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Report to the Honourable Robert Webster
Minister for Planning and
Minister for Energy

A Commission of Inquiry pursuant to Section 119 of the
Environmental Planning and Assessment Act 1979
concerning

PROPOSED DEVELOPMENT BY MAITLAND MAIN
COLLIERIES PTY LTD OF AN UNDERGROUND
COAL MINE AT GLENNIES CREEK, SINGLETON

John Woodward
Chairman

COMMISSIONERS OF INQUIRY
FOR ENVIRONMENT AND PLANNING

August 1991

SYDNEY

AUGUST 1991

**TO: THE HONOURABLE ROBERT WEBSTER
MINISTER FOR PLANNING AND MINISTER FOR ENERGY**

The Applicant, Maitland Main Collieries Pty Ltd seeks consent to develop an underground coal mine at Glennies Creek, a locality within Singleton Shire.

It is proposed to develop the mine in two mining stages. Stage I would produce a maximum of 550,000 run-of-mine tonnes per year for a period of three to four years.

Stage II involves longwall mining producing up to a maximum of approximately 3.0 million run-of-mine tonnes per year for approximately 2.25 million product tonnes per year.

The Applicant expects the project to generate export income in excess of \$140 million per year.

Construction workforce will build to a peak of 85 persons then reduce as surface facilities are completed. The maximum workforce required for Stage I and Stage II are, respectively, 240 and 386 persons.

The proposed mine is supported subject to conditions by Singleton Shire Council, the Departments of Planning, Mineral Resources, Water Resources and the State Pollution Control Commission. Submissions to the publicly exhibited EIS raised concerns about the proposed mine, and in particular two objectors, Mr and Mrs Andrews and Mr and Mrs Hall, opposed consent to the mine and sought a Commission of Inquiry.

In commissioning the Inquiry, the then Minister for Planning prescribed Terms of Reference which embraced the objections of the two objectors and environmental considerations arising under the EPA Act.

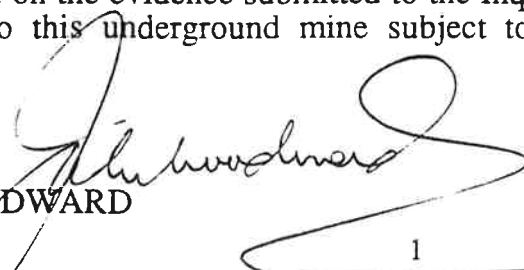
Environmental assessment of the mine was complicated by reason of the potential cumulative dust and noise impacts in the vicinity of Glennies Creek and Camberwell by reason of the existing Camberwell open cut mine and the approved, but not yet commenced Glendell mine. These two mine would be the dominant contributors to dust and noise impacts on dwellings in the area, Glennies Creek underground mine would add to the impacts.

Many dwellings in the locality have been acquired by coal mine companies including the Applicant. However, other rural properties (non coal company owned) remain.

In my findings I have proposed measures which seek to fairly visit upon this mine mitigation measures attributable to its likely impact on the air and noise environment of the locality.

My findings in relation to the Terms of Reference are set out in this report.

I am satisfied on the evidence submitted to the Inquiry that development consent may be granted to this underground mine subject to the recommended conditions of consent.


JOHN WOODWARD
Chairman

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**Report to the Honourable Robert Webster
Minister for Planning and Minister for Energy**

**PROPOSED UNDERGROUND COAL MINE BY MAITLAND MAIN
COLLIERIES PTY LTD - GLENNIES CREEK, SINGLETON**

An Inquiry pursuant to Section 119 of the Environmental Planning and Assessment Act 1979 with respect to a development application made by Maitland Main Collieries Pty Ltd to carry out coal mining on the land to which Authorisation numbers 44 and 128 applies.

IT IS RECOMMENDED:

That development consent be granted to the proposed Glennies Creek underground mine and that the mine development and operation be carried out in accordance with the Environmental Impact Statement prepared on behalf of Maitland Main Collieries Pty Ltd as modified in submissions to the Inquiry and by the conditions of consent recommended in this report.

TERMS OF REFERENCE FINDINGS

I find in relation to the Terms of Reference prescribed in the Instrument of Appointment for this Commission of Inquiry into the proposed Glennies Creek underground coal mine, Singleton as follows:

1. **To establish the environmental impacts likely to occur at the residences of Mr and Mrs Andrews, and Mr and Mrs Hall, Middle Falbrook Road, Glennies Creek, from mining activities at the proposed Glennies Creek Coal Mine.**

Mr and Mrs Andrews

Severe environmental impacts is likely to occur in relation to Mr and Mrs Andrews (residence 1 on Appendix 1 from the EIS) if the Glennies Creek underground coal mine is granted consent. These impacts are likely to involve exceedence of SPCC health and amenity criteria in relation to dust, and exceedence of SPCC noise goals submitted to this Inquiry, from the Glennies Creek mine alone. In respect of SPCC health criteria, the likely exceedence is marginal. However, when the cumulative impact of the Glennies Creek mine with the existing nearby Camberwell open cut mine (that is, the incremental impact arising from the Glennies Creek mine) and the approved but not yet commenced Glendell mine is considered, there will be a severe impact on this

family. In addition, by reason of proximity to the rail loop area and its mine related structures, the mine development will be clearly visible from the Andrews dwelling.

In the circumstances it is not appropriate for the Andrews family to continue to reside in this dwelling. Acquisition of the Andrews dwelling by the Applicant is not recommended in the circumstances of this case. An agreement exists between the Camberwell mine and the Andrews for acquisition of the Andrews property. It is my judgement that acquisition by Camberwell is likely to be concluded before 12 February 1995. Therefore, interim arrangements are required to protect this family from the environmental impacts of the Glennies Creek mine. A condition of consent is recommended to enable the Andrews to relocate in another dwelling in Singleton.

