Commission's Gosford to Mount Colah 132 kV line passes approximately 2 km south east of the quarry site, and that all of the preceding requirements and concerns also apply to this line.

The proponent should liaise with the Transmission Line Projects Section of the Commission on these above points, especially during the initial design and construction phases.

MS J SAVET
FORSITE LANDSCAPE ARCHITECTS
AND PLANNERS PTY LTD

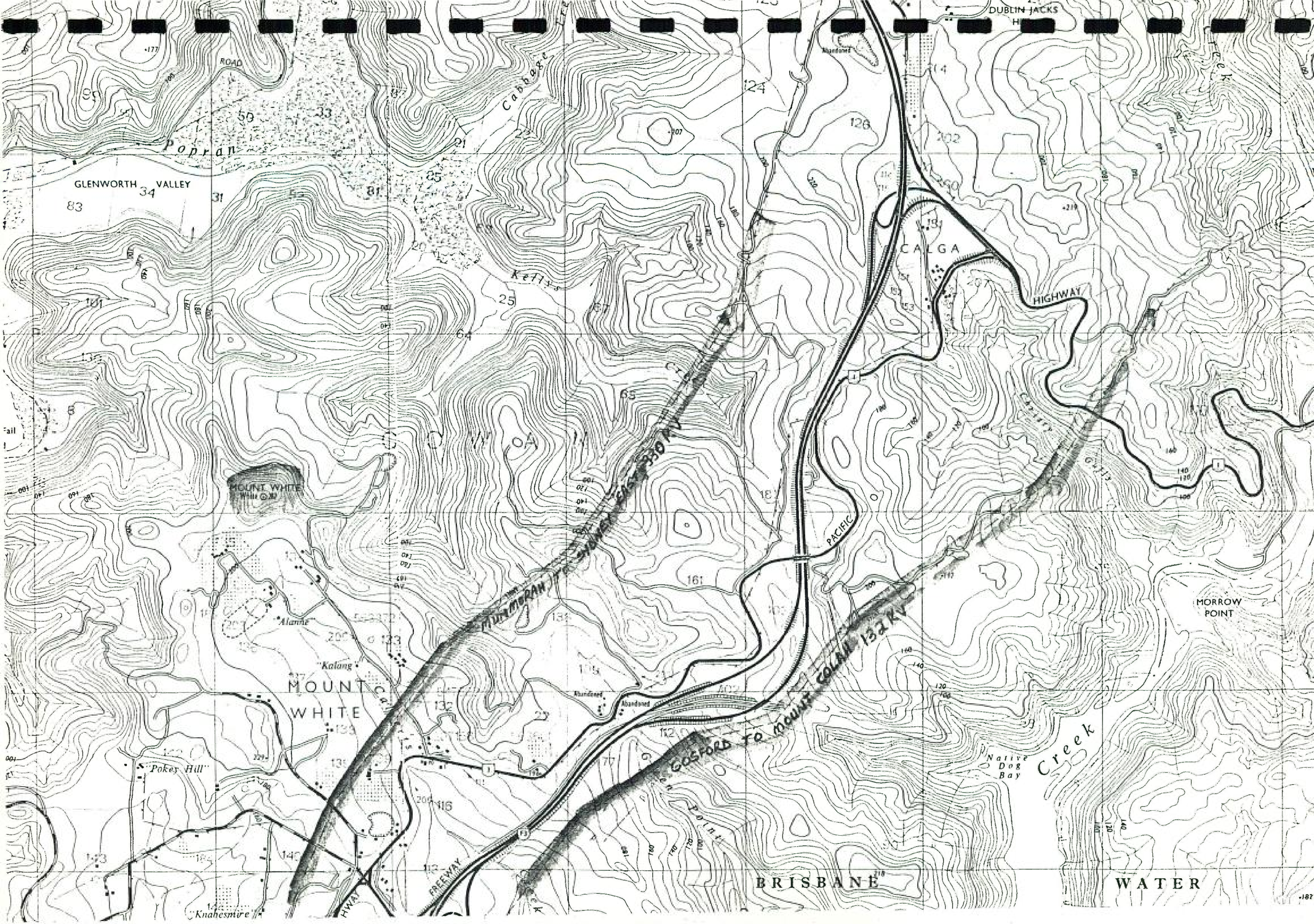
Should you require further information on any of the matters raised, please contact the under signed on (02) 268 6995.

The opportunity to consider the EIS when it is made public would be appreciated.

Yours faithfully

P STEWART
FOR SECRETARY

5.5.88


DUBLIN JACKS
ROAD
Cabbage
Popran
GLENWORTH VALLEY
CALGA
Kellys
HIGHWAY
PACIFIC
MOUNT WHITE
MUNMORAH TO SYDNEY EAST 330 KV
GOSFORD TO MOUNT COLAH 132 KV
MORROW POINT
"Alanne"
"Kalang"
MOUNT
WHITE
Abandoned
"Pokey Hill"
Native Dog Bay
Creek
FREEWAY
HWAY
BRISBANE
WATER

GOSFORD CITY COUNCIL

P.O. BOX 21, GOSFORD, N.S.W. 2250

DX 7211 GOSFORD

Telephone: (043) 258 248 Please Quote: 380.01.40
Jim Gray.Ka

Forsite Pty Ltd
PO Box 433
BROADWAY NSW 2007

Proposed Sandstone Quarry at Mt White

Dear Sir

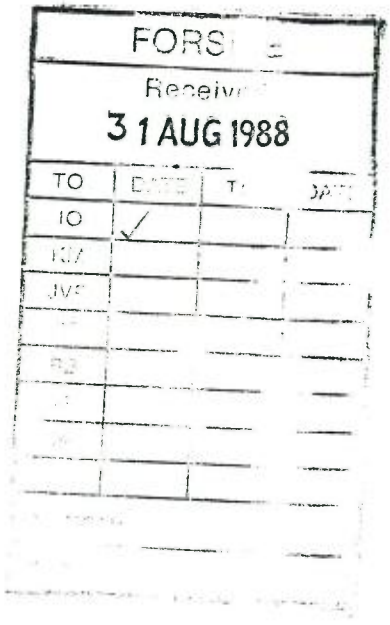
I refer to your letter dated 5 August 1988, concerning the above matter. I advise that this development would no longer enjoy existing use rights and it will be necessary to seek development consent for a designated development. It is recommended that you contact the Department of Mineral Resources and the Department of Planning, Assessments Branch for their requirements.

Yours faithfully

N. Prince

NEVILLE PRINCE
CITY MANAGER

Date:



Lands Office

P.O. Box 6
East Maitland 2323

Our reference: MD79 H 1424 GT:CL

Your reference: 88 070/JS/jrc

Telephone: (049) 302705
G. Taylor

The Director,
Forsite Landscape Architects
& Planners Pty. Ltd.,
P.O. Box 433,
BROADWAY NSW 2007

Dear Sir,

Environmental Impact Statement
Proposed Sandstone Quarry at Mount White over an area within
Permissive occupancy 1979/104 Gosford

Receipt is acknowledged of your letter dated 5th August, 1988 seeking comment from this office in relation to matters to be addressed in the environmental impact statement covering the above proposal. In order to identify the significant environmental impact of the proposal, the following relevant points should be expanded:

(a) Impact on the community,

(b) Impact on the natural environment,

(c) Impact on aesthetic, recreational, anthropological, archaeological, architectural, cultural, historic, scientific or social significance or other special value for present or future generations,

(d) Endangering of flora and fauna species,

(e) Long-term effects on the environment,

(f) Sterilisation of future land use options,

(g) Likely pollution of the environment,

(h) Environmental problems associated with the disposal of waste,

(i) Increased demands on resources, natural (e.g. coal, petroleum, etc.) or cultural (e.g. home sites), which are likely to become in short supply,

(j) Cumulative environmental effect with other existing or likely future activities,

(k) Erosion control measures,

(l) Rehabilitation of the site to its former natural state.

You would undoubtedly be aware of the need to consult with the Department of Planning as to requirements for preparation of any E.I.S. for designated development.

Apart from the above matters, the requirements of the Department of Mineral Resources, Soil Conservation Service of New South Wales, ~~Forestry Commission~~, National Parks and Wildlife Service and Gosford City Council should be addressed in the E.I.S.

...../2

Forsite Landscape Architects & Planners Pty. Ltd. MD79 H 1424

When the environmental impact statement has been prepared, the development application and two copies of the supporting E.I.S. should be lodged with this office. Provided the requirements set out above have been adequately addressed, the Regional Manager will be in a position to consent to lodgement of the development application with Gosford City Council.

It is a requirement of this office that this letter be included as an annexure to the E.I.S.

Yours sincerely,

G. TAYLOR
for REGIONAL MANAGER

-5 SEP 1986

New South Wales Government

National Parks and Wildlife Service

CENTRAL REGION

Lee Nash House
7 Charles Street
Parramatta

P.O. Box 95
Parramatta 2150

Forsite Landscape Architects and Planners
P.O. Box 433,
Broadway, N.S.W. 2007

att: Ms Julie Savet

Our reference: FILE CR 1084

Your reference:

Telephone:

Dear Ms Savet,

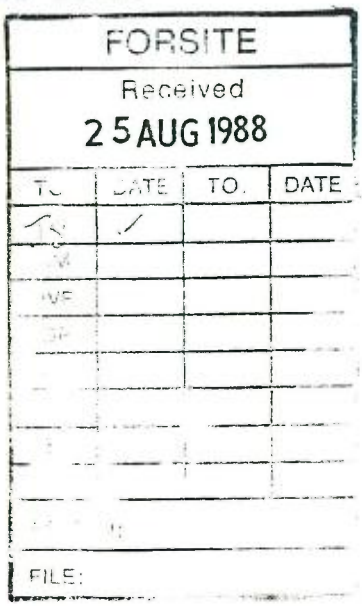
RE: MT WHITE SANDSTONE QUARRY

The Service has now had opportunity to consider your request for information on the above area.

1. There are a large number of sites, particularly engravings, in the general vicinity of the development area. In the immediate vicinity, the Service has records of four sites, including rock engravings, shelter sites with occupation deposit and axe-grinding grooves. In view of this high concentration of sites an archaeological survey of the development area and access road route is considered to be essential. You would need to engage the services of a qualified consulting archaeologist to undertake this survey.

2. As regards land claims, the Service is not the organisation responsible for registering land claims and can not provide advice on this matter: you should approach the Land Claims Unit in the Lands Department.

If you have any further queries on this matter, please do not hesitate to contact either myself or Bronwyn Conyers on 689 5015 or 689 5008.



Yours faithfully,

Luke Godwin
for Director
August 18, 1988

New South Wales Government

National Parks and Wildlife Service

HAWKESBURY DISTRICT

168 Mann Street
P.O. Box 1393
Gosford South, N.S.W. 2250

Telephone: 244911
STD: 043

The Director,
Forsite Planners,
P.O. Box 443,
BROADWAY. N.S.W. 2007.

Our reference: 89 DL/DR

Your reference:

Attention: J. Savet

25th August, 1988.

Dear Sir/Madam,

Re: E.I.S. Proposed Sandstone Quarry at Mt. White

Reference is made to your letter of 5/8/88.

The area is within a proposed Nature Reserve being considered for acquisition by the Service. In addition, the Service has undertaken extensive vegetation survey in the area, identifying vegetation types and rare plants etc. This information is available for your perusal if you care to cull into this office.

Thank you for referring this proposal to us.

Yours faithfully,

B.R. VILE,
For Director.

New South Wales Government

Public Works Department

METROPOLITAN DISTRICT OFFICE

174 Willoughby Road
St Leonards 2065
Please address all correspondence:
District Engineer
Box 47 P.O., St Leonards 2065

The Director,
FORSITE Pty. Ltd.,
P.O. Box 433, BROADWAY, 2007.

Our reference: MD3000/2047

Your reference: 88070/JS/jrc

Telephone: 436 6444
Contact: R.Latimer.

Dear Sir,

Re: E.I.S., Mt. White Sandstone Quarry.

Referring to your letter of the 5th. August, 1988 it is advised that this Department has ~~no special requirements~~ for the proposed Environmental Impact Statement.

The Department however reserves the right to comment on the E.I.S. when it is available.

Yours faithfully,

V.M.Taylor,
District Engineer,
Metropolitan.
pp RL 24-8-88.

FORSITE
Received
- 2 SEP 1988

TO:	DATE	TO	
IO	✓		
KM			
JVP			
GP			
RB			
NR			
EM			

ACTION:

FILE:

New South Wales Government

Soil Conservation Service

PO Box 543
GOSFORD NSW 2250
(043) 24.3844

6th September, 1988

The Director
Forsite Landscape Architects
& Planners
P.O. Box 433
BROADWAY NSW 2007

Contact:

Our reference: G/1030

Your reference: 88070/JS/jrc

Attention: Julie Savet

Dear Sir,

Environmental Impact Statement - Proposed Sandstone Quarry at Mount White.

I refer to your letter of 5th August, 1988, requesting comment from the Service in relation to the preparation of an Environmental Impact Statement for quarrying sandstone at Mount White.

The Soil Conservation Act, 1938, makes provision for the conservation of soil and farm water resources and for the mitigation of erosion within New South Wales. Any activity including sandstone quarrying which disturbs the natural ground surface or the protective vegetation cover constitutes an erosion hazard, necessitating the adoption of adequate control measures to minimise environmental degradation.

I have enclosed a copy of the Service's:

"Guidelines to Meet Requirements for Information on Soil and Land Stability in Proposals for Open-Cut Mining and Rehabilitation".

This booklet has been especially prepared to assist with soil conservation sections of Environmental Impact Statements. Some parts may be relevant to the subject proposal. Also, I would be available to provide specific technical advice required in such a document.

Additionally, it is important to note that depending on its extent, the proposed activity may encroach on "Protected Land" as defined under the Soil Conservation Act, 1938. In this instance, "Protected Land" would only include that land as having slopes generally in excess of 18 degrees from the

horizontal. If it is proposed to destroy or injure trees on "Protected Land", it is necessary to make application to the Catchment Areas Protection Board for an authority. However, there are some exemptions from the provisions. I have enclosed an information sheet for your perusal.

Please do not hesitate to contact me at this office for further information or on-site technical advice and expertise.

Yours faithfully

B.J. Wright

B.J. WRIGHT
District Soil Conservationist

CATCHMENT AREAS PROTECTION BOARD

RESTRICTIONS ON DESTRUCTION OF TREES ON PROTECTED LAND

1. The Soil Conservation Act, 1938, requires owners, occupiers and holders or grantees of timber rights, to make application to the Catchment Areas Protection Board for an authority before destroying or injuring trees growing on PROTECTED LAND.

2. Protected land means land mapped by the Catchment Areas Protection Board as having slopes generally in excess of 18 degrees from the horizontal; land within or within 20 metres of the bed or bank of any river, stream, lake, lagoon or swamp mapped or listed by the Board; or land mapped by the Board as being environmentally sensitive, or affected by or liable to, erosion, siltation or degradation.

3. Prohibition to Prevail

If a person is prohibited from doing anything under these provisions or an authority issued by the Board nothing in any other Act may permit the doing of that thing, except as provided for in paragraph 10 hereunder.

4. Why is it necessary?

The way land is used requires careful planning and management if costly land degradation is to be avoided. Silt in rivers is the main form of pollution throughout rural areas of New South Wales. Siltation can render works entirely ineffective and seriously degrade waterways to the general disadvantage of the community.

Generally a vigorous tree cover is recognised as the most effective control of erosion on steep lands and is of major importance along river banks.

Appropriate land use and sympathetic land management will protect the land and water resources of New South Wales and minimise the rate of soil erosion and stream sedimenation; rising water tables with consequent increased salinity; the loss of shelter for livestock; the loss of wildlife habitats; and the reduction in landscape amenity.

5. What land is affected?

These provisions of the Soil Conservation Act apply to all land mapped as protected land or along prescribed watercourses or water bodies, irrespective of tenure. That is to say, private property (freehold) and leased lands are included as well as lands held under tenure from the Crown.

PROTECTED LAND

6. What are the restrictions relating to 'protected land'?

The Soil Conservation Act provides that, unless the authority of the Catchment Areas Protection Board has been obtained, a person shall not

(a) ringbark, cut down, fell, poison or otherwise destroy, or cause to be destroyed; or

(b) top, lop, remove or injure or cause to be injured, any tree ('tree' includes sapling, shrub and scrub) on protected land.

7. How is Protected Land Identified?

Maps showing protected land are deposited in the office of the District Soil Conservationist which is nearest to the land to which the map relates, and may be inspected by any person during normal office hours without payment of a fee.

Protected land maps are also available for inspection at the local offices of a number of other Departments, particularly the Lands Department and Forestry Commission, and often at local council chambers.

8. Where are applications concerning Protected Land lodged?

The application form can be secured from any Soil Conservation Service office, which will accept the completed application on behalf of the Catchment Areas Protection Board.

9. Procedures - Protected Land

As soon as possible after receiving an application to lop or destroy trees on protected land, the District Soil Conservationist, acting as an agent for the Board, will arrange for an inspection of the area concerned and a report to the Catchment Areas Protection Board by an authorised government officer. If it approves of the application, the Board will issue an authority under section 21D of the Act subject to conditions considered necessary to control erosion and siltation and to generally eliminate or mitigate any adverse effects on the environment.

10. Exemptions from Protected Land Provisions

Anybody who is required or authorised to lop or destroy any tree on protected land having a slope in excess of 18° within a notified catchment area by or under any other Act or by any licence, permit, authority or consent granted or issued under any such Act is not required to obtain an authority to do so under the Soil Conservation Act.

Similarly, an owner or occupier of protected land having a slope in excess of 18° need not apply for an Authority should he wish to cut or destroy in any period of one year -

(a) no more than 7 trees per hectare;

(b) the trees growing on no more than 2 hectares of each separate area of protected land where the area of not more than 2 hectares does not comprise more than a ¼ of the separate area of protected land, other than for the development of a banana plantation, horticulture or the growing of crops; or

(c) the trees comprising a banana plantation or orchard involving the normal harvesting and management of banana plantations and orchards, other than the complete destruction of the plantation or orchard.

11. Penalties

Any person who contravenes these provisions of the Soil Conservation Act is liable to a fine of up to $10,000 for each offence.

12. Remedial Measures

If a person contravenes these provisions by damaging or destroying trees and the operations have resulted in or are liable to result in soil erosion, land degradation, siltation, or obstruction to the flow of a river or lake, or any adverse effect on the environment, the Catchment Areas Protection Board can require that person to carry out remedial measures to its satisfaction or the Minister can authorise the Service to undertake the work and recover the cost from the landholder. Failure to comply with such a notice also attracts a penalty of up to $10,000.

13. Get Expert Advice

The Catchment Areas Protection Board is conscious of the Government's wish that - "the provisions work in the interests of the whole of the State, as well as in the interests of the individual landholder".

Before destroying trees on any land, consult the local office of the Soil Conservation Service and obtain free advice. These local officers understand your problems of land use and know how to deal with them.

All correspondence to the Catchment Areas Protection Board should be addressed to the Board's Executive Officer and Policy Adviser.

New South Wales Government

State Pollution Control Commission

157 Liverpool Street
Sydney 2000
G.P.O. Box 4036
Sydney 2001

The Director
Forsite Landscape Architects and Planners P/L
P O Box 433
BROADWAY NSW 2007 210

Our reference: 270145A PG:JN

Your reference:

Telephone: (02) 265 8888
Telex Head Office: AA 72234
Fax: (02) 261 2310

ATTENTION: Ms Julie Savet

14 OCT 1988

Dear Sir,

EIS PROPOSED SANDSTONE QUARRY AT MOUNT WHITE

Reference is made to your letter of 5th August, 1988, seeking our advice on the above.