Mr and Mrs Hall

The mine has potential to cause dust impacts above SPCC amenity criteria submitted to this Inquiry on the occupants of "Dulwich" (residence 2 Appendix 1 from the EIS), Mr and Mrs Hall, during their continued occupation of this dwelling. The mine is likely to cause exceedences of SPCC noise goals submitted to this Inquiry. An agreement exists between the Camberwell mine and Mr and Mrs Hall for Camberwell's acquisition of "Dulwich", on request by the Halls, in accordance with the terms of the agreement. It is my judgement on the evidence that Mr and Mrs Hall are likely to exercise their rights under this agreement at some future time when the environmental impacts in terms of noise, dust and visual impacts from the Camberwell mine become intolerable to them, that is, when the Camberwell mine moves into its southern workings near the "Dulwich" residence within six to ten years on present indications. The dominant impact on these occupants will be caused by Camberwell.

In these circumstances, I find that no acquisition provisions should be included in the conditions of consent for this mine.

However, impacts in the period of the Halls continued occupation of the dwelling should be mitigated to reduce dust impacts within SPCC health and amenity criteria and within SPCC noise goals as submitted to this Inquiry. Monitoring of the dust and noise impacts of the Glennies Creek mine in the start up period of Stage I and of Stage II of the mine are required, and where exceedences are recorded, the Applicant should be required to either modify its operations and mining equipment or undertake at its costs, dust and/or noise measures at the dwelling upon request of the Halls in accordance with SPCC requirements.

2. To consider likely impacts on the heritage values of "Dulwich".

Environmental impacts of the Glennies Creek underground coal mine on the heritage values of "Dulwich" would be minimal. The dwelling "Dulwich" has local heritage value. A potential impact relating to vibration from blasting, particularly at the construction phase exists, but this can be avoided by controlled blasting in accordance with the recommended conditions of consent.

The rail loop and surface facilities of the mine will be visible from the front of "Dulwich". The visual impact can be reduced by tree and shrub plantings in

accordance with the recommended conditions of consent, but not eliminated. The Camberwell mine as it develops, will create a severe visual impact on "Dulwich". Dust emissions from the Glennies Creek mine will have minimal impact on the heritage value of "Dulwich". No measures are recommended in respect of minimal dust impact on the building itself.

3. **To define appropriate mitigating measures to offset likely environmental impacts from this proposed mine, including consideration of land acquisition and terms of conditions thereof.**

Environmental impacts considered in this Inquiry include dust emissions, noise levels in relation to likely affected dwellings, subsidence, water management including impacts on Glennies Creek and on groundwater from underground mining, emplacement of reject material, visual impacts, transportation of coal and road works.

No provision for further acquisition of property in the vicinity of the proposed underground mine is recommended. In the circumstances here, by reason of the cumulative impact of the Camberwell open cut mine with the likely impact of the approved Glendell open cut mine, these two mines will dominate environmental impact in the area in terms of dust and noise. The Glennies Creek mine would contribute to dust and noise impacts in terms of cumulative impact. In its early stages, the Glennies Creek mine is likely to give rise to noise and dust impacts alone, given the present stage of the Camberwell open cut mine, and the uncertain commencement date of Glendell.

In these circumstances, it is recommended that certain dwellings referred to in the recommended conditions of consent be monitored at the start up of Stages I and II of Glennies Creek mine and mitigation measures be undertaken by the Applicant to SPCC requirements. In respect of dust and noise, this may involve treatments and measures at dwellings or changes to mine operations and additional controls on mining equipment or both. In my judgement, these measures would be adequate and no further acquisition of properties by the Applicant should be required.

The evidence before the Inquiry is that Glennies Creek is outside the area of influence of subsidence, a matter of concern raised in submissions.

The underground mining activity is likely to cause changes in the hydrology of the area within the proposed coal lease. Changes in groundwater need to be monitored and the Applicant required to make good loss of water in bores and carry out remedial work arising from changes to the hydrology. These matters are covered by recommended conditions of consent.

Subsidence will occur on the surface above underground workings. Generally, subsidence will be slight, but in some locations may be severe. Provision exists for compensation under the Mine Subsidence Act. However, the Act does not cover impacts of surface rural lands and natural features which may affect or cause loss of rural production. A condition of consent is recommended to require the Applicant to make good damages arising from subsidence which fall outside the Mine Subsidence Act in respect of rural lands.

The other issues referred to are addressed in this report and conditions recommended to mitigate environment impacts from this proposed underground mine.

A grant of consent to the proposed Glennies Creek underground mine is therefore recommended subject to the conditions set out in this report.

BACKGROUND

Maitland Main Collieries Pty Ltd propose to develop an underground coal mine, on Authorisation numbers 44 and 128, at Glennies Creek, 12km north of Singleton and 3km northeast of Camberwell village, New South Wales. (See Appendix 2 map of general locality). The mine would produce a soft coking coal with high fluidity characteristics. Product coal would be railed directly from site to Newcastle for export.

The majority of the Hunter Region comprises undulating topography which has been cleared for grazing use with forested and wooded cover occurring to a limited extent. The EIS states that the proposed project area is mostly rolling hill country with some river flats. The Main Northern railway line cuts through the south western corner of the project site. There are scattered rural dwellings on the periphery of the site to the north, west and south. A dairy farm operates on the proposed project site.

The Glennies Creek project area is approximately 39 sq.km comprising Authorisation 44 held by the company and Authorisation 128 held by an associated company, Gunnedah Coal Company Limited (GCC) (Appendix 3). The company is a subsidiary of Australian Mining Investment Limited (AMIL), a publicly listed Australian company. The other partners in the project are Toyo Menka Kaisha Limited of Japan and Nippon Oil (Australia) Pty Ltd. AMIL also owns the Gunnedah Coal Company Limited, the operator of the Gunnedah Colliery which has been in production since 1899 and operates underground and open cut mines.