The Commission has reviewed the proposal and in accordance with our responsibilities to control or reduce pollution, to control waste disposal and to protect the environment, we are pleased to offer the following comments.

Air Pollution

The premises will not be scheduled under the Clean Air Act unless extracted material is processed on site. If the premises are not scheduled then the responsibility for the control of air pollution will rest with the Gosford City Council. Should the Council seek our advice on pollution control measures for the site we would suggest that the following be made conditions of any development consent that may be issued:

- Unsealed roads used for material haulage shall be kept sufficiently damp to prevent wind-blown or traffic-generated dust.

- Guide posts or other suitable barriers shall be placed along roads to prevent traffic movements onto non-traffic areas.

- Earthern bunds (if any) should be covered by suitable top soil and grassed as soon as practicable.

- Material extracted shall not be processed on the proposed site.

Water Pollution

The Commission's approval will be required for any works to control water pollution on the site. The following measures would be included as conditions in any approval that might be granted by the Commission.

- Surface water from all disturbed areas shall be directed to approved sediment control works.

- Surface water from uncontaminated areas including roof water drainage, shall be diverted from the waste-water collection system.

- Sedimentation basins shall have a minimum capacity of 500 cubic metres per hectare of disturbed area (including roadways) draining to the structure, or structures.

- The outlet from the sedimentation basins shall be provided with a suitable baffle to ensure that effluent is withdrawn at least 300 mm below the liquid surface to control the carryover of scum and floating matter.

- All practical measures shall be taken to prevent short-circuiting in the sedimentation basins.

- Sediment control facilities shall be installed before any other construction takes place.

- Areas disturbed and vegetation removed during construct-ion shall be kept to a minimum.

- A buffer zone of at least 30 metres of undisturbed vegetation shall be maintained along any watercourse.

- Disturbed areas shall be stabilised by landscaping or re-vegetating, or other approved means, as soon as practi-cable.

- Impervious bunds shall be constructed around all fuel or oil storage areas large enough to contain 110% of the volume held in the largest tank.

- A geotechnical engineer's certificate attesting to the long-term stability of the sedimentation basins shall be provided.

- Dewatering of areas subject to infiltration shall be controlled so that the non-filtrable residue concentra-tion in the wastewaters does not exceed 50 mg/L. In addition, equipment shall be provided to ensure there is no visible oil and grease and, in any case, less than 10 mg/L oil and grease in the wastewaters.

Noise Pollution

The premises will be scheduled under the Noise Control Act if the site area is 20,000 m² or more. Should this be the case the proponent will be required to seek the Commission's approval and conditions would be applied to the operation requiring that:

- the level of noise emanating from plant and equipment operating in or on the quarry shall not exceed the measured background noise level by more than 5 dB(A) when measured at the boundary of any residential premises, school or hospital in the vicinity of the quarry. The noise should be substantially broad-band in character.

- the hours of operation of the quarry shall be 7.00 a.m. to 6.00 p.m. Monday to Friday, 7.00 a.m. to 1.00 p.m. Saturdays with no operation on Sundays or public holidays.

The proponent would also be required to submit, with their application, details of the proposed truck entry and exit routes from the site together with noise impact statement for the operation prepared by an accredited acoustical consultant.

As with air pollution matters, should the premises not be scheduled, we would suggest that the Council includes the above in any development consent it may issue.

Yours faithfully,

W.G. HICKS
Regional Manager, Northern Sydney
for Secretary

·[5w-jm,sjmcdj-north]·

National Parks Association of NSW

15th September, 1988.

The Director,
Forsite Landscape Architects & Planners Pty. Ltd.,
P.O. Box 433,
BROADWAY. N.S.W. 2007.

Attention: Ms. J. Savet

Dear Ms. Savet,

Thank you for the opportunity to provide input on the environmental impacts of the resumption of quarrying E.N.E. of Mt. White.

This Association is concerned that quarrying on an increased scale would have an impact on this area which is a natural corridor between Brisbane Water and Dharug National Park.

Our view is that:-

(a) Explosive methods should not be used as it could have an adverse effect on the avifauna which is relatively rich within this valley, which includes rainforest species.

(b) The area should be subject to a rehabilitation program to ensure that the bushland will regenerate so as to result in the quarried area not being visually degrading to this valley.

(c) Silt traps being constructed and maintained to prevent damage to the gully rainforest in the vicinity of Kelly's Creek.

(d) The existing road to be used for access. Our information is that the owners of the freehold are prepared to sell their property to give access. It is the responsibility of the developer to prove that this is not the case.

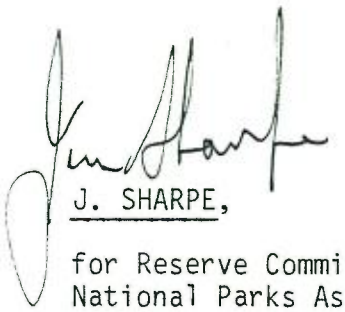
Building a parallel road would be unnecessarily destructive as the proposed route is on a very narrow bench with a steep slope below.

In the longer term we believe the area should be part of a Nature Reserve forming a corridor between the two National Parks. Therefore every effort must be made to mitigate disturbance, e.g., in rehabilitation work, only overburden from the site and material collected from the site and material collected from silt traps should be used to re-establish plants, thus avoiding the introduction of weeds in soil brought from other sites.

.../2

We trust these recommendations and views can be integrated into the development plan.

Yours sincerely,



J. SHARPE,

for Reserve Committee,
National Parks Association of N.S.W.,
275C Pitt Street,
Sydney. 2000.

GOSFORD DISTRICT
ENVIRONMENT
FOUNDATION

Tel.: [043] 60.1024

230 Scenic Road,
KILLCARE HEIGHTS, 2256.

16 August, 1988.

Ms Julie Savet,
Forsite Landscape Architects & Planners P/L,
P.O. Box 433,
BROADWAY, NSW., 2007.

Dear Ms Savet:

Re: **ENVIRONMENTAL IMPACT STATEMENT, PROPOSED SANDSTONE QUARRY AT MOUNT WHITE. Your 88070/JS/jrc of 5 August 1988.**

We have now had the advantage of sighting the location in a little more detail than we had previously.

You will be aware that there are some long standing plans to continue with the expansion of the reserve systems in this area, designed to protect the diversity of flora and fauna associated with the sandstone tops and gullies of the region. The altitude of the area provides for scenic qualities of a high order. Even the Department of Lands acknowledges that fact by notifying R89280 for public recreation and preservation of native flora and fauna. The National Parks and Wildlife Service has had certain advice upon the quality of the natural systems from a National Herbarium team. This advice supported the value of the area, including the site of your enquiry.

Also in existence, is a proposal for a *Mount Olive Nature Reserve* which presently includes the land which is the subject of P.O. 79.104.

It is the opinion of the Foundation that the Department of Lands has acted prematurely in granting the Permissive Occupancy. Any environmental impact should be related to the determination of the *Mount Olive Nature Reserve* proposal and not at a time when a decision about boundaries and management of the nature reserve, has yet to be resolved. We understand that the proposal for the quarry has not been referred to the NP&WS. Presumably, reference will be made after the E.I.S. has been prepared.

Under the circumstances, the Foundation must say it believes it is not in *the public interest* to proceed with the proposal.

Thank you for the opportunity to comment.

Yours sincerely,

Allen A. Strom,
SECRETARY.

APPENDIX B

THE PROJECT TEAM

The following organisations and individuals have contributed to this Statement.

FORSITE Landscape Architects & Planners Pty Ltd

Mr J van Pelt	Director
Ms J Savet	Environmental Planner

Project Co ordination
Visual Assessment
Impact Evaluation
Environmental Recommendations

Gosford Quarries Pty Ltd

Mr U Stafford	Managing Director
Mr P Brown	Gosford Area Manager

Technical Information

Mr R Payne — Plant Ecologist

Vegetation Assessment

Mr A York — Scientific Consultant

Wildlife Assessment

Brayshaw McDonald Pty Ltd

Ms H Brayshaw — Director

Archaeological Survey

Challis & Associates Pty Ltd

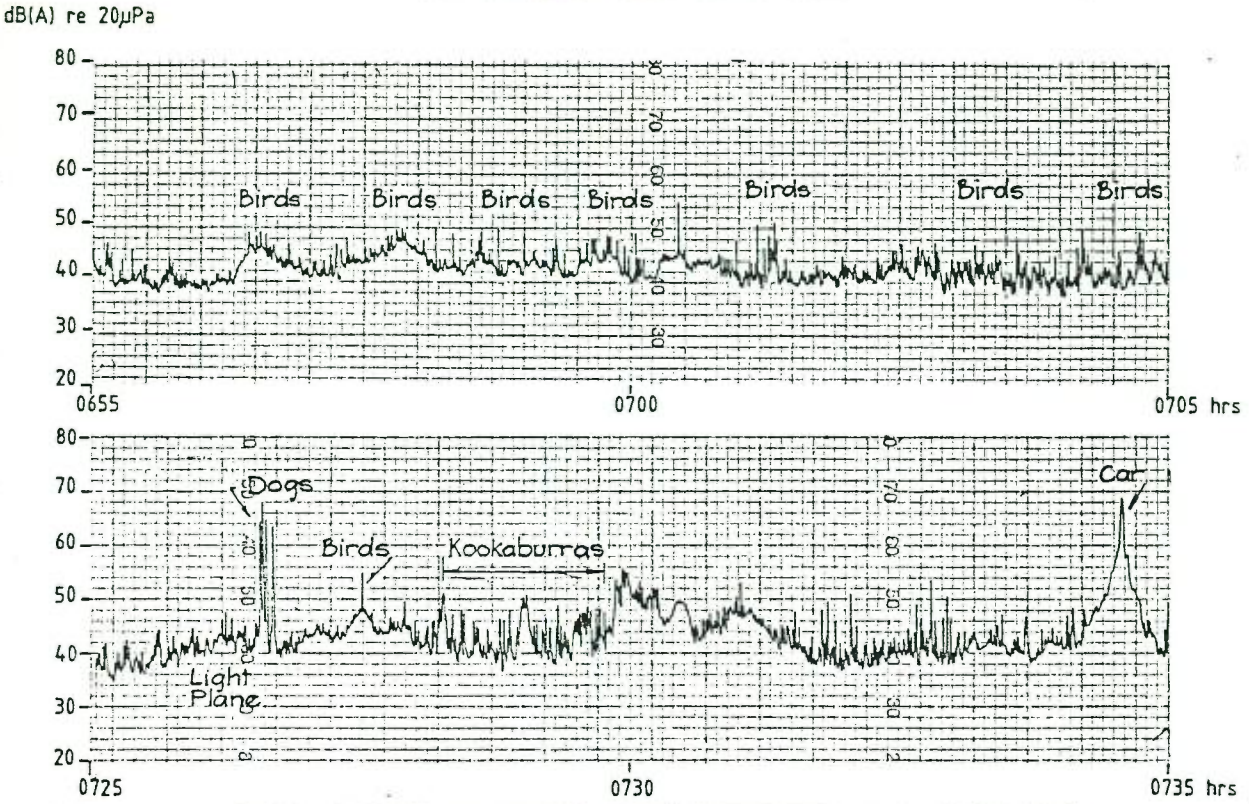
Mr L A Challis — Director

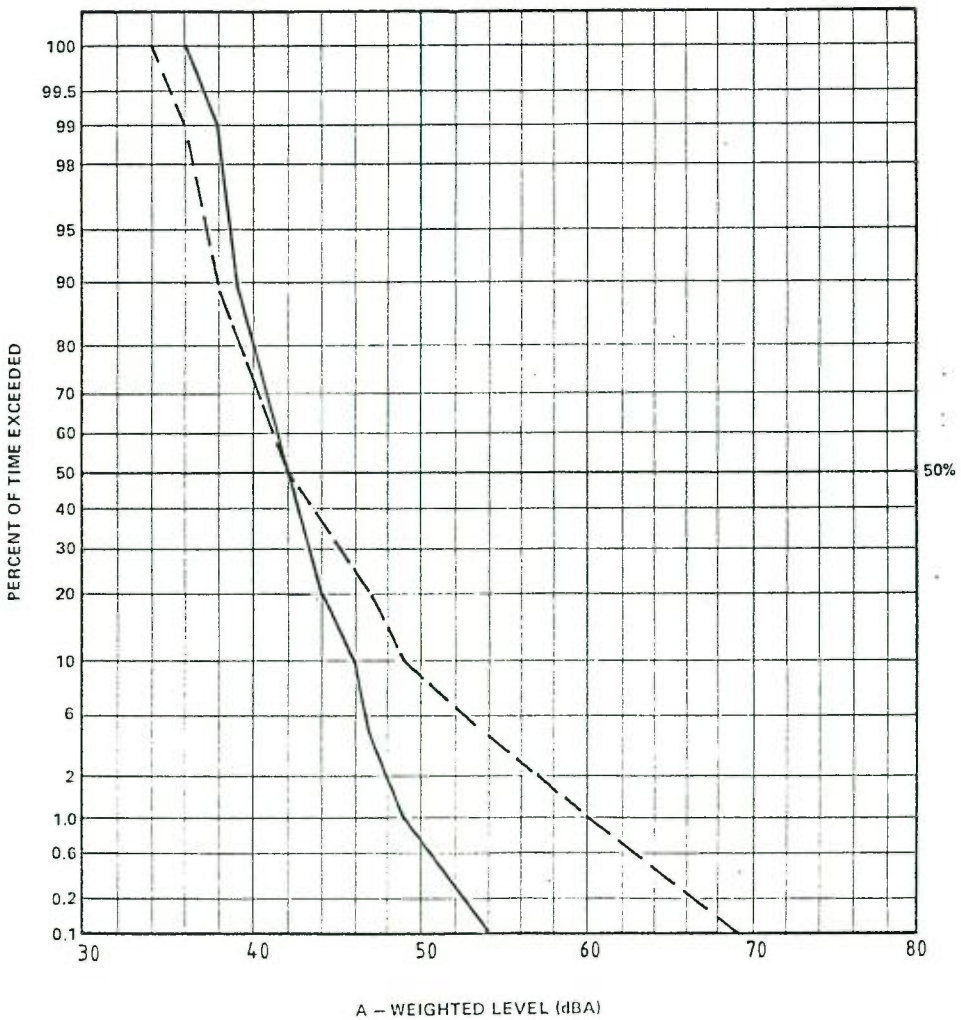
Acoustic Assessment

APPENDIX C

C1 EXISTING AMBIENT SOUND LEVELS

EXISTING AMBIENT SOUND LEVELS
POSITION 1 - ASHBROOKE ROAD
WEDNESDAY 26th JULY, 1988



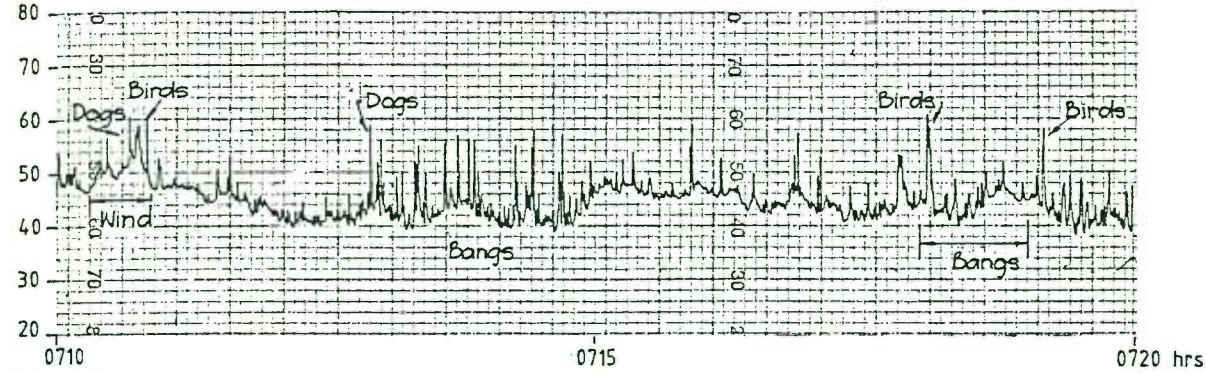


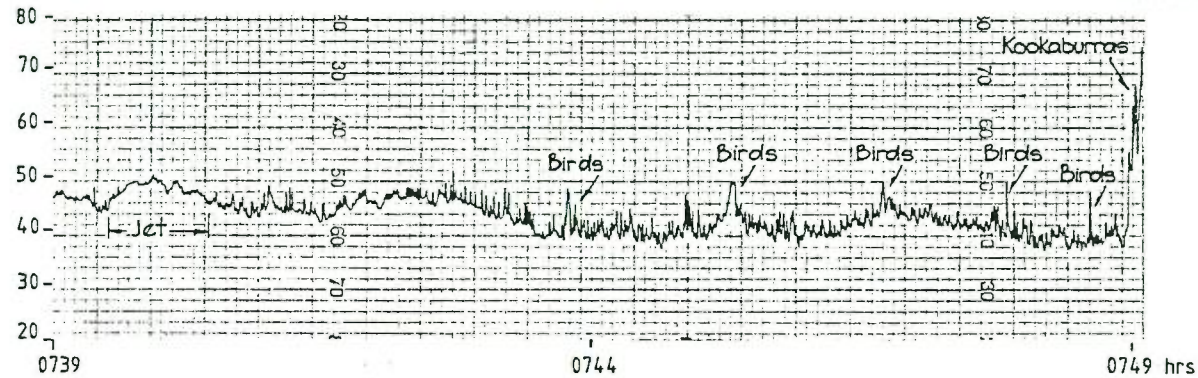
Leq 43 ———— 0655-0705 hrs:- Birds, Dogs, Insects

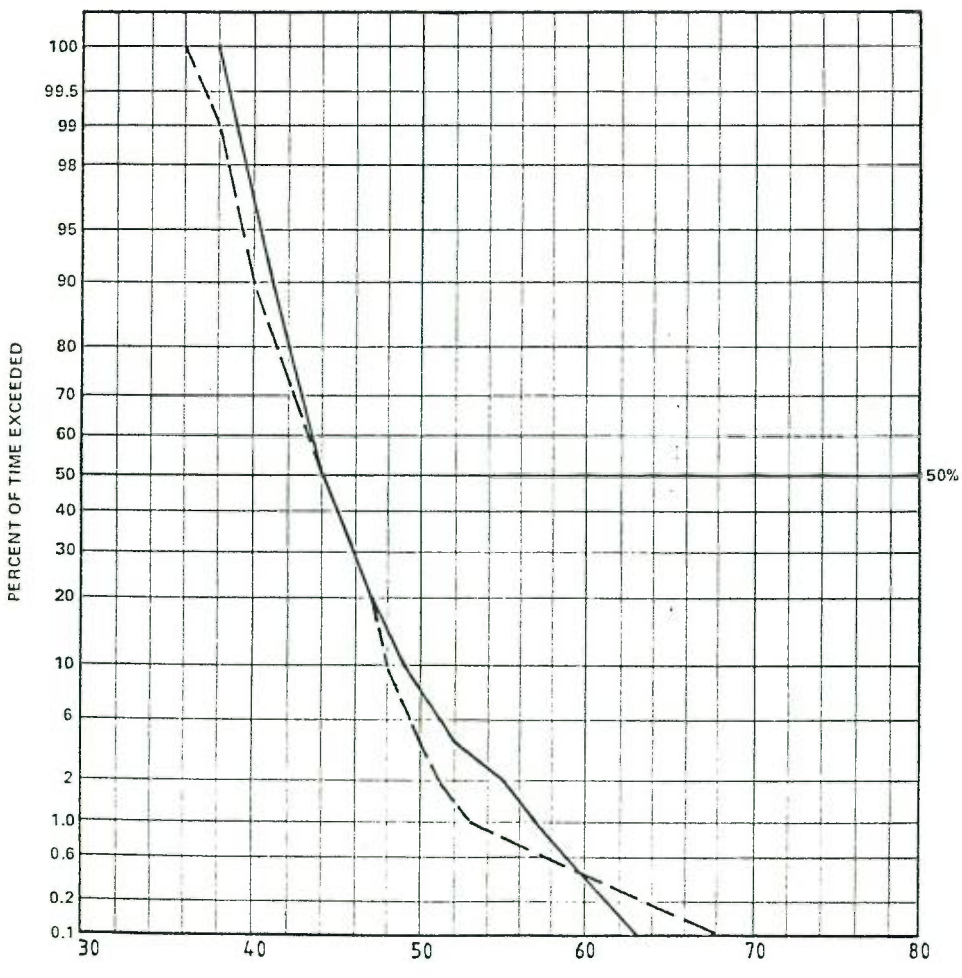
Leq 49 — — — — 0725-0735 hrs:- Birds, Kookaburras, Insects, Dogs, Light plane, Car