Authorisation 44 was first granted on 25 November 1975 as a potential replacement area for the Company's Millfield Colliery near Cessnock. Authorisation 128 was originally granted on 24 July 1978 to Gollin Wallsend Coal Company Limited (now Gunnedah Coal Company Limited). AMIL acquired the Company and GCC in May 1984.

Appendix 4 shows the land ownership in the Project area.

Maitland Main Pty Ltd seeks development consent to construct and operate an underground coal mine and associated surface facilities. A development application was lodged by the Applicant with Singleton Shire Council on the 23 August 1990. The development application was accompanied by an EIS. The EIS was exhibited by Singleton Shire Council and submissions were received from several parties. Submissions included two objections both formally requesting a Commission of Inquiry in respect of this proposed development conducted pursuant to the provisions of the Environmental Planning and Assessment Act. A third objection was received by the Commission of Inquiry after conclusion of the public hearings.

The Minister is the determining authority as stipulated in Section 101 of the Environmental Planning and Assessment Act (EPA Act). On 1 May 1991, the then Minister for Local Government and Minister for Planning directed that an Inquiry be held in accordance with Section 119 of the Act. The Minister appointed Commissioner John Woodward, Chairman of the Commissioners of Inquiry, to hold such Inquiry.

THE PROPOSAL

Maitland Main Collieries Pty Ltd propose to develop an underground mine with supporting surface facilities. The proposal is for a staged development embodying a gradual expansion of run-of-mine (ROM) production to a maximum of three million tonnes per annum. There will be two stages of surface infrastructure development corresponding to significant underground expansions incorporating longwall mining techniques.

Studies undertaken by the Applicant indicated that development of the resource would be most economic if, as has been proposed, efficient longwall mining technology were employed with the principal target being the high fluidity soft coking coal market.

Production in Stage I will produce approximately 550,000 ROM tonnes per year. This will then be increased in Stage II to 3 million ROM tonnes per year for approximately 2.25 million product tonnes per year. Stage I is proposed to finish between Year 3 and Year 4 of the mine and Stage II is proposed to begin in Year 2, therefore there will be some overlap between the two stages.

Stage I development will include:

- . box cut entry to the subcrop of the Barrett Seam;
- . driving development headings in the Barrett and Hebden Seams;
- . temporary pit-head facilities at the Barrett Seam Entry and truck haulage of raw coal on the private haul road to the rail head (located at the Hebden Seam Entry);
- . inclined drift entry to the Hebden Seam;
- . direct conveying of coal from the Hebden Seam to preparation plant and stockpiles via the new drift;
- . construction of a rail loading facility and a single module coal preparation plant at the Hebden Seam Entry.

The Stage II developments will accomplish a major increase in coal production and productivity through the installation of a longwall mining unit in the Middle Liddell Seam.

Specific features of the Stage II development include:

- . construction of interseam connections to the Middle Liddell seam;
- . production from one longwall unit with continuous miner support;
- . installation of additional coal handling capacity and washery modules;
- . closure and decommissioning of the Barrett Seam Entry.

MINING ACTIVITIES

The principal production technique to be used is the longwall method of mining. Appendix 5 shows a schematic cross-section of a typical longwall panel. The continuous miners, first workings, will form access roadways around blocks of coal 200m wide and 2,000m long ready for the longwall mining unit to extract progressively throughout the lease period. Development headings and some bord and pillar extraction in the Barrett Seam will be undertaken with continuous miners.

The EIS states that the coal reserves to be extracted lie between a zone of steep dips to the west and the Hunter Thrust to the east. These constraints and other surface features, together with the dip direction, determine the overall mine development. The conceptual mine plan (from the EIS) for the sequential extraction of longwall panels in the Middle Hebden Seam Entry is shown in Appendix 6 and Appendix 7 for the two Stages of development, while Appendix 8 shows the Barrett Seam extraction by a continuous miner unit through Years 3-20.

Stage I

Development headings will be driven in the Barrett and Hebden Seams from the Barrett Seam Entry and an inclined drift at the Hebden Seam Entry. According to the EIS, these headings will determine physical conditions before finalising technical design of the longwall extraction unit.

Initial development headings in the Barrett and Hebden Seams are not overlain by economic coal in the Middle Liddell Seam.

Stage II

Stage II of production will commence with the extraction of the first longwall block.

The longwall block will be located in the Middle Liddell Seam which lies approximately 50 metres above the Hebden Seam and is accessed via an interseam drift. Longwall mining in this seam will commence in panels to the west of the main headings. The underlying seam(s) can be extracted subsequently underneath worked out areas.

The Stage II development is preceded by the construction of an inclined drift from a portal adjacent to the rail facility and coal handling area to the underground workings. This access will provide for direct conveying of all coal from the mine to the surface stockpiles. Men and materials access will also be via the drift entry. Extraction by longwall will not occur until the access from the rail head facility has been established.

SURFACE FACILITIES AND INFRASTRUCTURE

The Barrett Seam Entry will be located approximately 3 kilometres to the east of the washery and rail load-out facility (Appendix 3). This latter area will become the Hebden Seam drift entry pit top area. The mine is planned to produce coal 24 hours per day Monday to Saturday with the possibility of development production and maintenance on Sundays. Appendix 9 shows the layout of the Hebden Seam Entry and coal handling facilities.

Glennies Creek ROM coal requires washing in order to prepare the product for export. A flexible plant and handling system capable of producing up to three products is proposed.

Separation of coarse coal will be achieved in a series of heavy media cyclones. Fine coal will be separated by spirals. The plant will be automated allowing total plant control from a single operator station. The building will be approximately 25m high, 40m wide and 25m deep. A free standing control building will accommodate electrical switchroom, control rooms, offices, laboratory and amenities. The plant will be steel framed and clad with corrugated steel sheeting. The control room will be of masonry construction.