EXISTING AMBIENT SOUND LEVELS
POSITION 2 - ADJACENT TO ASHBROOKE ROAD
WEDNESDAY 26th JULY, 1988

dB(A) re 20μPa





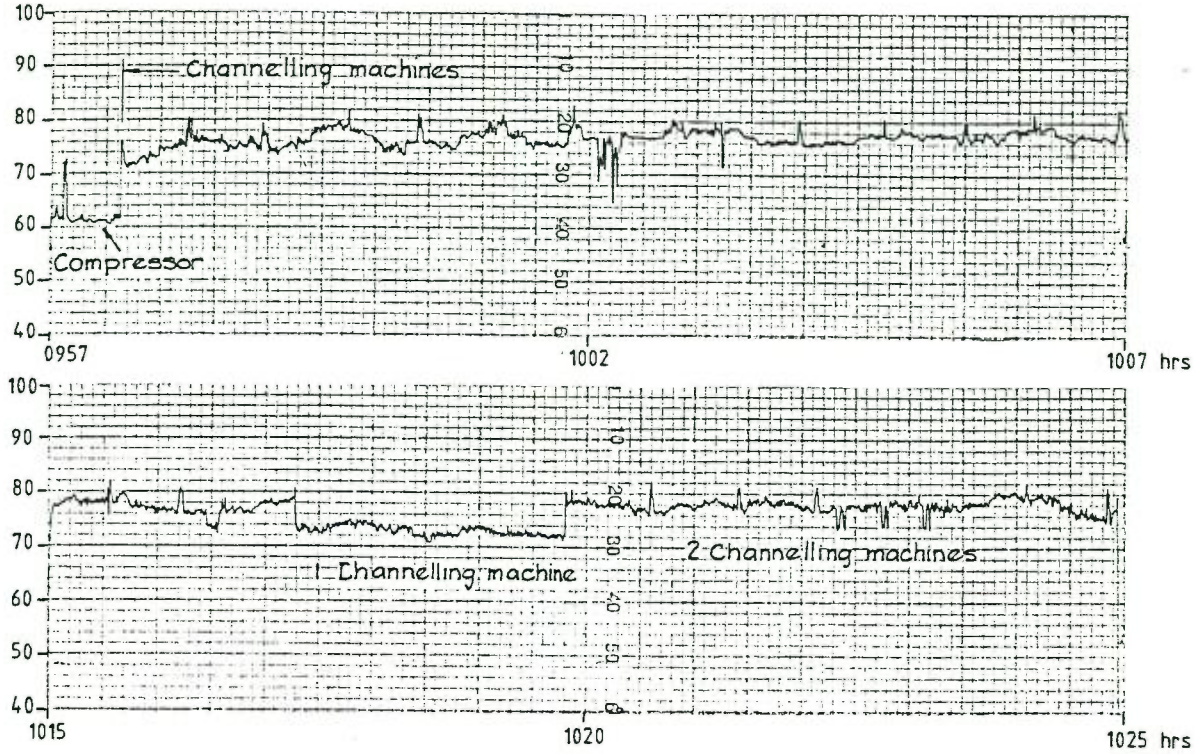


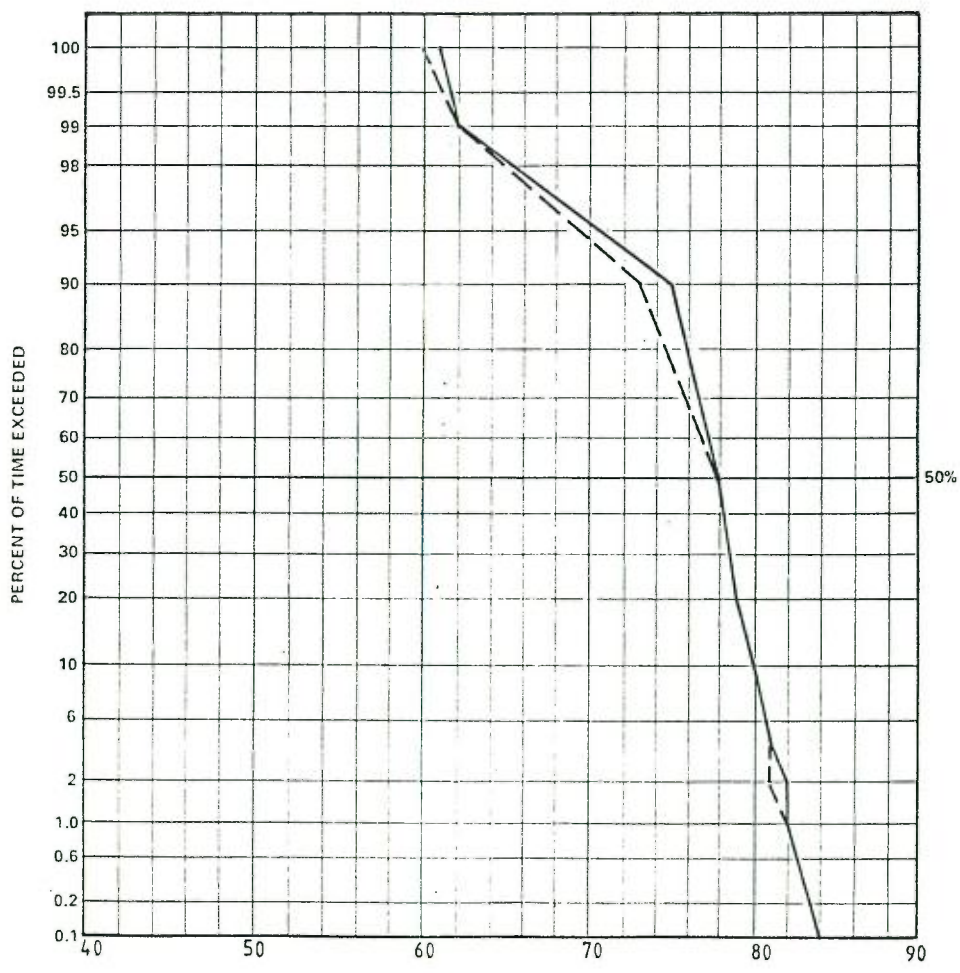
Leq 47 ———— 0710-0720 hrs:- Birds, Dogs, Insects, Bangs, Wind

Leq 47 — — — — 0739-0749 hrs:- Birds, Insects, Jet, Kookaburras

EXISTING AMBIENT SOUND LEVELS
ADJACENT TO QUARRY WITH SIMILAR EQUIPMENT
WEDNESDAY 26th JULY, 1988

dB(A) re 20μPa





Leq 78 ———— 0957-1007 hrs:- 2 Channelling machines, 3 Compressors

Leq 78 — — — — 1015-1025 hrs:- 2 Channelling machines, 2 Jack-hammers, Compressors

APPENDIX C

C2 CRITERIA FOR COMMUNITY NOISE ASSESSMENT

1. General

The assessment of community noise as a definitive technical procedure has attracted considerable attention over the last twenty years. During that period, there have been a number of major social surveys and associated environmental studies conducted in Australia and overseas.

These studies have given rise to various assessment procedures, national and international community noise standards and in many instances associated legislation or ordinances specifically prepared with the aim of minimising community noise impact.

2. Australian Standard 1055

In Australia, one of the most significant and far reaching programmes into community noise assessment is that associated with the work of Standards Association of Australia and specifically Committee AK 5, which has been re-designated as Committee AV 5. That committee has been responsible for the drafting and release of three (3) separate community noise assessment standards which were released as Australian Standard AS 1055 in 1973, and most recently in 1984.

The latest issue of AS 1055-1984 [2] now clearly specifies that the "noise limits are established by relevant authorities according to these guidelines and may be embodied in Noise Limit Requirement Documents to which references are made".

The latest issue of the standard also clearly points out that:

> "The standard is not a regulatory document and users should ascertain, from the relevant regulatory authority, details of specific requirements laid down in each State or Territory".

The relevant noise limits in New South Wales are those issued by either the local council, or in the absence of specific local noise limits, those published by the New South Wales State Pollution Control Commission.

3. Statistical Assessments

Noise is a non-stationery variable which normally fluctuates over a wide dynamic range. These fluctuations give rise to the need to specify the noise in such a way that the fluctuating characteristics of the noise are adqeuately specified. There are a number of ways in which environmental noise may be assessed. One of the most important developments in this regard involves the determination of the "percentile noise levels" which are sometimes described as the "noise exceedance levels". The fluctuating noise measured over a

specific period of time may then be determined in terms of the A-weighted percentile level associated with a given sound level.

The most common percentile levels determined by statistical sound level measurement equipment are the statistical values designated as L max, L0.1, L1, L2, L5, L10, L20, L50, L90, L99, L min and the L eq.

The parameters generally regarded as being the most significant amongst these are the parameters of "L1", which is the A-weighted sound level exceeded for 1% of the time and is close to the peak sound level; the "L10 level which is the A-weighted sound level exceeded for 10% of the sample period and which is also commonly termed the "mean peak noise"; the "L90" level which is the A-weighted sound level exceeded for 90% of the sample period and which is commonly termed the "mean minima" or "background sound level". The L eq (see Appendix C4 Glossary of Acoustical Terms) is termed the "equivalent sound level" and is the energy equivalent level for the sample period.

These statistical results may be plotted in a number of different ways, two of the most important of which have been adopted in this report.

The first method of data presentation is to plot the individual statistical parameters as a percentile noise graph (which is sometimes also termed "noise exceedence graph"). By evaluating this graph the longer term characteristics, as opposed to the short-term characteristics of an acoustical environment at different times, places or conditions may be more readily evaluated or intercompared.

The second method of presenting the statistical data is to graph the time varying noise levels utilising calibrated equipment which provides a level recording of the A-weighted sound levels. This technique is appropriate when only relatively short samples are to be recorded and/or analysed.

When the two forms of data presentation are combined a simple and direct method of assessment and/or comparison is provided for the technical reader and/or the assessor.

These forms of statistical data, when presented in a graphical format, are far easier to understand and assess, particularly when a comparative analysis is required.

As a consequence, most acoustical environmental studies are now prepared on the basis of structural data and with similar format. Advances in data formatting has led to the development of classes of environmental acceptability which may be determined on a statistical basis for both daytime, as well as for night-time conditions.

APPENDIX C

C3 INSTRUMENTATION FOR MEASUREMENT OF AMBIENT NOISE

The ambient noise levels were measured using the following equipment:

Community Noise Analyser	Genrad Type 1945
25mm Ceramic Microphone	Genrad Type 1971-9605
protected by Windshield	Bruel & Kjaer Type UA 0207

The A-weighted sound level was recorded on a

Chart Recorder	Linear Type 142

The reference level of the system was checked at frequent intervals using an Acoustic Calibrator, Bruel & Kjaer Type 4230, and remained within the range 93 $\pm$ 1dB(A). This instrument has been calibrated and complies with its manufacturer's specifications in terms of linearity and frequency response, and has a dynamic range greater than 90 dB(A).

APPENDIX C

C4 INSTRUMENTATION FOR SOUND LEVEL MEASUREMENTS

Precision Sound Level Meter	Bruel & Kjaer type 2215
and Octave Analyser fitted with a 12mm Condenser Microphone	Bruel & Kjaer type 4165
protected by a Windshield	Bruel & Kjaer type UA0237

The reference level of the system was checked before and after the measurements using an Acoustic Calibrator, Bruel & Kjaer type 4230, and remained within the range 93.8 $\pm$ 0.5dB(A).

This instrument has been calibrated in our laboratory, which is registered for this test by the National Association of Testing Authorities, and complies with AS 1259, Part 2-1976 "Sound Level Meters, Type 2, Precision" and AS Z41-1969 "Octave, half octave and one third octave band pass filters intended for the analysis of sound and vibrations".

APPENDIX C

C5 GLOSSARY OF ACOUSTICAL TERMS

GLOSSARY OF ACOUSTICAL TERMS

absorption	The conversion of acoustical energy into another form of energy, usually heat, when passing through an acoustical medium.
ambient noise	The ambient noise is the all encompassing noise associated with the environment at a specific location. It is a composite of sounds from many sources both near and far.
audio frequency	Is defined as any audible frequency typically regarded as lying between 20Hz and 20kHz. In practice sounds are audible at frequencies in the range 40Hz to 16kHz for a person age 30 years with normal hearing.
background noise	Is regarded as being the component noise in the absence of either the intruding noise (if such exists) or the foreground noise where some specific component of sound may elevate the perceived ambient noise above its normal level.
background noise level curves (BNL)	This series of curves are similar to the 'noise criteria curves', modified by a de-emphasis of the high frequency sound at frequencies above 2kHz to provide a more natural noise level.
decibel (dB) scale	A linear scale used to reduce logarithmically related quantities to convenient numerical values. By definition it is 10 times the logarithm to base 10 of the ratio of two power levels. In acoustics the scale is commonly used to express values of sound pressure and sound power for which the reference levels are 20 micropascals and 1 picowatt respectively.
A-weighting	An internationally standardised set of frequency corrections which approximates the response of the human ear at the 40 decibel level (40 phon level) and hence provides a single value of SPL, dB(A) which relates to the human perception of a sound.
equivalent continuous sound level (L_{eq})	Is effectively an average level and is defined as the steady sound level which would produce the same sound energy over a stated period of time as a specified time varying sound.
far field	Is that part of the sound field of a source radiating under free field conditions where the sound wave is spreading spherically. This normally occurs at significant distances from the source and the sound wave may be described as following the inverse square law, i.e. it is characterised by a 6 dB reduction in SPL for each doubling of the distance from the source.
free field	A sound field in a medium of such extent that the effects of the boundaries are negligible throughout the region of interest.
frequency	Of a periodic quantity; the time rate of repetition. Also the reciprocal of the period. The unit of frequency is the hertz previously known as one cycle per second.
frequency analysis	Is used to determine the spectral content of complex sound within various frequency ranges. The most commonly used forms are octave band and one third octave band analysis.
Hertz (Hz)	The unit of frequency measurement, representing cycles per second.
level	The number of decibels by which a given quantity differs from a reference quantity. It implies a measurement on a logarithmic scale relative to a stated reference or zero level, usually 20 micropascals for sound pressure.
L_{Amax}	The maximum A-weighted sound pressure level occurring during a specified period.
L_N	The sound pressure level which is exceeded for N% of a specified period of time e.g. L_{90}, the level exceeded for 90% of the time, is commonly used to quantify the ambient noise level.
L_{WA}	This is the abbreviation used for the A-weighted sound power in dB re 10^{-12} watts.
near field	Is that part of the sound field usually within about two wavelengths of the source where there is no simple relationship between the sound pressure and the distance.
noise	By standard definition is unwanted sound and hence can only be regarded as being noise when human beings are present to perceive it. Recently it has tended to encompass any sounds which the perceiver believes he can have stopped.
Noise Climate	Is the range of A-weighted sound levels between the 10 percentile level and the 90 percentile level.
Noise rating (NR) curves	A series of empirical curves used to evaluate noise by relating the spectral components to the relative sensitivity of the human ear. They utilise octave band levels and are characterised by an NR value which is numerically equal to the SPL at the intersection with the ordinate at 1000 Hz.
reverberant sound	The sound in an enclosure excluding that which is received directly from the source and which tends to persist after the emission of sound from the source has ceased.
sound	Energy that is transmitted by pressure waves in air or other materials and is the objective cause of the the sensation of hearing.
sound level	The level of sound pressure measured by a sound level meter and one of its weighting networks. When A-weighting is used the sound level is given in dB(A).
sound pressure level (S P L)	The fundamental measure of sound pressure is defined as 20 times the logarithm to the base 10 of the ratio of the r.m.s. sound pressure to the reference sound pressure. The reference sound pressure is normally taken to be 20 micropascals.
speech interference level (S I L)	Is the arithmetic average of the sound pressure levels of the octave bands centred on 500 Hz, 1 kHz and 2 kHz.
speech intelligibility (percentage)	The percentage of meaningful speech or spoken material that is correctly interpreted by a listener or listeners.
transmision loss	The reduction in magnitude of the audible characteristics of a signal between 2 stated points in a specified environment. (In this case, between a person talking and a person listening.)

APPENDIX D

VEGETATION LIST OF SPECIES IN GULLY RAINFOREST, WOODLAND I AND SHRUBLAND/SEDGELAND SPECIES

	COMMUNITY	4	5	1
PTERIDOPHYTA				
Psilotaceae				
	Psilotum nudum	—		
Lycopodiaceae				
	Lycopodium cernuum	—		
Osmundaceae				
	Todea barbera	—		—
Schizaeaceae				
	Schizaea rupestris	—		
	Schizaea bifida	—		
Gleicheniaceae				
	Gleichenia dicarpa	—		
	Sticherus flabellatus	—		—
Hymenophyllaceae				
	Hymenophyllum cupressiforme			—
Cyatheaceae				
	Cyathea leichhardtiana			—
	Culcita dubia	—		
Dennstaedtiaceae				
	Hypolepsis muelleri	—		—
	Pteridium esculentum	—		—
	Histiopteris incisa			—
Lindsaeaceae				
	Lindsaea linearis	—		
	Lindsaea microphylla	—		—
Adiantaceae				
	Adiantum aethiopicum	—		—
	Adiantum hispidulum			—
	Adiantum silvaticum			—
	Pellaea falcata var. falcata			—
	Pellaea falcata var. nana			—
	Cheilanthes distans	—		
Grammitaceae				
	Grammitis billardieri			—
Polypodiaceae				
	Pyrrosia rupestris			—
	Microsorium scandens			—
	Microsorium diversifolium			—
Davalliaceae				
	Arthropteris tenella			—
Aspidiaceae				
	Polystichum australiense			—
	Lastreopsis microsora			—
Apleniaceae				
	Asplenium australasicum			—

	COMMUNITY	4	5	1
Blechnaceae				
	Blechnum nudum			——
	Blechnum wattsii			——
	Blechnum cartilagineum			——
	Doodia aspera			——
ANGIOSPERMAE				
Euopmatiaceae				
	Eupomatia laurina			——
Monimiaceae				
	Wilkiea huegeliana			——
	Palmeria scandens			——
Cassythaceae				
	Cassytha sp.		——	——
Menispermaceae				
	Stephania japonica var. discolor			——
	Sarcopetalum harveyanum			——
Violaceae				
	Viola hederacea			——
Tremandraceae				
	Tetratheca glandulosa		——	
Droseraceae				
	Drosera spathulata		————	
	Drosera auriculata		——	
Oxalidaceae				
	Oxalis sp.			——
Thymelaeaceae				
	Pimelea linifolia		——	
	Pimelea hirsuta		——	
Proteaceae				
	Isopogon anethifolius		——	
	Isopogon anemonifolius		——	
	Conospermum longifolium ssp. longifolium		——	
	Conospermum ericifolium		——	
	Persoonia lanceolata		——	
	Persoonia levis		——	
	Persoonia pinifolia		——	
	Persoonia sp. nov. aff. pinifolia		————	
	Banksia ericifolia		————	
	Banksia spinulosa var. spinulosa		——	
	Banksia integrifolia		——	——
	Banksia serrata		——	
	Banksia robur		——	
	Hakea gibbosa		——	
	Hakea bakerana		——	
	Hakea sericea		——	
	Hakea dactyloides		——	

	COMMUNITY	4	5	1
	Hakea salicifolia			——
	Hakea teretifolia	——		
	Grevillea buxifolia	——		
	Grevillea sericea	——		
	Grevillea diffusa ssp. filipendula	————		
	Grevillea linearifolia	——		
	Lomatia silaifolia	——		
	Lomatia myricoides			——
	Xylomelum pyriforme	——		
	Lambertia formosa	——		
Dilleniaceae				
	Hibbertia scandens			——
	Hibbertia dentata			——
	Hibbertia fasciculata	——		
	Hibbertia diffusa	——		
	Hibbertia cistiflora	——		
Pittosporaceae				
	Pittosporum undulatum			——
	Pittosporum revolutum			——
	Bursaria spinosa			——
	Citriobatus pauciflorus			——
	Billardiera scandens	——		
Passifloraceae				
*	Passiflora edulis			——
Elaeocarpaceae				
	Elaeocarpus reticulatus	——		——
Sterculiaceae				
	Lasiopetalum macrophyllum			——
	Lasiopetalum ferrugineum var. ferrugineum			——
	Lasiopetalum rufum	——		
Euphorbiaceae				
	Phyllanthus filicaulis	——		
	Phyllanthus thymoides	——		
	Ricinocarpus pinifolius	——		
	Breynia oblongifolia			——
Cunoniaceae				
	Callicoma serratifolia			——
	Ceratopetalum gummiferum	——		
	Ceratopetalum apetalum			——
	Aphanopetalum resinosum			——
	Schizomeria ovata			——

	COMMUNITY	4	5	1
Baueraceae				
	Bauera rubioides	———		
Escalloniaceae				
	Abrophyllum ornans			———
Rosaceae				
	Rubus hillii			———
Fabaceae-Mimosoideae				
	Acacia ulicifolia	———		
	Acacia myrtifolia	———		
	Acacia prominens			———
	Acacia linifolia	———		
	Acacia suaveolens	———		
	Acacia oxycedrus	———		
	Acacia maidenii			———
	Acacia elata	———		
	Acacia terminalis	———		
Fabaceae-Faboideae				
	Oxylobium ilicifolium	———		
	Gompholobium latifolium	———		
	Gompholobium grandiflorum	———		
	Gompholobium pinnatum	———		
	Pultenaea daphnoides	———		
	Pultenaea rosmarinifolia	———		
	Pultenaea ferruginea var. ferruginea	———		
	Dillwynia retorta var. retorta	———		
	Dillwynia rudis	———		
	Hovea linearis	———		
	Bossiaea heterophylla	———		
	Bossiaea stephensonii	———		
	Bossiaea scolopendria	———		
Myrtaceae				
	Rhodamnia rubescens			———
	Syzygium oleosum			———
	Acmena smithii			———
	Backhousia myrtifolia			———
	Syncarpia glomulifera			———
	Tristaniopsis laurina			———
	Angophora hispida		———	
	Angophora costata	———		———
	Angophora floribunda	———		———
	Eucalyptus punctata var. punctata	———		
	Eucalyptus deanei			———
	Eucalyptus haemastoma	———		
	Eucalyptus racemosa	———		
	Eucalyptus capitellata		———	
	Eucalyptus agglomerata	———		
	Eucalyptus eximia	———		
	Eucalyptus gummifera	———		
	Eucalyptus piperita ssp. piperita	———		

	COMMUNITY	4	5	1
	Leptospermum attenuatum	——		
	Leptospermum flavescens	——		
	Leptospermum arachnoides	——		
ø	Leptospermum laevigatum	——		
	Kunzea ambigua	——		
	Kunzea capitata		———	
	Callistemon citrinus		———	
	Melaleuca linariifolia			——
ø	Melaleuca hypericafolia	——		
	Baeckea virgata		———	
	Baeckea ramossissima	——		
	Baeckea brevifolia	——		
	Baeckea diosmifolia	——		
	Darwinia fascicularis ssp. fascicularis		———	
Casuarinaceae				
	Allocasuarina torulosa	——		
	Allocasuarina littoralis	——		
	Allocasuarina distyla	———		
Piperaceae				
	Peperomia tetraphylla	——		
Moraceae				
	Ficus coronata			——
	Ficus rubiginosa			——
Rhamnaceae				
	Pomaderris ligustrina	——		
	Pomaderris ferruginea			——
Vitaceae				
	Cissus hypoglauca			——
	Cayratia clematidea			——
Olacaceae				
	Olax stricta	——		
Rutaceae				
	Boronia ledifolia	——		
	Boronia pinnata	——		
	Zieria smithii			——
	Phebalium squameum	——		
	Eriostemon australasius	——		
	Eriostemon buxifolius ssp. obovatus	——		
	Asterolasia correifolia	——		
Meliaceae				
	Synoum glandulosum			——
Sapindaceae				
	Dodonaea triquetra	——		
	Dodonaea camfieldii		———	

	COMMUNITY 4	5	1
Araliaceae			
Astrotricha floccosa			—
Umbelliferae (Apiaceae)			
Actinotus helianthi	—		
Actinotus minor	—		
Platysace linearifolia	—		
Epacridaceae			
Styphelia triflora		—	
Astroloma pinifolium	—		
Astroloma humifusum	—		
Monotoca scoparia	—		
Leucopogon microphyllus	—		
Trochocarpa laurina	—		
Epacris microphylla	—		
Woollsia pungens			
Sprengelia incarnata		—	
Dracophyllum secundum	—		
Loganiaceae			
Mitrasacme polymorpha	—		
Oleaceae			
Notelaea longifolia			—
Apocynaceae			
Parsonsia straminea			—
Asclepiadaceae			
Marsdenia rostrata			—
Rubiaceae			
Morinda jasminoides			—
Psychotria loniceroides			—
Myrsinaceae			
Rapanea variabilis			—
Lobeliaceae			
Pratia pendunculata	—		
Pratia purpurascens			—
Stylidiaceae			
Stylidium productum ?	—		
Goodeniaceae			
Goodenia dimorpha var. dimorpha	—		
Goodenia heterophylla	—		
Scaevola ramosissima	—		
Dampiera stricta	—		

	COMMUNITY 4	5	1
Asteraceae			
Olearia tomentosa	——		
Solanaceae			
Solanum prinophyllum			——
Duboisia myoporoides			——
Convolvulaceae			
Dichondra repens			——
Gesneriaceae			
Fieldia australis	——		
Bignoniaceae			
Pandorea pandorana			——
Acanthaceae			
Pseuderanthemum variabile			——
Verbenaceae			
Clerodendrum tomentosum			——
MONOCOTYLEDONES			
Liliaceae			
Blandfordia grandiflora	——		
Dianella caerulea	——		
Smilaceae			
Smilax glyciphylla	——		
Smilax australis			——
Philesiaceae			
Eustrephus latifolius			——
Geitonoplesium cymosum			——
Iridaceae			
Patersonia sericea	——		
Patersonia glabrata	——		
Dioscareaceae			
Dioscorea transversa			——
Xanthorrhoeaceae			
Xanthorrhoea resinosa ssp. fulva ?	——		
Xanthorrhoea arborea	——		
Lomandra filiformis ssp. filiformis	——		
Lomandra longifolia	——		——
Lomandra obliqua	——		
Lomandra glauca	——		
Lomandra multiflora	——		
Lomandra fluviatalis	——		

	COMMUNITY	4	5	1
	Agavaceae			
	Doryanthes excelsa	——		
	Philydraceae			
	Philydrum lanuginosum		——	
	Araceae			
	Gymnostachys anceps			——
	Orchidaceae			
	Thelymitra ixiodes var. ixiodes	——		
	Liparis reflexa	——		
	Dendrobium speciosum var. speciosum	——		
	Dendrobium linguiforme	——		
	Cymbidium suave	——		
	Sarcochilus falcatus			——
	Juncaceae			
	Juncus continuus		——	
	Restionaceae			
	Empodisma minus	——		
	Cyperaceae			
	Cyperus vaginatus		——	
	Schoenus brevifolius	——		
	Schoenus melanostachys	——		
	Ptilanthelium deustum		——	
	Lepidosperma laterale	——		
	Lepidosperma filiforme		——	
	Lepidosperma elatius		——	
	Lepidosperma flexuosum	——		
	Gahnia aspera	——		
	Gahnia clarkei		——	
	Caustis flexuosa	——		
	Caustis pentandra	——		
	Tetraria capillaris		——	
	Carex sp.			——
	Isolepsis inundatus ?	——		
	Poaceae			
*	Poa annua		——	
	Eragrostis brownii		——	
	Oplismenus imbecillis			——
	Dimorphochloa rigida	——		
*	Andropogon virginicus		——	
	Themeda australis	——		
*	Cynodon dactylon		——	
*	Stenotaphrum secundatum		——	

Ø Appear to be out of context with local flora-planted specimens?
* Weedy or exotic species.

APPENDIX E

WILDLIFE SPECIES EXPECTED TO INHABIT THE SITE

\# Key to sightings and habitat requirements.

% Broadbent, J A and Cranwell, I (1979)
* Mount King Ecological Surveys (1986)
& seen in field during field reconnaissance

\+ require free water
@ rocky areas, sandstone caves, crevices, exfoliating rocks

1. MAMMAL FAUNA

Scientific Name	Common Name	Field Sighting#
Terrestrial Mammals		
Tachyglossus aculeatus	Echidna	% &
Dasyurus maculatus	Spotted-tailed Quoll	%
Antechinus flavipes	Yellow-footed Antechinus	
Antechinus stuartii	Brown Antechinus	* %
Antechinus swainsonii	Dusky Antechinus	%
Smithopsis murina	Common Dunnart	* %
Perameles nasuta	Long-nosed Bandicoot	* % &
Isodon macrourus	Northern Brown Bandicoot	%
Phascolartos cinereus	Koala	%
Vombatus ursinus	Common Wombat	% &
Wallabia bicolor	Swamp Wallaby	* %
Macropus rufogriseus	Red-necked Wallaby	* % &
Macropus giganteus	Eastern Grey Kangaroo	* % &
Macropus robustus	Common Wallaroo	%
Rattus lutreolus	Swamp Rat	* %
Rattus fuscipes	Bush Rat	* %
Rattus rattus	Black Rat	* %
Melomys cervinipes	Fawn-footed Melomys	* %
Hydromys chrysogaster	Water Rat	*
Mus musculus	House Mouse	* % &
Pseudomys novaehollandie	New Holland Mouse	
Arboreal Mammals		
Petauroides volans	Greater Glider	* %
Petaurus australis	Yellow-bellied Glider	
Petaurus breviceps	Sugar Glider	%
Petarus norfolcensis	Squirrel Glider	* %
Pseudocheirus peregrinus	Common Ringtail Possum	* %
Trichosurus vulpecula	Common Brushtail Possum	* %
Cercartetus nanus	Eastern Pygmy Possum	%
Acrobes pygmaeus	Feathertail Glider	%
Trichosurus caninus	Mountain Brushtail Possum	* %

Scientific Name	Common Name	Field Sighting#
Introduced Mammals		
Felis catus	Feral Cat	* %
Canis familiaris	Feral Dog	* %
Vulpes vulpes	Fox	* %
Lepus capensis	Brown Hare	* %
Oryctolagus cuniculus	European Rabbit	* %
Equus caballus	Horse	*
Bos taurus	Cattle	* % &
Capra hircus	Goat	* %
Sus scrofa	Wild Pig	%
Bats		
Pteropus poliocephalus	Grey-headed Flying-fox	
Pteropus scapulatus	Little Red Flying-fox	
Taphzous flaviventris	Yellow-bellied Sheathtail Bat	
Tadarida australis	White-striped Mastiff Bat	
Mormopterus norfolkensis	Eastern Little Mastiff Bat	
Nyctophilus geoffroyi	Less Long-eared Bat	
Chalinolobus gouldii	Gould's Wattled Bat	
Chalinolobus morio	Chocolate Wattled Bat	
Eptesicus vulturnus	Little Forest Eptesicus	
2. AVIFAUNA		
Accipiter fasciatus	Brown Goshawk	*
Haliastur spenurus	Whistling Kite	* %
Aquila audax	Wedge-tailed Eagle	* &
Hieraaetus morphnoides	Little Eagle	*
Falco berigora	Brown Falcon	* &
Falco cenchroides	Australian Kestrel	*
Coturnix australis	Brown Quail	* %
Turnix varia	Painted Button Quail	* %
Irediparra gallinacea	Comb-Crested Jacana	*
Vanellus miles	Spur-winged Plover	* %
Gallinago harwickii	Latham's Snipe	*
Streptopelia chinensis	Spotted Turtle-Dove	* % &
Columba livia	Feral Pigeon	*
Macropygia amboinensis	Brown Cuckoo-Dove	*
Geopelia striata	Peaceful Dove	* %
Phaps chalcoptera	Common Bronzewing	%
Ocyphaps lophotes	Crested Pigeon	* % &
Leucosarcia melanoleuca	Wonga Pigeon	* % &
Calyptorhynchus lathami	Glossy Black Cockatoo	%
Calyptorhynchus funereus	Yellow-tailed Black Cockatoo	* %
Cacatua roseicapilla	Galah	*
Cacatua galerita	Sulphur-crested Cockatoo	* % &
Callocephalon fimbriatum	Gang-gang Cockatoo	* %
Glossopsitta pusilla	Little Lorikeet	*
Trichoglossus haematodus	Rainbow Lorikeet	* %

Scientific Name	Common Name	Field Sighting#
Alisterus scapularis	Australian King-Parrot	* % &
Platycercus elegans	Crimson Rosella	* % &
Platycercus eximius	Eastern Rosella	* % &
Psephotus haematonotus	Red-rumped Parrot	%
Cuculus variolosus	Brush Cuckoo	* %
Cuculus pyrrhophanus	Fan-tailed Cuckoo	* %
Chrysococcyx lucidus	Shining Bronze Cuckoo	* %
Eudynamys scolopacea	Common Koel	* %
Centropus phasianinus	Pheasant Coucal	%
Ninox novaeseelandiae	Southern Boobook Owl	* %
Podargus strigoides	Tawny Frogmouth	* %
Aegatheles cristatus	Owlet Nightjar	%
Caprimulgus mystacalis	White-throated Nightjar	* %
Hirndapus caudacutus	White-throated Needletail	* %
Dacelo gigas	Laughing Kookaburra	* % &
Ceyx azureus	Azure Kingfisher	* %
Microeca leucophaea	Jacky Winter	*
Todiramphus sanctus	Sacred Kingfisher	*
Merops ornatus	Rainbow Bee-eater	*
Eurystomus orientalis	Dollarbird	* %
Menura novaehollandiae	Superb Lyrebird	% &
Hirundo neoxena	Welcome Swallow	* %
Hirundo ariel	Fairy Martin	* %
Anthus novaeseelandiae	Richard's Pipit	%
Coracina novaehollandiae	Black-faced Cuckoo-Shrike	* %
Coracina tenuirostris	Cicadabird	* %
Lalage tricolor	White-winged Triller	* %
Zoothera dauma	Scaly Thrush	%
Petroica rosea	Rose Robin	*
Petroica multicolor	Scarlet Robin	* %
Eopsaltria australis	Eastern Yellow Robin	* % &
Falcunculus frontatus	Crested Shrike-tit	*
Pachycephala pectoralis	Golden Whistler	* %
Pachycephala rufiventris	Rufous Whistler	* %
Colluricincla harmonica	Grey Shrike-Thrush	* %
Monarcha melanopsis	Black-faced Monarch	* %
Myiagra inquita	Restless Flycatcher	*
Myiagra cyanoleuca	Satin Flycatcher	*
Myiagra rubecula	Leaden Flycatcher	%
Rhipidura rufifrons	Rufous Fantail	* %
Rhipidura fuliginosa	Grey Fantail	* % &
Rhipidura leucophrys	Willie Wagtail	* %
Psophodes olivaceus	Eastern Whipbird	* % &
Cinclosoma punctatum	Spotted Quail-thrush	* %
Malurus cyaneus	Superb Blue-Wren	* % &
Malurus lamberti	Variegated Wren	* % &
Sericornis citreogularis	Yellow-throated Scrub-wren	* % &
Sericornis frontalis	White-browed Scrub-wren	* %
Stipiturus malachurus	Southern Emu Wren	%
Origma solitaria	Rock Warbler	% &
Sericornis magnirostris	Large-billed Scrub-wren	%

Scientific Name	Common Name	Field Sighting#
Sericornis pyrrhopygius	Chestnut-rumped Hyacola	%
Gerygone mouki	Brown Gerygone	*
Gerygone olivacea	White-throated Gerygone	*
Acanthiza pusilla	Brown Thornbill	* %
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	*
Acanthiza reguloides	Buff-rumped Thornbill	* %
Acanthiza chrysorrhoa	Yellow Thornbill	* %
Gerygone mouki	Brown Warbler	%
Gerygone olivacea	White-throated Warbler =	%
Acanthiza lineata	Striated Thornbill	* %
Daphoenositta chrysoptera	Varied Sitella	* %
Climacteris leucophaea	White-throated Treecreeper	* % &
Climacteris erythrops	Red-browed Treecreeper	%
Anthochaera chrysoptera	Red ~~Brush~~ Wattlebird ?	%
Plectorhyncha lanceolata	Striped Honeyeater	*
Philemon corniculatus	Noisy Friarbird	* %
Manorina melophrys	Bell Miner	* %
Manorina melanocephala	Noisy Miner	*
Meliphaga lewinii	Lewin's Honeyeater	* %
Lichenostomus chrysops	Yellow-faced Honeyeater	* %
Lichenostomus melanops	Yellow-tufted Honeyeater	*
Lichenostomus leucotis	White-eared Honeyeater	* %
Melithreptus brevirostris	Brown-headed Honeyeater	* %
Phylidonyris novaehollandiae	New Holland Honeyeater	%
Melithreptus lunatus	White-naped Honeyeater	*
Phylidonyris nigra	White-cheeked Honeyeater	* %
Phylidonyris melanops	Tawny-crowned Honeyeater	%
Acanthorhynchus tenuirostris	Eastern Spinebill	* %
Myzomela sanguinolenta	Scarlet Honeyeater	* %
Dicaeum hirundinaceum	Mistletoe Bird	* %
Pardalotus punctatus	Spotted Pardalote	* % &
Pardalotus striatus	Striated Pardalote	* %
Zosterops lateralis	Silvereye	* %
Carduelis carduelis	European Goldfinch	* %
Passer domesticus	House Sparrow	*
Emblema temporalis	Red-browed Firetail	* %
Poephila bichenovii	Double-barred Finch	%
Sturnus vulgaris	Common Starling	* %
Acridotheres tristis	Common Mynah	*
Oriolus sagittatus	Olive-backed Oriole	* %
Ptilonorhynchus violaceus	Satin Bowerbird	%
Corcorax melanorhamphus	White-winged Chough	*
Grallina cyanoleuca	Australian Magpie-lark	* % &
Artamus cyanopterus	Dusky Woodswallow	* %
Cracticus torquatus	Grey Butcherbird	* %
Cracticus nigrogularis	Pied Butcherbird	*
Gymnorhina tibicen	Australian Magpie	* % &
Strepera graculina	Pied Currawong	* %
Corvus coronoides	Australian Raven	* % &