Coal handling facilities have been designed for the staged production requirements of the project. All works for the main development are concentrated adjacent to the Hebden Seam mine entry drift. The principal coal handling works are located wholly within a figure eight rail loop.

Stage I

A portal conveyor will deliver coal from the initial Barrett Seam Entry to a 3,000 tonne ROM stockpile. Additional ROM stockpile capacity will be provided within the box cut. The coal will be transferred by front end loader into trucks and transported to the washery via the haul road. The haul road will be located on company owned land as shown in Appendix 4.

Trucks will dump directly into a feed hopper or a ROM stockpile. The feed hopper will deliver coal for sizing and then to a 200 tonne surge bin and from this bin to the washery. Rejects will be delivered to a 200 tonne overhead truck loading bin and product coal to two 50,000 tonne clean coal stockpiles. Rejects will be back loaded by trucks to the emplacement area. Coal will be reclaimed from the product stockpile and conveyed to a 1,000 tonne overhead rail loading bin.

Stage II

In Stage II, coal will be conveyed directly from the mine to a 100,000 tonne ROM stockpile. The sizer employed in Stage I is of adequate size to handle Stage II production. A reclaim conveyor will feed coal to a bin and then to the washery. Washery rejects will pass to a 200 tonne truck load-out bin.

Product stockpiles will consist of two stockpiles each of 55,000 tonne capacity. Provision has been made for a further 55,000 tonne stockpile if required. Additional dead storage is available between the stockpile rows. The dust control system will include water sprays around the perimeter and fitted to the overhead gantries. Mobile plant will be employed as necessary to manage stockpiles.

Reclaim conveyors will feed to a 1,000 tonne overhead rail loadings bin and loading will meet State Rail Authority (SRA) requirements for a Level 5 category facility.

REJECT EMPLACEMENT

Rejects from the coal washery will be transported by truck and/or scraper to an area (shown on Appendix 3) via the private haul road. The reject material will be compacted by bulldozer at the emplacement area. A water management scheme is proposed for the emplacement area to contain leachate and turbid water while diverting clean water away from the emplacement area.

Emplacement is progressively undertaken by clearing, topsoil storage, filling and respreading each section of the emplacement area after its design height is reached. Although the total amount of affected land in Stage II is 56.3ha, a maximum of only 7ha will be the cleared working area at any one time.

Reject emplacement is discussed further in "Commissioner's Comments and Findings" section entitled 'Waste Emplacement'.

TRANSPORT

Maitland Main Collieries Pty Ltd proposes to construct its own balloon rail loop and loading facilities in the vicinity of Nundah Rail Crossing immediately adjacent to the Main Northern Rail Line.

All product will be railed directly from the site to the Port of Newcastle, which is approximately 82km from where the rail loop joins the Main Northern Railway. A rail loading facility has been designed to meet SRA requirements.

The EIS states that the Applicant is committed to coal transport from the Project by rail. The Singleton Shire Council, however, requested that contingency plans for alternative coal haulage from the mine site be assessed. In this situation, and subject to Council approval, coal would be hauled along an access way being negotiated with Southland Coal Pty Ltd (Camberwell) and Bloomfield Collieries Pty Ltd (Rixs Creek). Coal would be hauled via public roads, Rixs Lane and the New England Highway, in emergency situations only.

Within the mine site and during Stage I, trucks will transport ROM coal from the Barrett Seam mine entry to the rail head facilities, along the Company's private haul road. Approximately one in four trucks will be backloaded with washery rejects for delivery to the reject emplacement area.

The construction workforce will generate traffic in the 12 month period prior to the mining start up. The peak construction workforce (85 personnel) will generate peak traffic of 60 movements, with an additional 40 movements due to deliveries. Peak traffic movements would occur once per day in the morning. There would be no afternoon peak because of varying finishing times.

Estimated employee traffic generated by the proposed Project is summarised in Appendix 3 (from the EIS Table 6.1).

Bridgman Road will carry much of the additional traffic generated by the Glennies Creek Project. In the EIS it is stated that all Glennies Creek mine personnel and construction traffic will be requested to travel via Bridgman Road, Stony Creek Road and the private haul road to prevent any deterioration of Middle Falbrook Road.

Middle Falbrook Road and Glennies Creek Road will carry the remaining workforce traffic that is expected to originate from the Muswellbrook area to the north. Middle Falbrook Road will be repositioned by or on behalf of Camberwell once mining of Camberwell's south pit commences. If the choice is to divert the northern section of Middle Falbrook Road around the pit, increased traffic at its junction with the New England Highway could be expected to occur as Glennies Creek employees could choose to travel this route to the Hebden Seam Entry. The Applicant proposes to carry out road works and a realignment of Stony Creek Road to meet Council's requirements. The closure of the Nundah railway crossing (located on Middle Falbrook Road) poses a viable means by which deterioration of Middle Falbrook Road can be prevented. Closing the rail crossing would ensure that no mine traffic would travel north from the New England Highway to the mine site. Both the Applicant and the Council support this alternative.

LEGISLATIVE REQUIREMENTS

1. Development Consent

The Environmental Planning and Assessment Act (1979) and associated Regulation (1980) provide the basis for development control in New South Wales. The activities associated with the proposed Project require development consent under the legislation. As this Project is classified as Designated Development, the development application must be accompanied by an EIS.

The development application was submitted to Singleton Shire Council on the 23 August 1990, which is the relevant Local Government Authority. The development application was accompanied by an EIS. The EIS was exhibited by Singleton Shire Council and submissions were received from several parties. Submissions included two objections both formally requesting a Commission of Inquiry in respect of this proposed development conducted pursuant to the provisions of the Environmental Planning and Assessment Act.

On 1 May 1991, the then Minister for Local Government and Minister for Planning, pursuant to Section 101(6) of the Environmental Planning and Assessment Act 1979, directed that an Inquiry be held in accordance with Section 119 of the Act. The Minister appointed Commissioner John Woodward, Chairman of the Commissioners of Inquiry, within the meaning of the Act to constitute a Commission of Inquiry to hold such inquiry. The Minister remains the determining authority by reason of Section 101 of the Environmental Planning and Assessment Act, 1979.

2. Coal Lease

The Department of Mineral Resources (DMR) administers the Coal Mining Act (1973), under which Coal Leases are granted.

Coal Leases are granted for 21 years and provisions for renewal is contained in the Coal Mining Act (1973).

The then Minister for Minerals and Energy indicated in 1985 that the Department would be prepared to proceed with Coal Lease invitation procedures for this proposal. The proposed coal lease would include rights to

the surface over certain company owned lands in the south and southeast of the project area so that surface facilities could be constructed.

3. Joint Coal Board Approval

Maitland Main Collieries Pty Ltd will need to obtain Joint Coal Board (JCB) approval under Order No.27 to open a coal mine.

4. State Pollution Control Commission Approvals and Licences

The Company will need to submit applications to the State Pollution Control Commission (SPCC) for approvals to construct and licences to operate the Project. Approvals to construct and annual licences to operate are required under the Clean Air Act (1961), Clean Water Act (1970) and Noise Control Act (1975).

COAL RESOURCES

The Project site is located near the north eastern boundary of the Singleton-Muswellbrook Coal District. Two Permian coal-bearing sequences occur in the district, namely the Wittingham Coal Measures of the Singleton Super Group and the Greta Coal Measures.

The coal seams of economic interest are in the Foybrook Formation, within the lower part of the Wittingham Coal Measures. Seven named seams are present but only three are planned to be mined: the Hebden, Barrett and Middle Liddell Seams.

Currently there are 37 collieries, both underground and open cut, located in the Hunter Coalfield Region. It is stated in the EIS that the region produces nearly two-thirds of the State's coal and 64% of the State's export coal.

The EIS states that coking coal product differs significantly from other Hunter Valley coals in that it has high Gieseler fluidity values and that coal possessing the property of high fluidity is an essential component of coal blends used in steel making, particularly in Japan from indigenous mines and American coals.

NEIGHBOURING COAL DEVELOPMENTS AND PROPOSALS

A number of coal mine developments have been approved, planned or are operating in surrounding areas. Appendix 10 shows adjoining authorisations and collieries. South of the Project area Southland Mining has commenced construction of the Camberwell Coal Mine planned to produce 2 million tonnes/year. Further south, Bloomfield Collieries Pty Ltd is already excavating for the Rixs Creek Coal Mine planned to produce 1.5 million tonne/year.

To the northwest of the Project area and overlying a portion of the Company's proposed coal lease is the Swamp Creek Colliery Holding.

The Glendell project, located immediately west of the Project area, was granted development consent but has not proceeded to date. An Inquiry pursuant to Section 119 of the Environmental Planning and Assessment Act (1979) recommended that the

Glendell project proceed subject to conditions. The proponents have recently been granted a coal lease. Commencement of mining operations may occur in the near future.

Camberwell and Glendell are open cut coal mine developments.

DEVELOPMENT IN THE SINGLETON SHIRE

The Singleton Shire is located approximately 250 kilometres north of Sydney and 80 kilometres west of Newcastle in an area generally referred to as the Hunter Region (Appendix 2). The Shire embraces a wide range of diverse land uses. Traditionally, rural activities have provided the basis for the local economy, grazing, dairying, grape growing and wine making, and market gardening being the major activities. Other land uses include the Singleton Army Base, National Parks and State Forests.

Since 1969 the Singleton Shire has experienced a dramatic period of growth in coal mining and power generation. By 1971 the mines in the Singleton Shire included the Liddell State Mine, Liddell Colliery, Foybrook Mine, Newdell Mine, Hebden Mine, Wambo Mine and the Lemington and Ravensworth No.2 Mines.

At present the following fifteen coal mines are operating within the Shire:

1. Lemington Mine
2. Wambo Mine
3. Liddell State Mine
4. Great Greta Colliery
5. Warkworth No.1 Open Cut
6. Hunter Valley Mine Open Cut
7. Hebden - Swamp Creek (closed temporarily)
8. Liddell Colliery
9. Howick Open Cut
10. R.W. Miller - Mt Thorley Open Cut
11. Saxonvale Open Cut
12. Ravensworth South Open Cut
13. Camberwell
14. Rixs Creek
15. United Collieries.

In addition to these existing mines, development consents have been granted for:

16. Glendell Mine
17. Bulga Coal Mine

18. Narama Coal Mine.

The Singleton Shire Council has indicated that it is aware of a further 5 proposed coal mines:

- 19. Mitchells Flat (with Commissioners of Inquiry for report to Minister)
- 20. Mount Owen Coal Mine (Development Application with Council)
- 21. Glennies Creek Coal Mine (with Commissioners of Inquiry for report to Minister)
- 22. Swamp Creek Extensions at Hebden
- 23. Ashton Coal Development Area (near Camberwell Village).

In 1971 raw coal production from the Singleton Shire amounted to 4.2 million tonnes per annum and employment in the industry totalled 1,094 persons. In 1986/87 raw coal production was 36.4 million tonnes per annum and employment was 6,064 persons.

Commensurate to the increase in mining activity has been an increase in demand for residential, rural residential and industrial land in the vicinity of the Singleton township. The extent of flood liable land and the existing Singleton urban area limits the amount of land available for urban, industrial, and commercial development.