Scientific Name	Common Name	Field Sighting#
Common Bird Names from R.A.O.U. (1978)		
3. HERPETOFAUNA		
Diplodactylus vittatus	Wood Gecko	
Oedura lesueurii	Leseur's Velvet Gecko	@ %
Phyllurus platurus	Southern Leaf-tailed Gecko	@ %
Underwoodisaurus millii	Thick-tailed Gecko	
Lialis burtonis	Burton's Snake Lizard	%
Pygopus lepidopus	Common Scaly-foot	%
Amphibolurus barbatus	Bearded Dragon	* %
Amphibolurus diemensis	Mountain Dragon	%
Amphibolurus muricatus	Jacky Lizard	*
Physignathus leseurii	Eastern Water Dragon	* %
Varanus varius	Lace Monitor	* %
Varanus gouldii	Sand Monitor	
Ctenotus leseurii	Striped Skink	*
Ctenotus taeniolatus	Copper-tailed Skink	@ * %
Egernia cunninghami	Cunningham's Shrink	@ %
Egernia whitii	White's Skink	@ % &
Lampropholis delicata	Fence Skink	* %
Lampropholis guichenoti	Garden Skink	* &
Lampropholis mustelina	Weasel Skink	* %
Lampropholis playnota	Red-throated skink	@ %
Tiliqua casuarinae	Oak Skink	*
Saiphos equalis	Three-toed Skink	* %
Sphenomorphus quoyii	Eastern Water Skink	* % &
Sphenomorphus tenuis	Yellow-bellied Skink	%
Tiliqua scincoides	Eastern Blue-tongued Lizard	%
Cryptoblepharus boutonii	Bouton's Snake-eyed Skink	%
Anomalopus sp.	—	
Carlia burnettii	—	
Ctenotus robustus	—	
Demansia psammophis	Yellow-faced Whip Snake	* %
Pseudechis porphyriacus	Red-bellied Black Snake	* %
Typhina nigrescens	—	
Morelia spilotes	Diamond Python	%
Boiga irregularis	Brown Tree-snake	
Dendrelaphis punctulatus	Common Tree-snake	
Acanthophis antarcicus	Common Death-adder	%
Cacophis squamulosus	Golden-crowned Snake	%
Cryptophis nigrescens	Eastern small-eyed Snake	
Furina diadema ?	Re-naped Snake	%
Hemiaspis	Red-bellied Swamp-snake	
Holocephalus bungaroides	Broad-headed Snake	
Holocephalus stephensi	Stephen's Banded Snake	
Notechis scutatus	Tiger Snake	% &
Pseudonoja textilis	Eastern Brown Snake	%
Vermicella annulata	Bandy-bandy Snake	

Scientific Name	Common Name	Field Sighting#
Amphibians		
Limnodynastes tasmaniensis	Spotted Grass Frog	+ *
Limnodynastes peroni	Brown-striped Frog	+ * %
Limnodynastes dumerilli	Eastern Banjo Frog	*
Pseudophryne bibronii	Brown Toadlet	*
Pseudophrune australis	Red-crowned Toadlet	+ * %
Crinia signifera	Common Eastern Froglet	+ * %
Uperoleia marmorata	Yellow-spotted Toadlet	* %
Litoria fallax	Eastern Dwarf Tree Frog	+ * %
Litoria latopalmata	Brown-palmed Frog	+ * %
Litoria aurea	Green and Golden Bell Frog	+
Heleioporus australiacus	Giant Burrowing Frog	+ %
Litoria caerulea	Green Tree-frog	+ %
Litoria lesuerii	Lesuer's Frog	+
Litoria peronii	Peron's Tree Frog	+
Litoria verreauxii	Verreaux's Tree Frog	+

APPENDIX F

ARCHAEOLOGICAL SURVEY

MOUNT WHITE QUARRY - ARCHAEOLOGICAL SURVEY

by

Helen Brayshaw

September 1988

Report to Gosford Quarries Pty Ltd
through
Forsite Landscape Architects and Planners Pty Ltd

BRAYSHAW MCDONALD PTY LTD
CONSULTANT ARCHAEOLOGISTS
51 THOMPSON ST DRUMMOYNE 2047

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FIGURES

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1 INTRODUCTION

An archaeological survey was undertaken of an area to be affected by proposed resumption and extension of extraction at a dimension sandstone quarry at Mount White north of Sydney. The survey was commissioned by Forsite Planning Consultants Pty Ltd on behalf of Gosford Quarries Pty Ltd.

The quarry, which has been unused for 8 years, is situated in Permissive Occupancy 79/104 in the Parish of Cowan, Gosford Shire. The northern boundary abuts a Flora and Fauna and Public Recreation Reserve, the others vacant Crown Land. The PO itself is about 33ha, although the area to be affected by quarrying is less than a third of this. Access to the Pacific Highway, at a point about 1.6km north of Mount White, is to be on an unsealed road some 2km long of which about 1.3km is to be new construction.

It is proposed that a level pad approximately 30x30m would be cleared for quarrying, and two settling ponds excavated adjacent. Portable amenities buildings would be located adjacent to the quarrying site and a stiff leg crane erected to lift blocks out of the quarry. Extraction will be by rotating pneumatic hammer and hand held rock drills, transportation totalling 10 trucks per week for an anticipated 20 years. Information as to the precise location of the quarry area, portable amenities and crane was not available for this report, but the access route was pegged prior to the survey.

The purpose of the survey was to identify and record all Aboriginal sites and relics of archaeological and Aboriginal significance which would be affected by the resumption of quarrying, and to determine appropriate site management procedures.

This report describes the fieldwork procedure and results of the surface survey for archaeological sites within the development area. Also described are previously known archaeological sites in the vicinity of the study area, the local and regional prehistory and the environmental context of the development area as a basis for assessing the archaeological importance of archaeological sites identified during the survey. Aboriginal consultation undertaken is outlined. The report makes recommendations on the management, preservation and salvage of sites located on the basis of their assessed scientific and heritage value.

2 ENVIRONMENTAL SETTING

The quarry site is some 700m ENE of Mount White overlooking the steep valleys of Kellys Creek and Cabbage Tree Creek to the north, tributaries of Propran Creek which flows south and then west into Mangrove Creek, the latter joining the Hawkesbury River less than 4km to the south west.

Mount White is 286m ASL and the quarriable resource between 160 and 140m. Some 200m to the west of the old quarry is a creek which passes through the remnants of a dam before plunging down 130m to the floodplain barely 600m to the north. Much of the access route lies close to the 170m contour, on a ledge which is in part supported by outcropping sandstone.

Bedrock in the area is Triassic Hawkesbury sandstone. On the steep slopes of Mount White it forms two major outcropping layers. These contain ledges and shelters and overhangs, some of the latter up to 4m high and 20m long and all of which have sloping rock floors. Weathering within the shelters takes the form of honeycombing, cavernous niches and domed ceilings, with few surfaces suitable for rock art. The ledges consist of boulders up to 3m high with pitted and rounded surfaces. At the quarry site extensive sheets of relatively level sandstone are exposed, and a similar but smaller exposure occurs to the west of the creek; elsewhere, including along the access route, bedrock exposures are much smaller in area, more fragmented and have roughly weathered and generally sloping surfaces.

A significant portion of the study area had been cleared of much of its vegetation in the past, leaving a pattern of heath-like and regenerative growth at the less steeply sloping levels of the quarry. The western two thirds of the access route appears not to have been cleared.

Species observed included **Angophora costata** [Smooth-barked Apple], **Eucalyptus haemastoma** [Scribbly Gum], **E. gummifera** [Bloodwood], **Acacia** spp, **Banksia serrata** and **Banksia spinosa**, **Leptospermum attenuatum**, **Grevillea** spp, **Persoonia** spp [Geebung], **Hakea** spp, **Actinotus minor**, **Boronia ledifolia**, **Eriostemon australasius**, **Isopogon anethifolius**, **Dillwynia retorta**, **Xanthorrhoea arborea** [Grass Tree], **Doryanthes excelsa** [Gymea Lily] and **Pteridium esculentum** [Bracken Fern]. Of the species observed a number are known to have formed part of the Aboriginal subsistence economy as food or for other purposes. For example, those eaten include Geebung [fruit], Fern [rhizome], Gymea Lily

[fruit], Wattle [seeds] and Grass Tree [inner leaves]. Wattle bark supplied tannin and was used medicinally and to stun fish. The Grass Tree supplied resin and spear shafts.

At the time of the survey the grasses, shrubs and leaf litter were quite dense, with the result that ground visibility was generally <1% except along the various vehicle tracks associated with earlier quarrying.

3 ARCHAEOLOGICAL CONTEXT

Vinnicombe's [1980] investigation of the Gosford Region provided data on site distribution which is applicable to much of the Sydney Basin Hawkesbury sandstone environment [McDonald 1985, 1987]. She found that the outcropping of Hawkesbury sandstone correlated strongly with the location patterns of several types of Aboriginal sites. For example the presence of numerous overhangs and shelters suitable for occupation, of extensive smooth and stable flat and vertical surfaces suitable for art, and patches of rock of texture suitable for grinding implements or foodstuffs.

Of the three major landforms occurring on Hawkesbury sandstone formations, ridge top, ridge slope and valley floor, only ridge slope is represented in the study area. Along ridge tops rock engravings are common on exposures of sandstone; stone arrangements also occur, but much less frequently. There may also be grinding grooves if surface water is available nearby. Open sites consisting of stone artefacts may occur on adjacent soils, though it is probable that these will have been covered by soil deposition and leaf litter, often being exposed only by disturbance or erosion. Engravings, grinding grooves and occasionally also stone arrangements occur on ridge slopes; shelters with art and/or archaeological deposit also occur where there are suitable rock outcrops. All sites on slopes are particularly likely where there are drainage lines and rock pools. On valley floors grinding grooves are likely to occur on rock exposures in or near creek beds, and there may be occupation sites. Open sites may be present but are likely to have been covered by alluvium, and rock shelters at the intersection of valley floor and ridge slope are likely to have been occupied.

In Vinnicombe's study the Mount White area was not subject to intensive investigation. However as the ecosystem which was so surveyed proved lacking in examples of stone arrangements, as the Mount White area was close to her Spencer [lower Mangrove Creek]

and upper Mangrove Creek survey areas, and as Ian Sim had recorded several near Mount White, these were viewed in the context of other sites in the vicinity.

All of the sites inspected on this occasion, including two middens sites on Mangrove Creek, were on the slopes and ridges south and south west of Mount White. They included rock platforms up to several hundred metres in length covered with engravings of macropods, humans, fish, footprints, ancestral beings, boomerangs, circles, other indeterminate figures and a sailing ship. One of these sites contained an extensive pathway between stones arranged in two rows which have since been disturbed and effectively destroyed. Two shelters with charcoal drawings also occur, one with a small section of shallow deposit containing oyster shells. Other similar sites were viewed on this occasion by Vinnicombe at Calga and Peats Ridge.

Within a 2.5x2km area encompassing PO 79/104 and the proposed access route 12 sites have been recorded, all but three by Ian Sim. Eight of these sites are rock engravings, two [#45-3-163 and #45-3-169] associated with axe grinding grooves. Three other axe grinding groove sites occur, including #45-3-167 at which 44 grooves occur in association with a shelter with drawings and over 28 engraved figures.

Above the dam in the small creek only 100m south of the access route as it passes through Portion 109 is #45-3-155, consisting of a pothole and 2 axe grinding grooves. Some 550m to the west on the ridge about 140m south of the access route is #45-3-609, recorded in 1967 as containing engravings of men, kangaroos, birds, fish, circles, unidentified figures and a schooner under full sail. In the valley east of the quarry is #45-3-161, an engraving of two circles and a boomerang. South of Mount White are 45-3-167 to -169. #45-3-168 includes engravings of many figures identified as a culture hero, a rainbow serpent, a man spearing a kangaroo, oval and circular shapes and a line of footprints. To the west and north west are Sim's site #45-3-163 to -166; axe grinding grooves occur at two of these sites and the engraved figures identified include whales, eels, fish, kangaroos and footprints. Amongst this group is #45-3-1671, at which two axe grinding grooves were recorded by Warren Bluff on a private visit to the area in April 1988. On the same visit, at #45-3-1670 within PO 79/104 and about 300m west of the old quarry, Bluff recorded one mundoe, or large footprint.

The only previous systematic archaeological survey associated with development to impinge on the study area was the investigation of the route of the Sydney to Newcastle natural gas pipeline, which is crossed by the proposed access route 500m

north west of its junction with the Pacific Highway. The nearest sites located on that survey were engravings and a shelter with art at Marlows Gully some 3.5km to the south of the present study area, and engravings and two shelters with art at Calga 2.6km to the north east [Brayshaw 1979]. Also in the Calga area Koettig [1982] surveyed a transmission line route, locating two shelters with art, one also containing potential archaeological deposit.

It was Vinnicombe's [1980] assessment that because of the highly dissected nature of the topography in the region and consequent mosaic of different vegetational and faunal populations, and the consequent variety of ecosystems within a limited area, Aboriginal usage of the area was very flexible. Super-imposed on this flexibility she suggested there was an overall seasonal patterning oriented towards marine resources in summer and towards terrestrial resources in winter.

A chronological context for this occupation has been provided by Attenbrow [1982]. In the upper Mangrove Creek catchment she found that most of the evidence for occupation of the valley dated from the last 5,000 years. However three of the sixteen shelters she investigated contained older evidence, and one, Loggers, extended back beyond 11,000 years.

4 THE SURVEY

4.1 Aboriginal Consultation

The National Parks & Wildlife Service requires that local Aboriginal communities are consulted when archaeological surveys are being performed. The present study area falls within the boundary of the Darkinjung Local Aboriginal Land Council, based at Gosford. Contact was made with Mr Jack Smith, Coordinator of the Darkinjung, and it was arranged that a representative of the LALC would participate in the field survey and provide a report. In the event, Mr Leonard Smith and Mr Paul Franks joined the archaeological team.

A copy of this archaeological report is to be forwarded to the Darkinjung LALC as a basis for consideration in their issuing of a statement of Aboriginal interest in sites identified during the investigation.

4.2 Procedure

Prior to the fieldwork being carried out the National Parks & Wildlife Service site register was consulted for information regarding prehistoric sites, together with associated survey reports and other relevant literature. This material was used to provide an archaeological background to the investigation and formed a basis of site prediction for the area.

The survey was carried out on 1st September by Helen Brayshaw, Elizabeth Rich and Caroline Rola-Wodjecowski, with the assistance of the Darkinjung representatives. The Gunderman 1:25,000 topographic map was used in the field in addition to a 1:15,000 plan of the quarry area and proposed access road from the East Maitland Crown Lands Office [MD87 H224].

While the precise boundaries of PO 79/104 were not delineated on the ground, they extend well beyond the quarriable deposit, and their general location was apparent from the local topography. The route of the proposed access road had been clearly pegged the previous day.

On the day of the survey the weather was fine and and partly cloudy.

4.3 Results

One site which had previously been recorded within the study area [**#45-3-1670**] was relocated, additional features being identified and recorded; a site [**MW #1**] comprised of three engraved figures, a narrow groove and an axe grinding groove, was identified west of the old quarry; a circle part of which at least appeared to be an Aboriginal engraving [**MW #2**] was identified east of the quarry.

Apart from weathering factors all sites appeared to be in good condition, although trail bike tracks were visible on the surface of the rock at **MW #1.**

#45-3-1670 Engraving Site
Map Ref: Gunderman 1:25,000 3/3167 62/9835
Location: This site is on an expanse of exposed sandstone west of the dam and about 190m west of the area likely to be affected by quarrying.
Description: In April 1988 this site was recorded as containing an engraving of a large mundoe or !footprint of a mythical creature [32x17cm]. Examination on the present occasion revealed the presence of another engraved mundoe [30x21cm] and a circular

shape which may also have been engraved [21x18cm external 12.5x13.5cm internal]. Both mundoes are oriented towards the east and both have been abraded. Night recording would be required to identify whether other vague depressions on the rock surface were also Aboriginal engravings.

MW #1 Engravings and Axe Grinding Groove
Map Ref: Gunderman 1:25,000 3/3194 62/9834
Location: On an expanse of sandstone adjacent to and 67 - 105m south west of the old quarry.
Description: Two engraved circles, one [51x41cm] pecked and abraded, the other [30x28cm] abraded, particularly weathered and barely visible, and an abraded oblong shaped figure [41x10cm], together with a narrow groove [37x4cm], possibly the result of spear sharpening, make up the body of figures 67m from the north western corner of the quarry at 245o. A further 38m away at 258o from the engravings is an axe grinding groove [36x7cm] adjacent to a natural shallow depression in the rock which would hold water after rain.

MW #2 Engraving
Map Ref: Gunderman 1:25,000 3/3205 62/9830
Location: Twenty metres east of the old quarry and about 30m south of the edge of the rock platform.
Description: This site consists of an oval outline [150x69cm] part of which appears to be a pecked and abraded Aboriginal engraving, but the remainder of which is natural. The engraved section may have been added to the natural component to form the figure, or the natural component may be weathering consequent upon the engraving of the outline.

Sand in sections of the groove and in the centre of the figure has resulted in pale colouration and depressions in the rock, which is otherwise pitted and dark grey.

4.4 Discussion

With the results of this survey fourteen sites have now been recorded within 5sqkm in the Mount White area, engravings and axe grinding grooves being the site types most commonly occurring. The 2.8 sites/sqkm is much less than the 8/sqkm found in Vinnicombe's intensive survey areas, but the Mount White area as defined here consists only of ridge top and upper slope - more sites are likely to be found when watercourses and the base of the slopes are the subject of systematic investigation. Of the sites located within the Mount White 5sqkm prior to the present survey none has been destroyed.

Sites at which a vivid tapestry of large culture heroes, rainbow serpents, humans, animals, birds, weapons and other figures adorn sandstone exposures of the ridges and slopes close to Mount White constitute a rich and visible Aboriginal heritage. The engravings of footprints, circles and unidentified figures recorded at **#45-3-1670**, **#MW1** and **#MW2** are an important if undistinguished component of this heritage.

Grinding grooves resulting from the sharpening of axes or spears indicate that processes of tool manufacture or maintenance were undertaken at sites at which they occur. Within the Mount White area they occur at over 40% of the sites now recorded, sometimes in large numbers.

Within the context of sites occurring at Mount White and the wider region, those located during the present investigation are not of particularly high scientific or educational value. However they are to be valued as components of the cultural heritage embodied in the region.

5 RECOMMENDATIONS

The following recommendations are made on the basis of

* Discussions with Assistant Cultural Resource Coordinator in the NPWS regional office and with the Coordinator of the Darkinjung Local Aboriginal Land Council.