THE LOCALITY

Annual reports from the Department of Mineral Resources show that coal was first produced in the area near Rixs Creek in the early 1870's and that intermittent underground mining from other operations as far north as Rosedale, about 1km south of the proposed Glennies Creek mine, continued until about 1948.

The dominant land use of the undulating terrain has been beef cattle grazing, while dairying and fodder crop growing are conducted on the alluvial flats beside Glennies Creek. There is an existing dairy farm on lands acquired by the Applicant which will continue to operate as a dairy. The Camberwell and Glendell mine sites are in close proximity to the proposed Glennies Creek mine.

Some areas within the lease are wooded, particularly some of the steeper slopes and along the water courses.

Buildings are restricted to scattered houses, dairies and outbuildings, a church, and a meeting hall. There are scattered rural dwellings around the proposed mine site one of which is a local heritage item, "Dulwich". Small wooden bridges cross Main Creek and Station Creek, and a large bridge crosses Glennies Creek at Middle Falbrook.

Roads through the area are generally sealed and single laned. Stony Creek Road is unsealed. The Main Northern Railway passes through the southwest corner of Authorisation 44 and crosses Glennies Creek and Station Creek on the southern border of the study area.

Small quarries used for road gravel are located in the area adjacent to the New England Highway and Glennies Creek Road. The Swamp Creek open cut mine abuts the north western boundary of the Project area.

Appendix 3 illustrates the general location features of the Project area.

TRANSPORTATION AND TRAFFIC

The Main Northern Railway passes through the south western corner of the Project area. Also to the southwest, but outside the Project area lies the New England Highway. Glennies Creek Road roughly bisects the Project area from northeast to southwest, joining the New England Highway west of the Village of Camberwell. Middle Falbrook Road also runs through from northeast to southwest leaving the Project area at about the middle of its southern boundary to join the New England Highway a few kilometres north of Singleton. Outside the Project area to the east, Bridgman Road runs south to the New England Highway at Singleton Heights.

The EIS states that a traffic study was recently submitted to the Singleton Shire Council in support of the mining development application and identified the intersection of Bridgman Road and the New England Highway as requiring additional traffic control. Middle Falbrook Road will be cut or diverted in the near future by development of the adjoining Camberwell open cut mine.

EXISTING LAND USE

The Project area is located within a rural environment with open pasture land dominating the areas of rolling hills. Bordering Glennies Creek are fertile level floodplain terraces which are irrigated from the creek and used for cropping, intensive grazing and dairying.

Approximately 20 properties in the area are involved in cropping and most of these use crops to provide fodder for dairy and beef cattle. There are about eight dairies operating in the area of the proposed mine, one of which is owned by Maitland Main Collieries Pty Ltd. Dairying is confined to alluvial flats since improved pastures are necessary to maintain production. An operational dairy farm exist on lands owned by the Applicant in close proximity to the surface facilities within the proposed mine lease area. Small holdings and hobby farms are located nearby, along Middle Falbrook and Bridgman Roads.

The western edge of the residential area of Singleton Heights occurs approximately 10km south of the proposed project area. The EIS comments that population growth in Singleton township has concentrated in Singleton Heights in recent years and is expected to continue in this area and in adjoining undeveloped lands flanking Bridgman Road.

A number of dwellings have been acquired by the Applicant and Camberwell or are included in compensation provisions of the approved Glendell mine.

Urban development in the area is restricted to the village of Camberwell which is located adjacent to the New England Highway and 3km west of the Hebden Entry and rail loop. The village comprises a separate older area of 18 occupied residences to the north and a more recently developed area to the south. The land adjacent to the village is mainly pastoral. Camberwell has a community hall and a church, but no retail outlets or schools.

The EIS believes that in terms of numbers employed, areas of land owned and used intensively and value of production, coal mining is the predominant land use in the Singleton Shire. However, agricultural activities remain a dominant use. The EIS believes that the large concentrations of mining to the west and south of the Singleton township have transformed the character of these areas, from rural to "mining industrial". However, notwithstanding the commencement of the Camberwell mine last year, the locality of Glennies Creek retains its rural character at present.

LAND CAPABILITY

It is stated in the EIS that the Project area is covered by the "Camberwell" Land Capability Series Sheet 9133, published by the Soil Conservation Service of New South Wales (SCS). The purpose of land capability is to identify the intensity limits at which various land uses can be undertaken so that environmental stability is maintained, and to recognise management requirements for avoiding particular hazards in the area.

Land Classifications in the EIS were based upon the eight class system used by the Soil Conservation Service (SCS). It relies upon an assessment of the biophysical characteristics of the land, the extent to which these will limit a particular type of land use and the current technology that is available to manage the land.

It is stated in the EIS that:

- . There is no Class I prime agriculture land in the project area.
- . The relatively flat river terraces bordering Glennies Creek have been classified as Class II, or "prime agricultural land with some limitations to agricultural production potential". An area of Class III land (fair to good agricultural land) exists on the lower reaches of Main Creek. The Class II and Class III lands are presently being cropped and grazed.
- . Large areas of Class IV land exists in the northwest sector of the Project area and on the southern side of Glennies Creek. These areas are presently being used for grazing. Class V land is found over most of the steeper slopes and is presently grazed. Class VI land is on the steepest slopes with poor or thin soils and is generally wooded.
- . The proposed rail loop is located mainly on Class IV land with a small section of Class II land. The rejects emplacement area is located on Class IV and V land. The Barrett Seam Entry lies on Class V land and the haul road progresses across Class V to Class IV lands.

RELEVANT PLANNING INSTRUMENTS

The coal authorisation area for the proposed Glennies Creek coal mine is affected by the Statutory provisions of the Singleton Planning Scheme Ordinance. This Ordinance was proclaimed on 7 January 1966 and since gazettal of the Environmental Planning and Assessment Act, 1979 it is a deemed local environmental plan. Under this instrument, the lease application area is zoned predominantly 1(a) Non-Urban 'A' except for a strip of land on both sides of the New England Highway and parallel to it having a width of 805m. This area is zoned 1(b) Non-Urban 'B'.

Within both zones, the proposed underground mine as described in the EIS is permissible with consent. Clause 25(a) of the Singleton Planning Scheme requires that the Singleton Shire Council, as consent authority, shall not grant consent to an application for an underground mine without the concurrence of the Director of the Department of Planning.

Since the proposal requires a new coal lease under the Coal Mining Act 1973, it is affected by a Direction of the Minister for Planning under Section 101 of the Environmental Planning and Assessment Act 1979. This Ministerial direction requires particular Councils in receipt of development applications for new coal mines that require new coal leases to refer these applications to the Minister for his determination. The Minister is the determining authority in this instance and is required to consider the development application in terms of Section 90 of the Environmental Planning and Assessment Act, 1979.

The Hunter Region Environmental Plan 1989 was gazetted on 17 March 1989 and applies to the lease application area. The Plan sets requirements for, and gives guidance on, the preparation and processing of local environmental plans and applications for development, on development needs and opportunities, and on the management of the region's growth and development.

Clause 32(e) of the Hunter REP states:

"The objective of this plan in relation to planning strategies concerning roads, railways and public transport are to maximise accessibility and facilitate the movement of people and goods throughout the region in a manner which has regard to social, economic, environmental and safety considerations, in particular - to encourage the transport of goods, especially coal and other bulk materials, by rail or other non-road modes where practicable."

Further, the Hunter REP in relation to the control of development states:

"34. A Council

- a) should not grant consent to the carrying out of any development involving the storage or handling of goods or materials which are likely to be delivered by heavy transport vehicles, unless it has considered whether use could be made of a transport mode other than road which, in the opinion of that Council, is economically practicable; and*

- b) *should not grant consent to the carrying out of development on land having frontage to a main or arterial road unless -*
 - i) *all vehicular access to the land is from a road other than a main or arterial road, where practicable; or*
 - i) *the Council is satisfied that the applicant has demonstrated that there will not be an adverse effect on traffic movement in the area as a result of the development."*

Further relevant clauses in the Hunter REP 1989 that are to be considered by consent authorities in considering proposals and the preparation of plans are clauses 39, 41, 45 and 47 which are here summarised.

- 39. objectives in relation to planning strategies concerning mineral resources and extractive materials that minimise the impacts on the environment and community.
- 41. policies for control of development to minimise the adverse effects of mineral extraction.
- 45. objectives to control development so as to minimise any adverse effects resulting in the extraction of minerals.
- 47. policies for control of development to ensure the emission of pollutants is properly monitored and controlled.

State Environmental Planning Policy No.11 - Traffic Generating Developments, provides that applications for the development of extractive industries or mines shall be referred to the Roads and Traffic Authority for its views prior to determination.

SUBMISSIONS TO THE INQUIRY

The Environmental Impact Statement (EIS) was publicly exhibited from 31 August 1990 to 12 October 1990. A total of 13 public submissions to the EIS were received. The principle issues of concern identified by parties are contained in Appendix 11.

The ten parties who made submissions to the Inquiry are listed in Appendix 12. These included two parties, Andrews and Hall, who objected to the proposed development and who sought a Commission of Inquiry under Section 101 of the EPA Act. A third submission (Bowman) objecting to the development was received by the Commission of Inquiry after conclusion of the public hearings.

ISSUES: COMMISSIONER'S COMMENTS AND FINDINGS

INTRODUCTION

This Commission of Inquiry was commissioned under the Environmental Planning and Assessment Act (1979), to inquire into the proposed development of the Glennies Creek underground coal mine situated north of Singleton within the Shire of Singleton with respect to the following Terms of Reference:

Terms of Reference:

1. *To establish the environmental impacts likely to occur at the residences of Mr and Mrs Andrews, and Mr and Mrs Hall, Middle Falbrook Road, Glennies Creek, from mining activities at the proposed Glennies Creek Coal Mine;*
2. *To consider likely impacts on the heritage values of "Dulwich";*
3. *To define appropriate mitigating measures to offset likely environmental impacts from this proposed mine, including consideration of land acquisitions and terms and conditions thereof.*

The development application supported by an Environmental Impact Statement (EIS) lodged by Maitland Main Collieries (the Applicant) and the locality are described earlier in this report.

Parties making submissions to the EIS and to the Inquiry raised numerous issues which they considered relevant to the proposed mine and to the above Terms of Reference. Submissions to the Inquiry addressed the potential issues of environmental impact and measures to mitigate those impacts falling within Term of Reference 3 as well as those related to "Dulwich" and the two objectors referred to in Term of Reference 1.

Under Section 90 of the Environmental Planning and Assessment Act (EPA) 1979, the Minister is required to consider the impact of the proposed development on the environment and, where any harm to the environment is likely to be caused, any means that may be employed to protect the environment or mitigate the harm - Section 90 (1)(b). The parties to the Inquiry agreed that the Commission of Inquiry should address the relevant issues arising under Section 90, particularly in view of Term of Reference number 3.

Parties who made submissions to the Inquiry included two objectors, Andrews and Hall, who sought a Commission of Inquiry under Section 101 of the EPA Act. A third submission (Bowman) objecting to the development was received by the Commission of Inquiry after conclusion of the public hearings. Issues raised by Bowman's submission are referred to in other submissions and have been considered by the Commission of Inquiry in making its findings and recommendations.

The Applicant relied on its EIS including reports on potential noise and dust impacts by Dr Nigel Holmes supplemented by further submissions at the Inquiry. The submission from the Department of Mineral Resources was supplemented at the Inquiry by a report from Dr Holla on subsidence likely to be caused by underground mining. Submissions were made by Singleton Shire Council, Department of Water

Resources and the State Pollution Control Commission (SPCC). An environmental impact assessment was undertaken by the Department of Planning which formed its submission to the Inquiry.