* An assessment of the significance of the sites in the local and regional context.

* Provisions of the National Parks & Wildlife Act of 1974 [as amended] whereby it is illegal to damage, deface or destroy an Aboriginal relic without written permission of the Director.

* * *

1. It is desirable that all three sites occurring within the study area should be preserved.

   #45-3-1670 is situated well away from development activities but **MW #1** and **MW #2** may be at risk, especially the former.

2. If the sites are not within the area to be quarried but likely to be affected by the disposition of facilities or settling ponds, either directly or by vehicles, barricades should be placed around them to prevent damage. Quarry workers should be informed of their location and the need for their protection.

3. If destruction of any of the sites is considered to be unavoidable, for example if they overlie the only quarriable deposit, then detailed recording, such as night recording, tracing and possibly photogrammetry would be prerequisite to the issuing of Consent to Destroy.

4. The issuing of such Consent would also be contingent upon agreement by the Darkinjung Local Aboriginal Land Council, a statement of whose views will be provided on receipt of a copy of this report.

5. If Consent to Destroy is to be applied for written application to the Director of the National Parks & Wildlife Service should be made through the Central Region Cultural Resource Coordinator in the Parramatta office.

6. Five copies of this report should be forwarded to

Ms Bronwyn Conyers,
Cultural Resource Coordinator,
NPWS,
PO Box 95,
PARRAMATTA, 2150.

7. One copy of this report should be forwarded to

Mr Jack Smith,
Coordinator,
Darkinjung Local Aboriginal Land Council,
PO Box 401,
WYONG, 2259.

6 REFERENCES

Attenbrow V. 1982 The archaeology of Upper Mangrove Creek Catchment. In Bowdler S. [ed] **Coastal Archaeology in Eastern Australia.** Proceedings of the 1980 Valla Conference on Australian Prehistory.

Brayshaw H. 1979 Archaeological survey of the route of the Natural Gas Pipeline between Sydney and Newcastle. Report to NSW NPWS.

Koettig M. 1982 Archaeological survey for Aboriginal sites along the proposed 33KV FDR 794A Route. Report to Sydney County Council.

McDonald J. 1985 Sydney Basin Aboriginal Heritage Study: rock engravings and shelter art sites. Stage I. Report to NSW NPWS.

McDonald J. 1987 Sydney Basin Aboriginal Heritage Study: rock engravings and shelter art sites. Stage II. Report to NSW NPWS.

Sim I. 1966 **Rock engravings of the McDonald River District, NSW. Occasional Papers in Aboriginal Studies No 7. Prehistory and Material Culture Series No 1.** Australian Institute of Aboriginal Studies, Canberra.

Vinnicombe P. 1980 Predilection and Prediction: a study of Aboriginal sites in the Gosford-Wyong Region. Report to NSW NPWS.

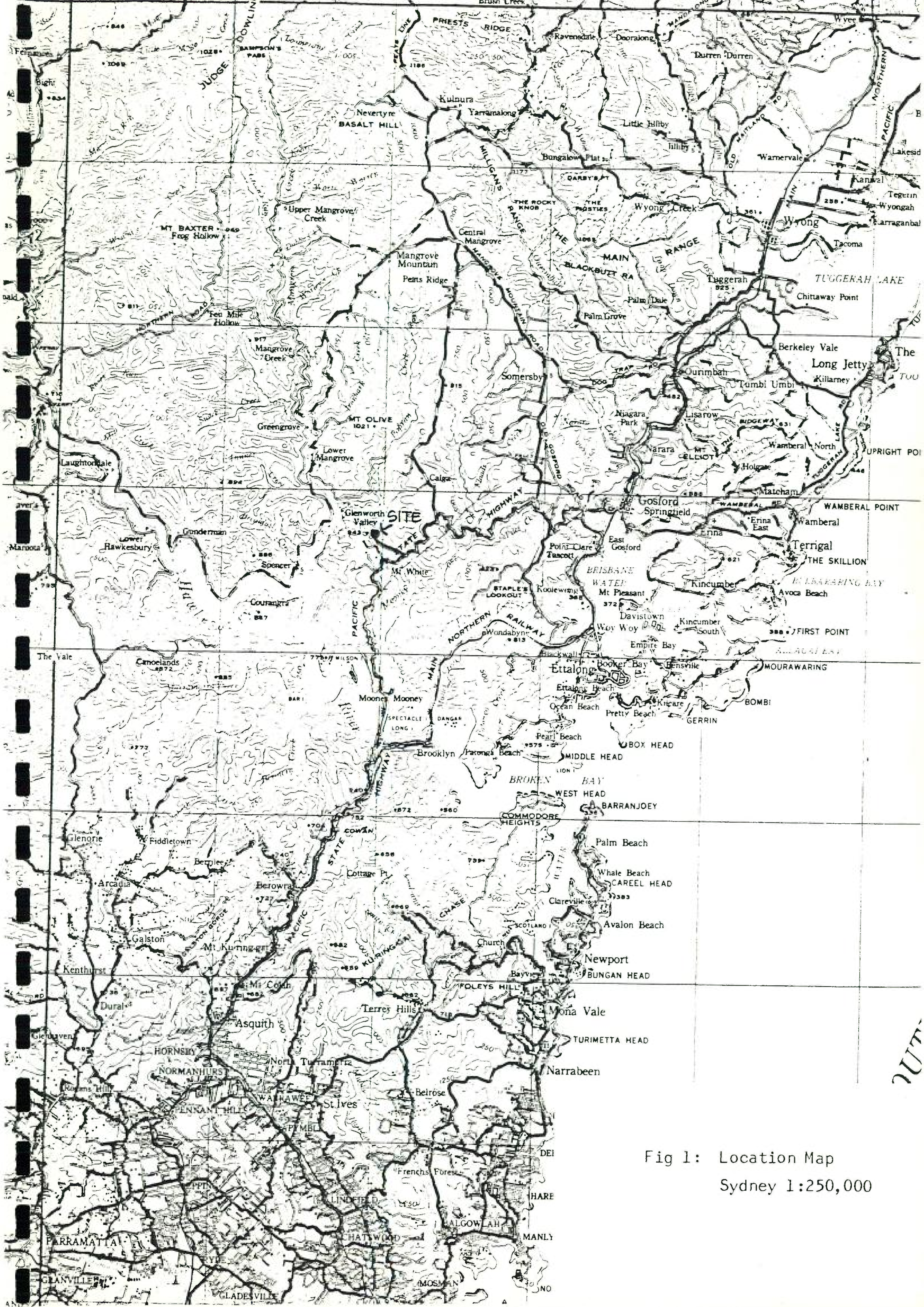
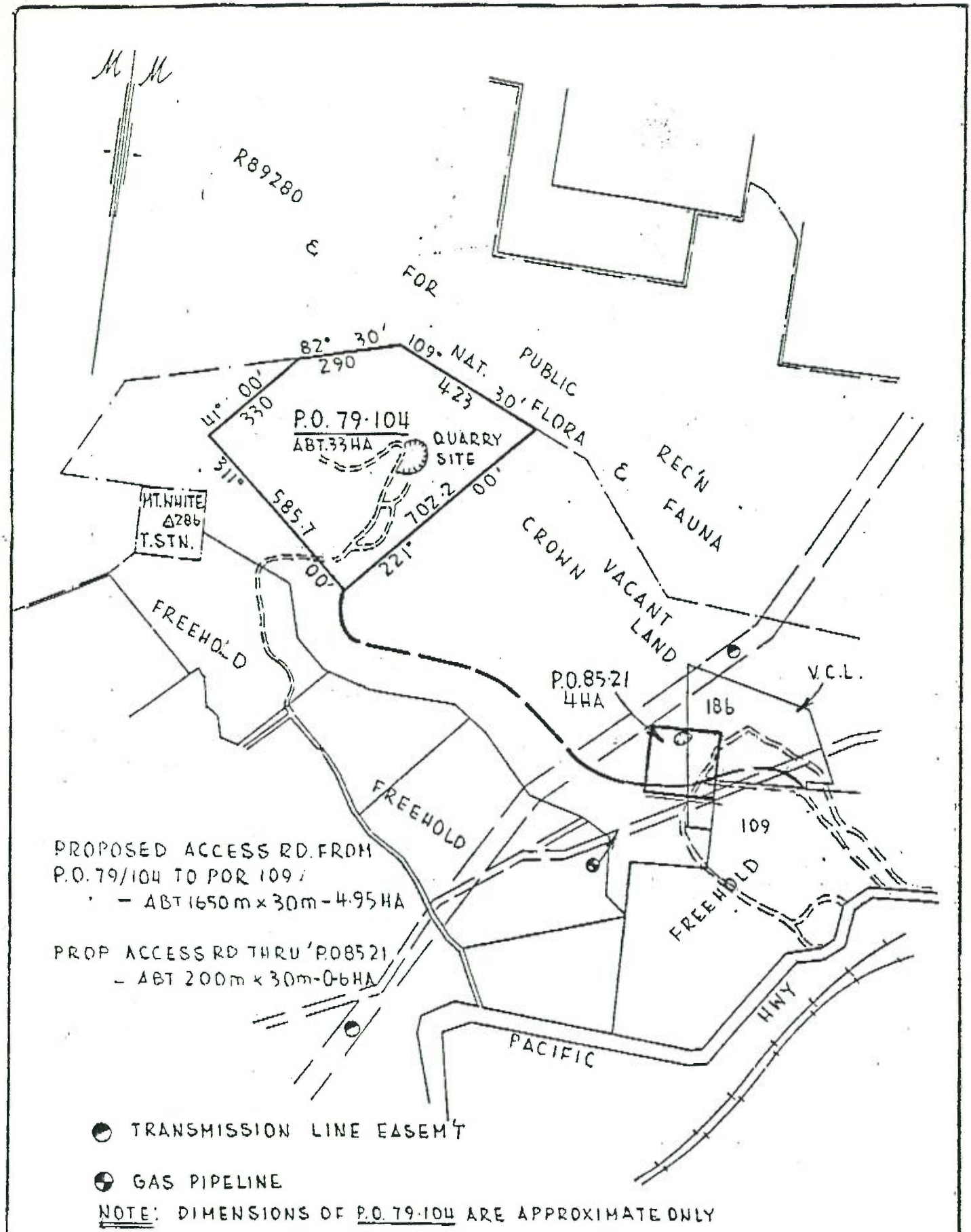


Fig 1: Location Map

Sydney 1:250,000



CROWN LANDS OFFICE

PARISH COWAN
COUNTY N'LAND
LAND DISTRICT GOSFORD
LANDS OFFICE MAITLAND
COUNCIL GOSFORD
FILE NO. MD 87 H 224

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Fig 2: Diagram of Quarry and Proposed Access Road

Reduction Ratio 1:15 000

Fig 3: Site Location Map
Gunderman 1:25,000

1:	#45-3-1670	8:	#45-3-166
2:	MW #1	9:	#45-3-167
3:	MW #2	10:	#45-3-168
4:	#45-3-155	11:	#45-3-169
5:	#45-3-163	12:	#45-3-161
6:	#45-3-164	13:	#45-3-609
7:	#45-3-165	14:	#45-3-1671

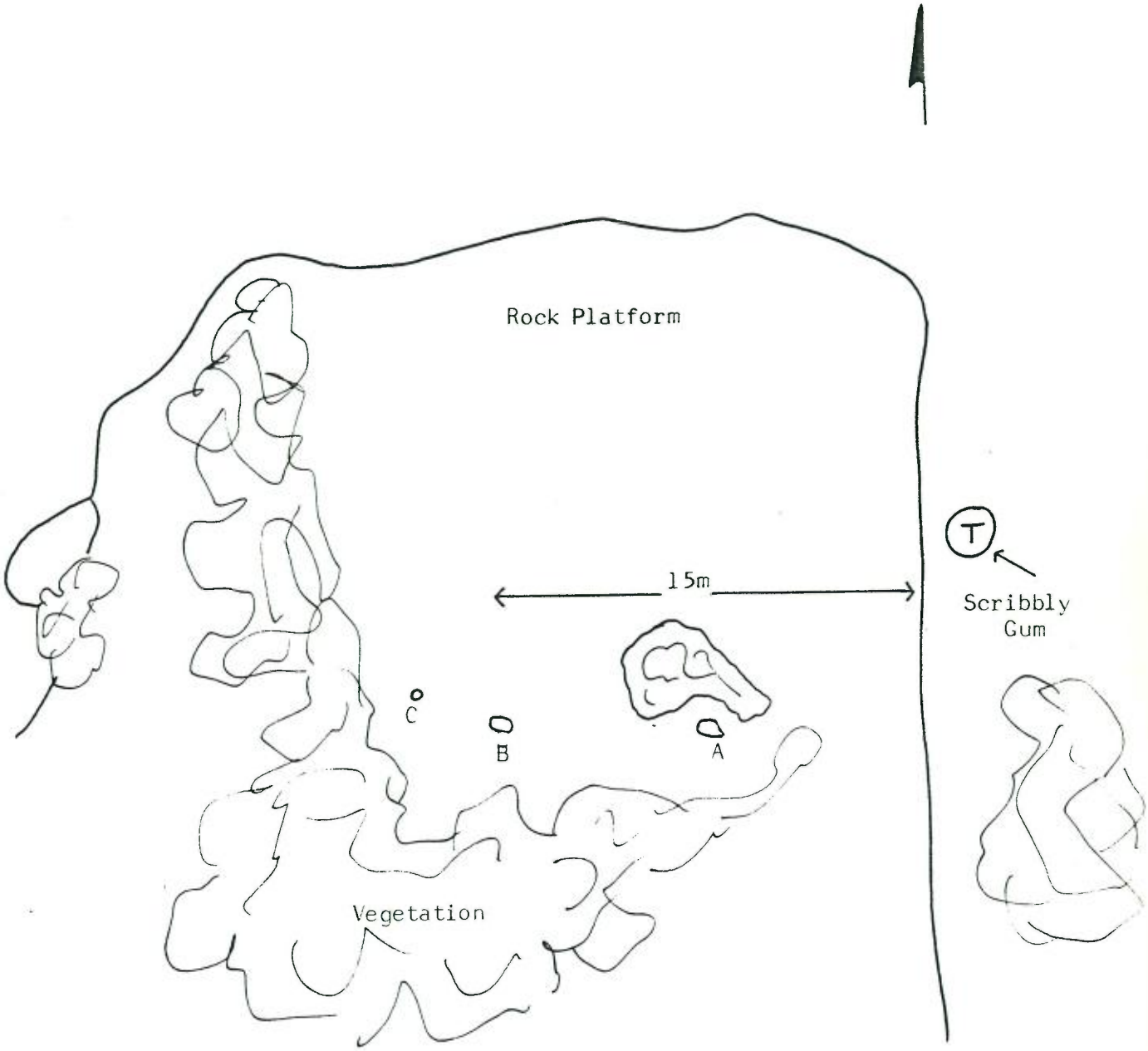
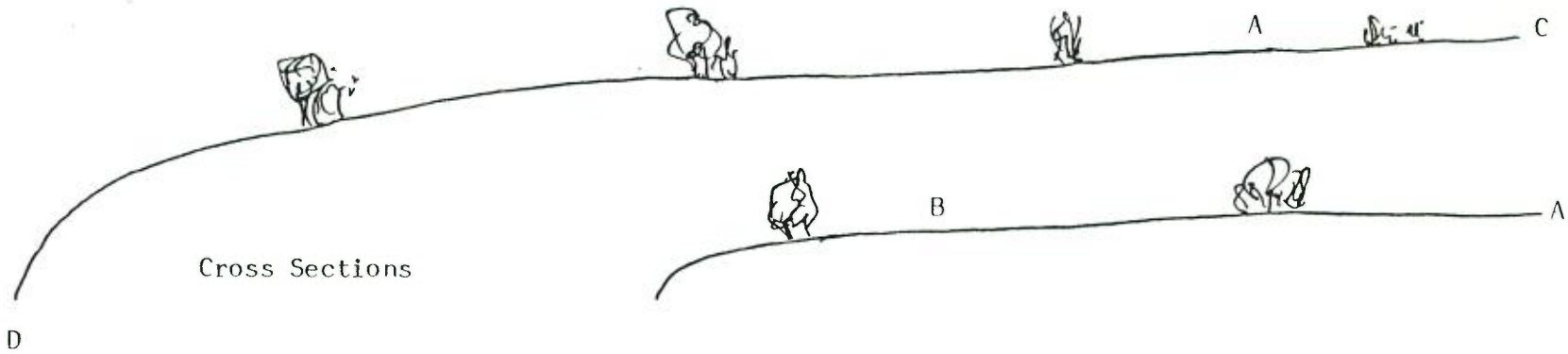
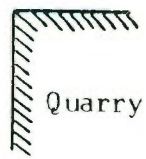


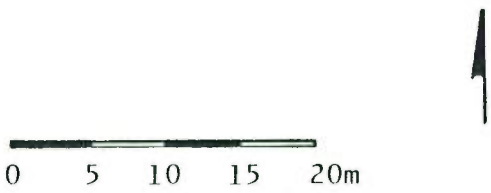
Fig 4: #45-3-1670
Sketch Plan



Plan

D





A Engravings and Narrow Groove
B Axe Grinding Groove

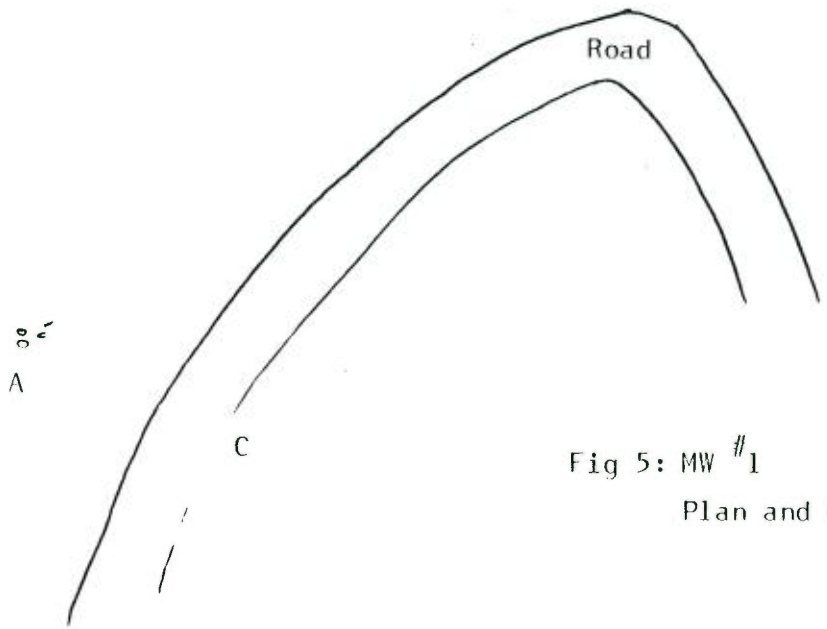


Fig 5: MW #1

Plan and Cross Sections

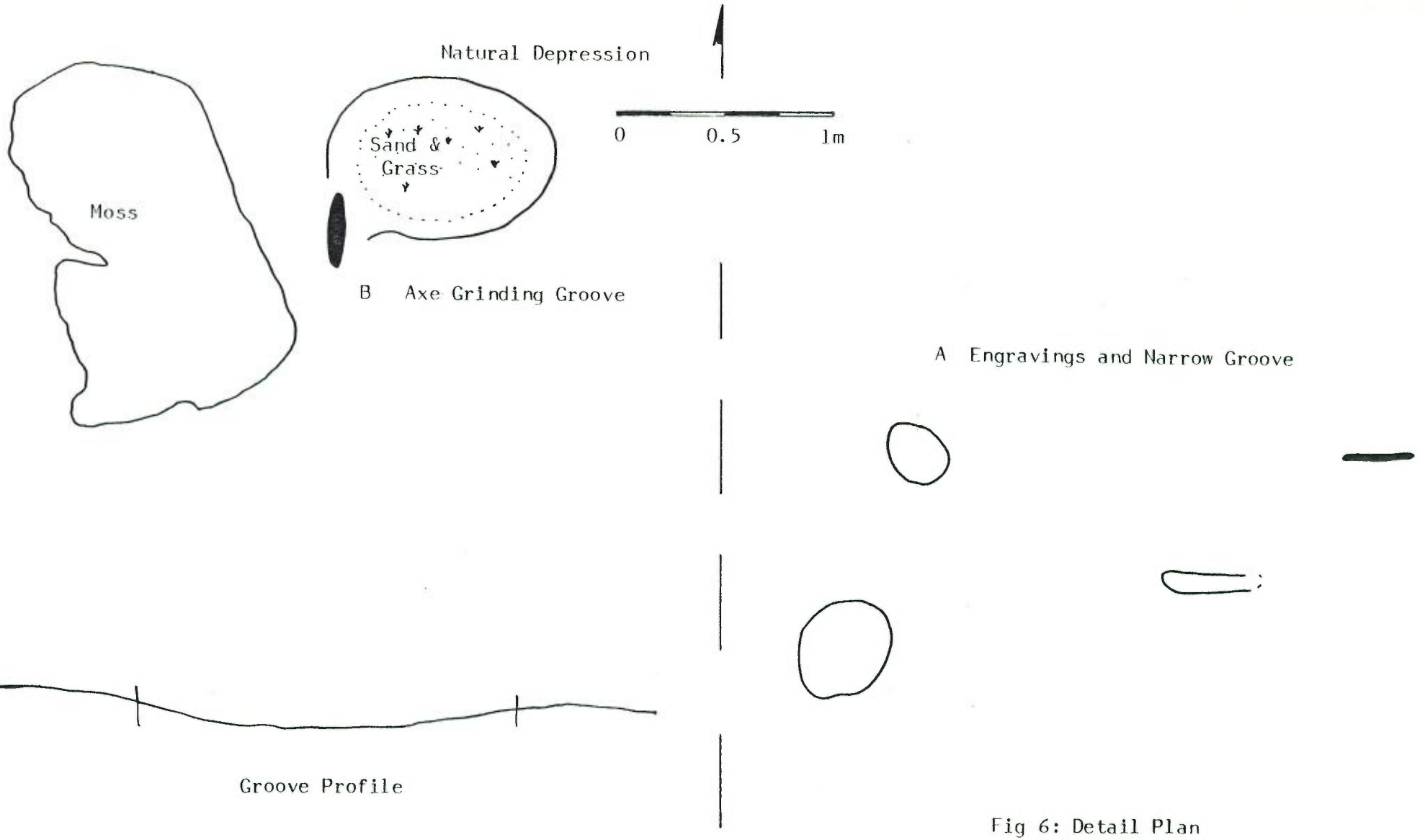
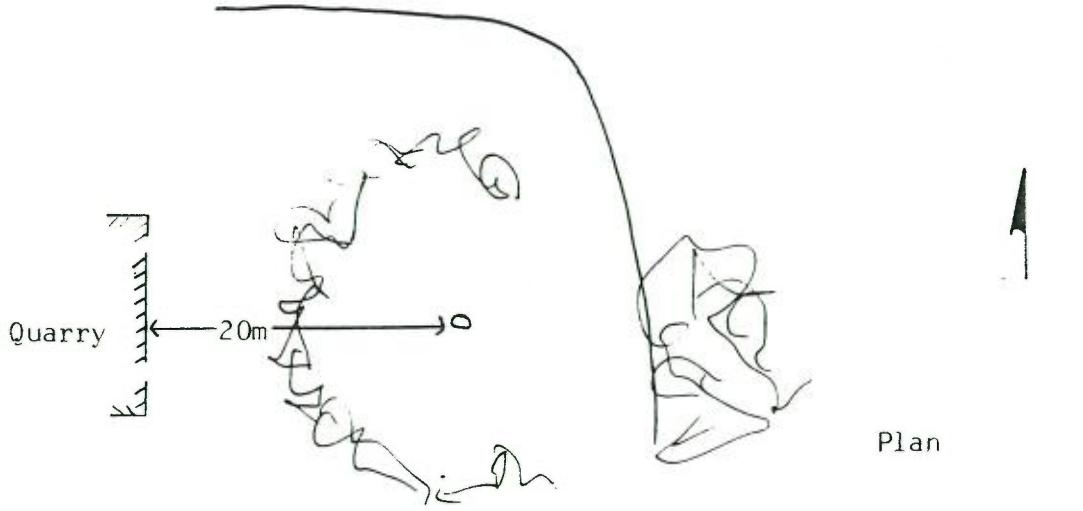


Fig 6: Detail Plan



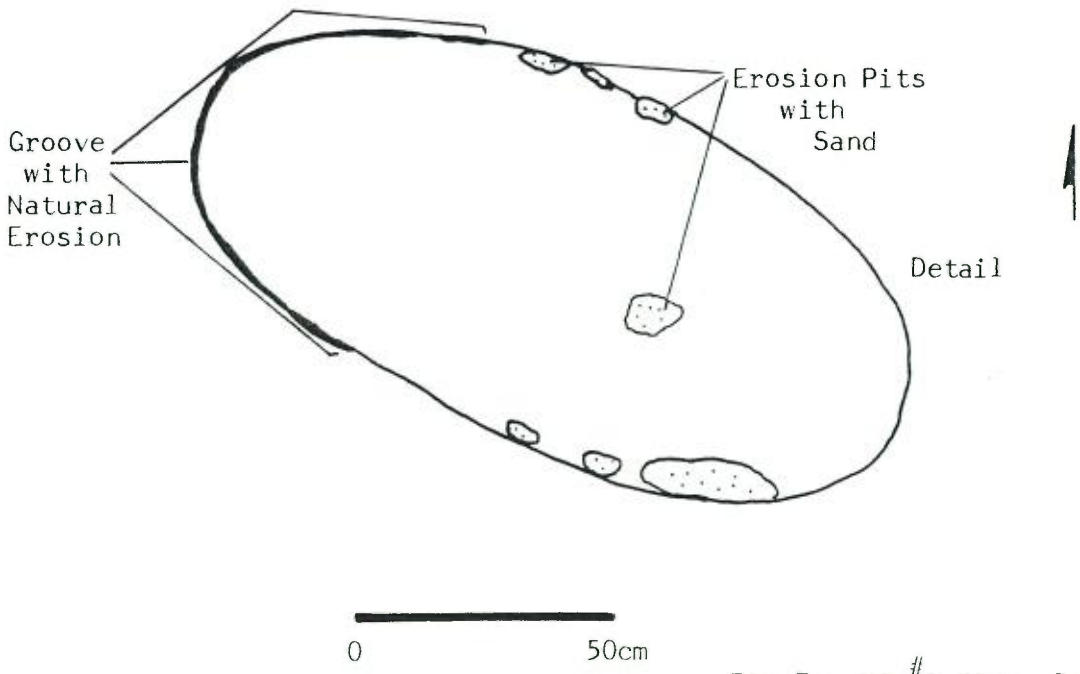
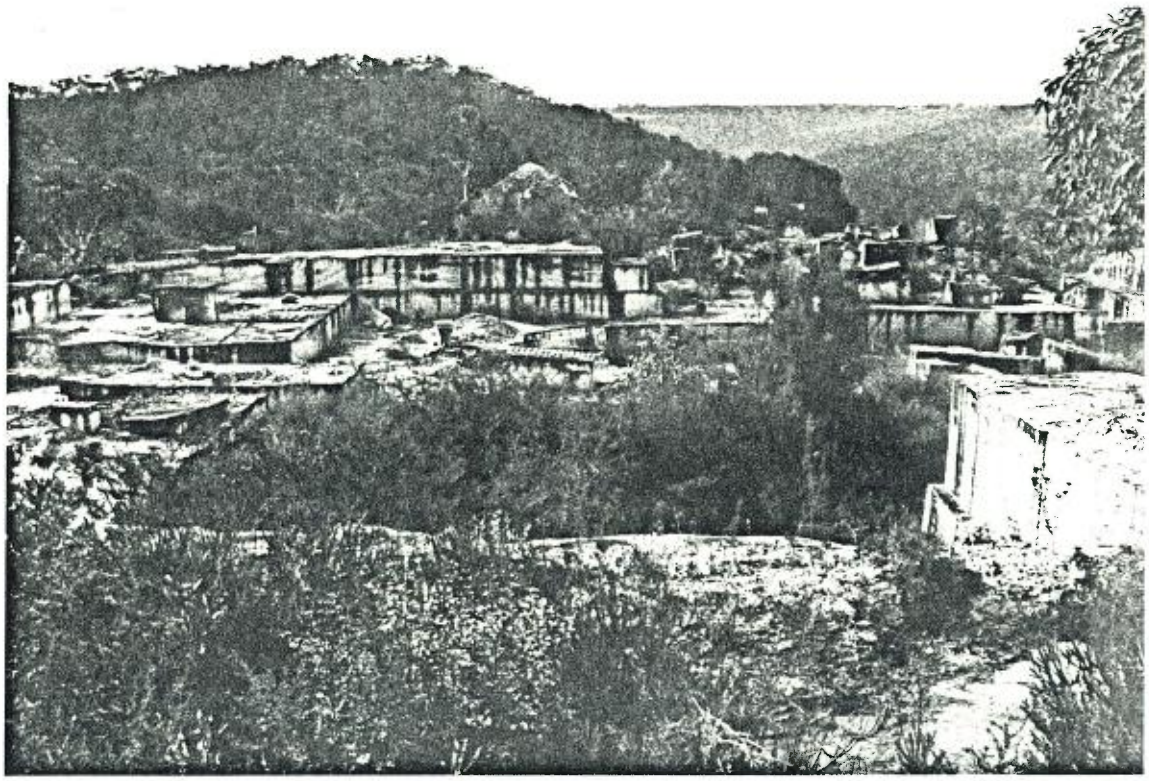
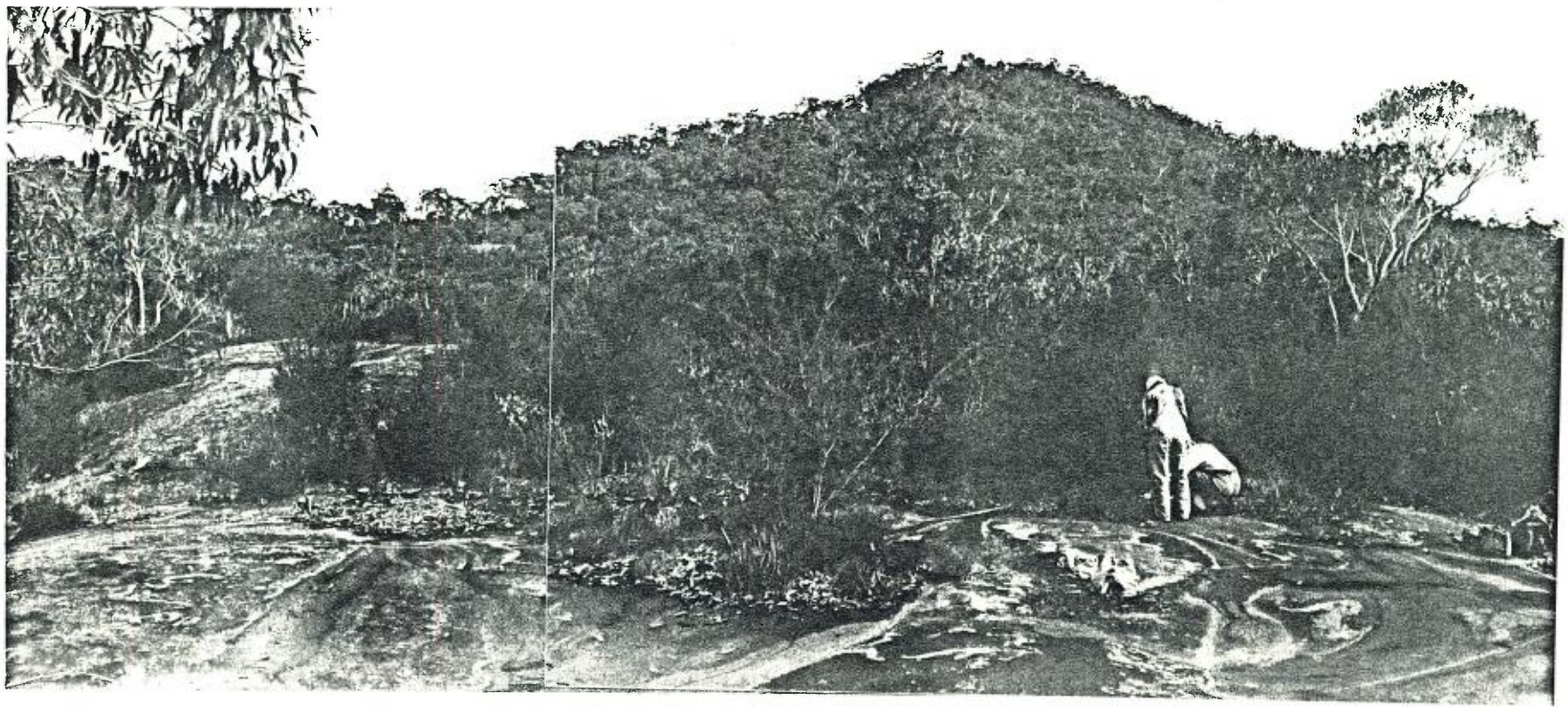


Fig 7: MW #2 Plan, Detail
and
Cross Section



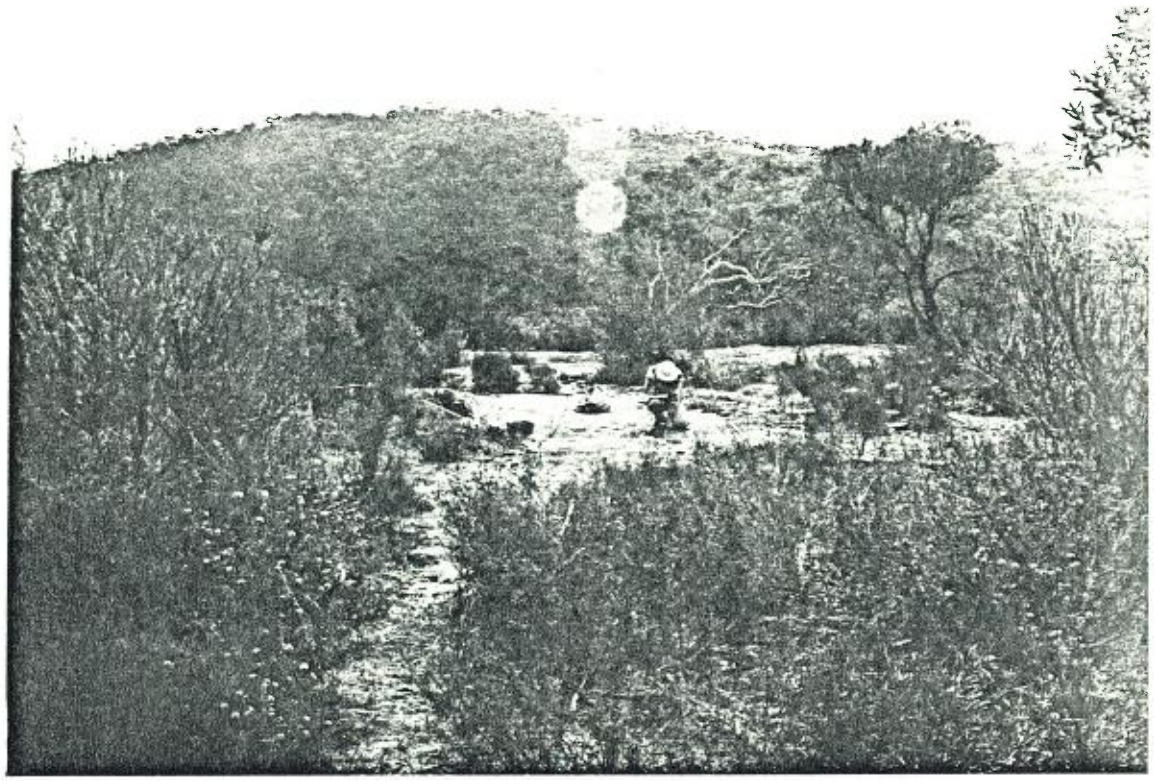
Pl 1: View north over previously quarried area.



Pl 2: **#45-3-1760** view south west towards Mount White.

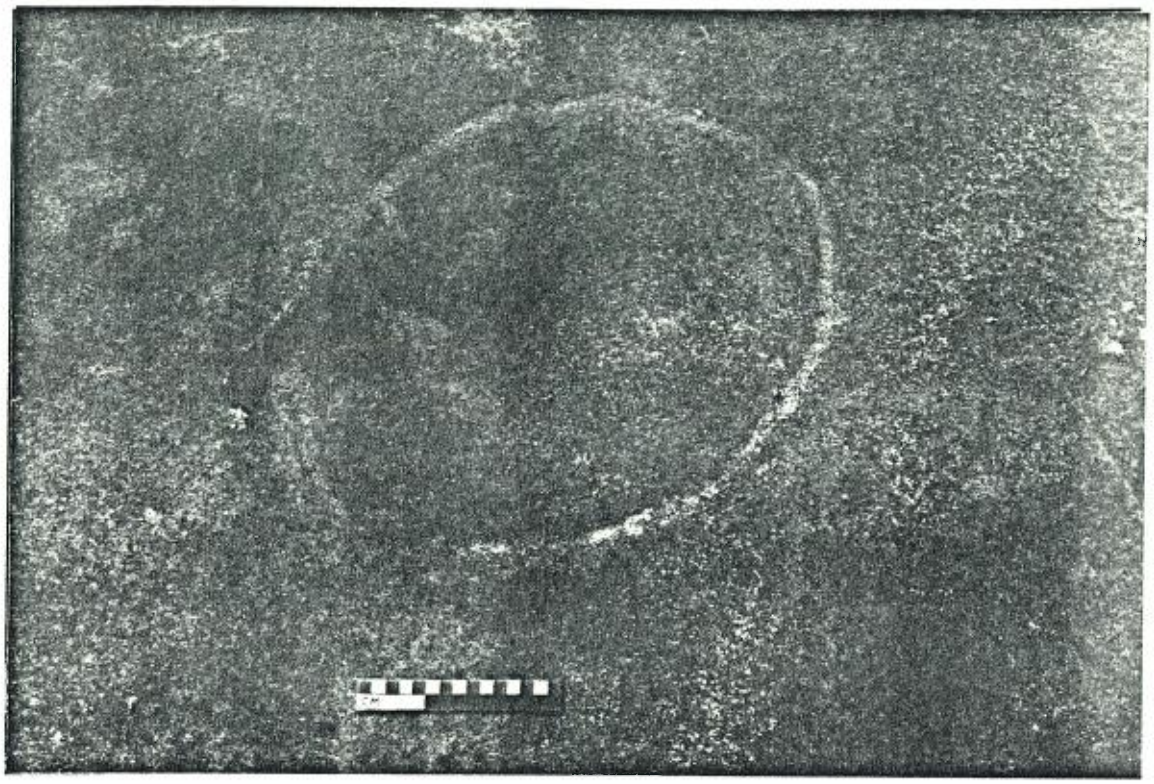
Pl 3: Previously recorded engraved figure at **#45-3-1670.**

Pl 4: Another engraved figure at **#45-3-1670.**

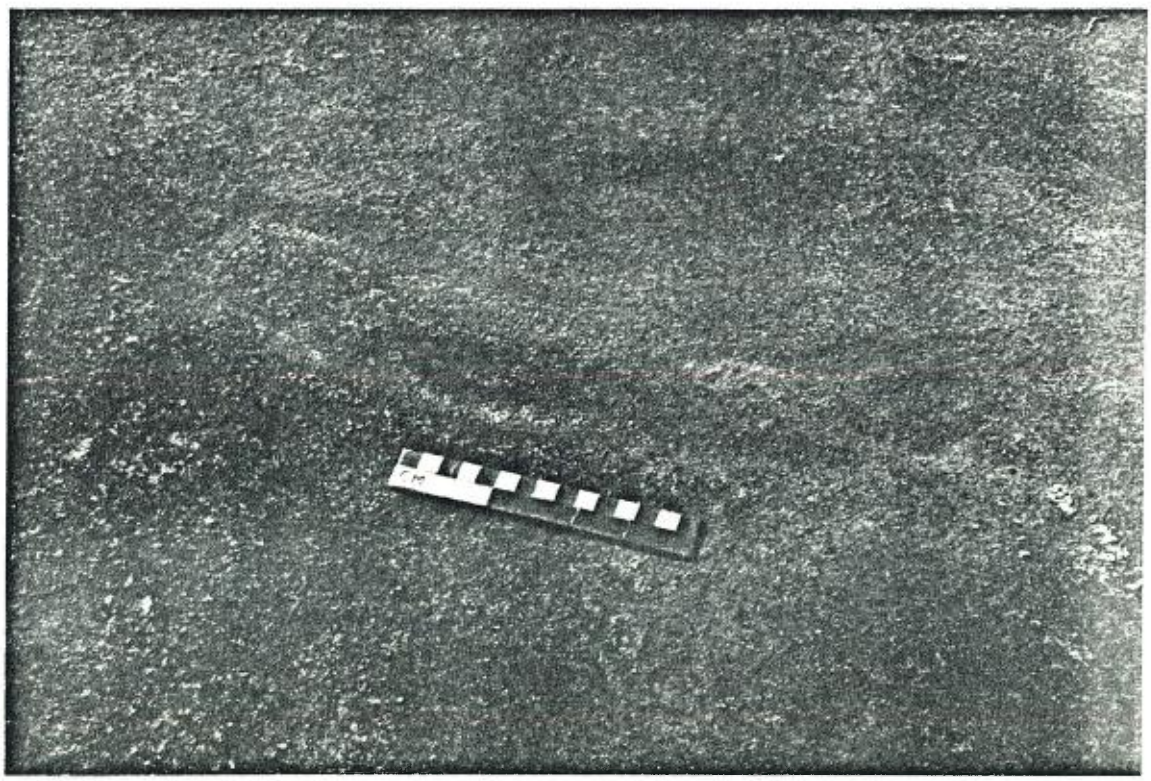


Pl 5: **MW #1** view north west from road towards engravings.

Pl 6: **MW #1** engravings and narrow groove.

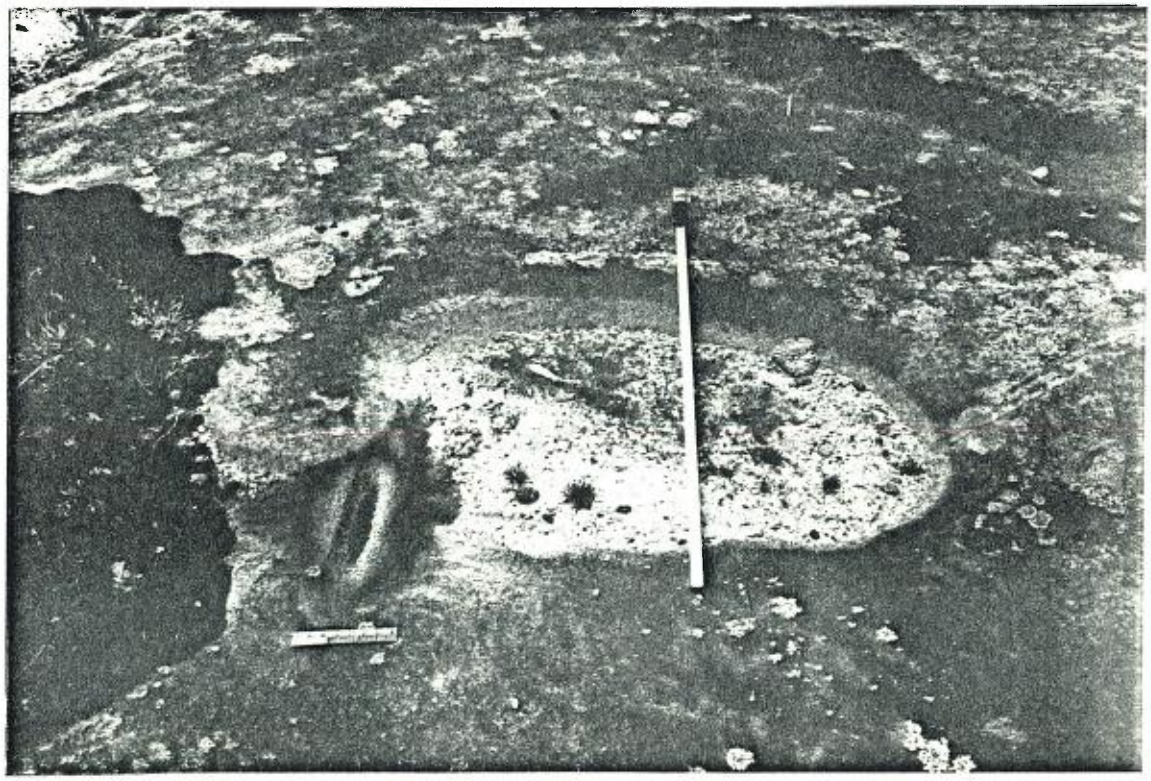


Pl 7: **MW #1** larger engraved circle.

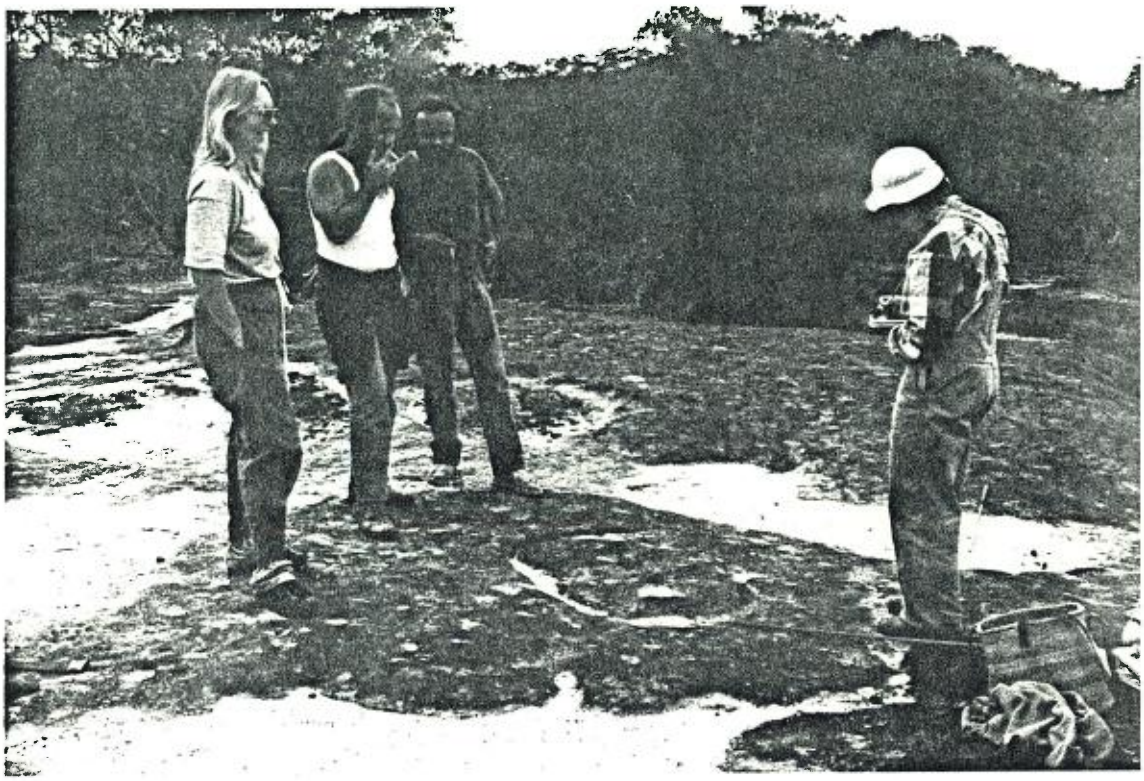


Pl 8: **MW #1** engraved figure.

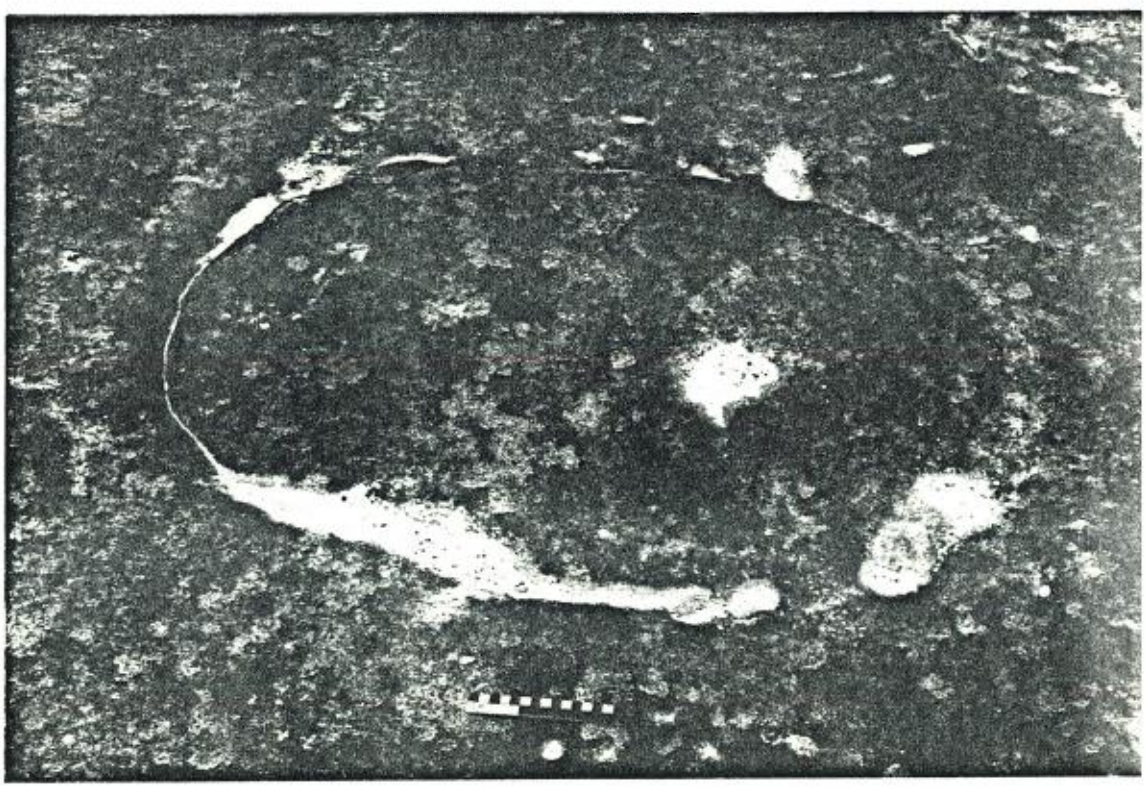
Pl 9: **MW #1** view north west of axe grinding groove.



Pl 10: **MW #1** axe grinding groove.



Pl 11: **MW #2** view north west of engraving.



Pl 12: **MW #2** detail of engraving.

APPENDIX G

PERMISSIVE OCCUPANCY P.O. 79.104

DEPARTMENT OF ~~AGRICULTURE~~ LANDS, N.S.W.

Telephone ~~(02) 79~~ 302777
Extn. ~~435~~ 705

THIS FORM TO BE RETURNED TO THE DEPARTMENT

~~Box 39, G.P.O., Sydney, 2001~~
P.O. Box 6, EAST MAITLAND 2323

....., 19.....

The Manager,
Gosford Quarries Pty. Limited,
300 Johnson Street,
ANNANDALE 2038

Ref. MD79 H 1424 GT:CL

Dear Sir,

NOTICE OF GRANTING OF PERMISSION TO OCCUPY

Permissive Occupancy 19 79 / 104 Gosford

Permission has been granted for the occupation from 1st October, 1988

of an area of about 38 hectares

situated in the Parish of Cowan

County of Northumberland shown by red edge

on the annexed diagram for the purpose of the

removal of Dimension Stone, Flagging Stone and Ballast and for Access

The permission to occupy is subject to:–

(a) Completion and return of this agreement.
(b) Payment of rent for period 1st OCtober, 1988
to 30th September, 1989 .. .. $ 264-00
and thereafter at the rate of $ 264-00
per annum.
(c) Payment of costs .. .. $ 180-00 (pd.25.3.87 Rec. H6065)
(d) Payment of stamp duty .. .. $ 3-00
(e) Lodgment of a Cash Deposit or Bank Guarantee
in the sum of $5,000-00
(f) Payment for docket books required at the rate of
$0-75 per book .. ..
(g) Payment of royalty at the rate of $4-00/m³ Dimension Stone
$0-60/m² Flagging Stone
$0-50/m³ Ballast
with a minimum monthly payment of $50-00

G. Q.
31 MAY 1988

(h) Compliance with the conditions numbered

on the attached form A. 254 (a).

is permissive occupancy replaces that formerly held
de the same number by your company. Any over-payment
the permissive occupancy will be carried forward to your
count. Interest at 18% p.a. is accruing on overdue
nt if any, and will continue to accrue until date of
yment.

Yours faithfully,

~~Under Secretary~~ G. TAYLOR
~~Per~~ for REGIONAL MANAGER

30 MAY 1988

I agree to the rent, royalty, terms and conditions as above stated and am retaining for my own information Tenant's Copy of the above, together with Form A.254 (a) and illustrative diagram.

I enclose a remittance of $ 447-00 in settlement of the amounts now payable

and for the purchase of — docket books.

*I have made arrangements with the Westpac Banking Corporation

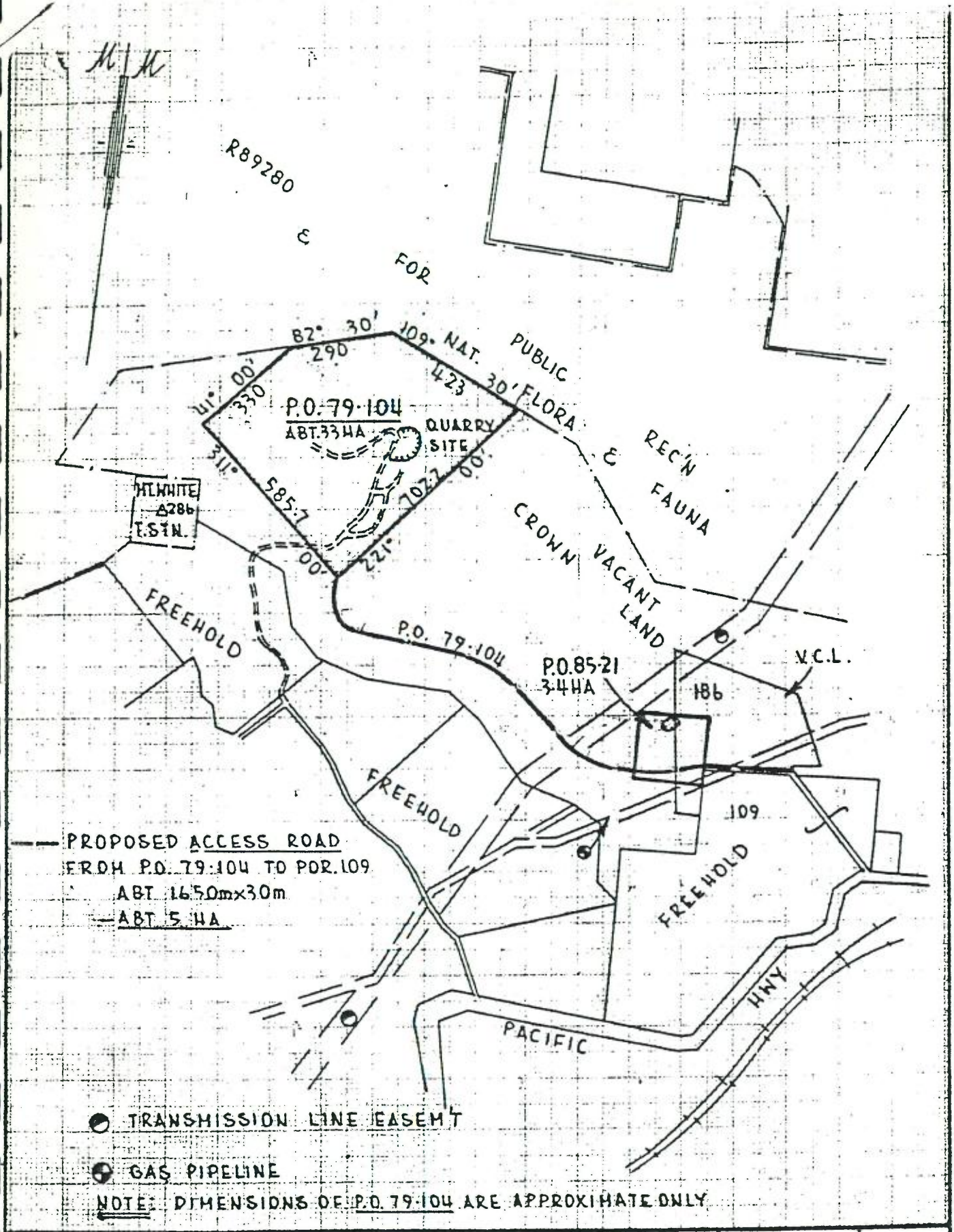
Bank at Railway Square to forward a Guarantee in satisfaction of *(e)* above

ot applicable if Cash Deposit ged.

U. Stanford
(Tenant's Signature)

8th June 1988.
(Date)

~~The Under Secretary for Local Government and Lands,~~
~~Box 39, G.P.O.,~~
~~Sydney, 2001~~
The Regional Manager



CROWN LANDS OFFICE

PARISH COWAN
COUNTY N'LAND
LAND DISTRICT GOSFORD
LANDS OFFICE MAITLAND
COUNCIL GOSFORD
FILE NO. MD 87 H 224

0	10	20	30	40	Table of mm

Diagram Showing

P.O. 79-104

Reduction Ratio 1:15000

GOSFORD QUARRIES PTY LTD

EIS
516

Mount White sandstone quarry

Borrower's name	Date	Ext

RAECO

GOSFORD QUARRIES PTY LTD

EIS
516

Mount White sandstone quarry