A site inspection was undertaken in the presence of parties and Appendix 13 outlines the route taken.

This underground mining proposal needs to be seen in its regional and local contexts. The Upper Hunter Valley has been dominated by agriculture with a gradual change in recent decades with the introduction of coal mining, particularly open cut mining, in certain locations. Appendix 10 shows mining proposals and operations in the Upper Hunter Valley. To the northwest of the proposal site, within an approximate distance of 8km, are 3 operational mines, Liddell State underground mine, Ravensworth open cut mine, and the Liddell Mine which is a combination of both open cut and underground operations. In this same vicinity, to the northwest, there are proposals for a further four mines; Mt Owen, Swamp Creek, Glendell (approved but not commenced) and Narama, all open cut mines. South of the Glennies Creek proposal site lie two operating open cut mines, Rixs Creek (approximately 4km away) and Camberwell (in close proximity to Glennies Creek).

Although the Camberwell open cut mine commenced last year, the locality around Glennies Creek retains its dominant rural character. The Glennies Creek mine, being underground, with its principal surface facilities adjoining the Main Northern line, will not significantly change the rural character of Glennies Creek and surrounding area. The proposed Glendell open cut mine, approved but not yet commenced, will change the character of the area to the west of Glennies Creek. However, if and when Glendell commences, areas around Glennies Creek to the north and east will retain their rural character unless further mines are developed in these areas. The Camberwell mine, being open cut, will impact on the rural character as its various stages are developed to the north and south of the Main Railway line.

The dairy farm on Maitland Main's land, within the area subject to subsidence, is to continue its operation during the course of mining. Other agricultural uses will continue within the areas of the Authorisation of Maitland Main Collieries Pty Ltd under the Coal Mining Legislation.

Camberwell open cut coal mine is of particular importance in considering the Glennies Creek proposal. The potential cumulative impacts of the two mines need to be considered, particularly in terms of noise and dust impacts.

Camberwell commenced mining last year. Its contribution to cumulative impact will vary during the life of the mine depending on the stage and location of mining within its coal lease. The Camberwell mining operation occurs in two pits; the north pit and the south pit. Mining is to commence in the north pit and may move to the south pit in Year 6, although the time schedule may extend beyond the sixth year of operation. Figure 3.1.1 from the Camberwell EIS illustrates the layout of the Camberwell project and the location of the "Dulwich" homestead (Appendix 14). In terms of transport, the Camberwell Mine uses a rail loop which is intended to be a joint rail loading facility with the Rixs Creek Mine. The coal lease granted to Camberwell is for a 21 year period. Mining is to be carried out in accordance with the conditions of development consent and the coal lease issued for the Camberwell project.

Camberwell have acquired a number of properties within its area of affectation due to noise and dust impacts. Messrs Hall and Andrews have agreements with RHA Pastoral Company Pty Ltd (the land holding company for the Camberwell Project) under which RHA Pastoral must purchase their properties, if requested at futures times, in accordance with the terms of their respective agreements. The Andrews agreement is exercisable prior to 12 February 1995 and the Hall's agreement at some future date determined by the Halls in accordance with terms of the agreement. Provision is made for the price of purchase to increase up until the time of acquisition. In addition, the Halls have received a payment (non-refundable) to compensate them for the effects of mining near their property which is to be deducted from their final purchase price if and when they decide to sell. It should be noted that this Inquiry is not concerned with the merits or otherwise of the actual terms of agreements between the Camberwell Coal Company and Messrs Hall and Andrews. However, it is noted that the agreement exists as a means of mitigating adverse impacts of dust and noise on these residents from the Camberwell mine. The agreements provide a means for both families to quit their dwellings due to adverse impacts from the Camberwell mine.

The Glendell Open Cut Mine is also of particular importance when considering the cumulative impacts on the area. It is not clear if or when the mining operations will commence although a coal lease has recently been issued for the Glendell project. Development consent was granted in 1983 under certain noise and dust criteria, adopted by the SPCC at that time, following a Commission of Inquiry.

Many properties have been acquired by mining companies in the vicinity of Glennies Creek and Camberwell. These are shown on Figure 4.16 from the EIS (Appendix 4). However many rural properties and dwellings remain in private ownership in the Glennies Creek locality. The extent of property acquisition by Glendell is not known to this Inquiry. Further properties are likely to be acquired by Glendell under its conditions of consent. Some of these properties may include dwellings which could be impacted by the Glennies Creek mine.

Maitland Main has acquired certain properties shown which are in Appendix 4. It does not propose to acquire further properties although some submissions to the Inquiry proposed further acquisition provisions as conditions of consent.

The following parties support approval of the proposed Glennies Creek Mine subject to conditions:

- . Singleton Shire Council
- . Department of Planning
- . State Pollution Control Commission
- . Department of Mineral Resources
- . Department of Water Resources.

Three objectors were opposed to the mine:

- . one sought refusal (Hall - owner of "Dulwich") but commented that if consent should be granted that certain measures were required to mitigate the adverse impacts on the property of "Dulwich" and on its residents;
- . the second objector was Andrews who sought interim arrangements. That is, the mitigation of adverse impacts from the proposed development by way of

provision of alternative accommodation in Singleton rent free until the 12 February 1995 (the date when the Andrews agreement with Camberwell expires);

a third objector (Bowman) objected on grounds common to other submissions.

At the Preliminary Hearing of this Inquiry, parties identified issues of concern which they considered should be addressed in this Inquiry. These have been considered in making my findings and recommendations in relation to the project.

The findings of this Commission of Inquiry, on the issues of potential environmental impact having regard to the Terms of Reference and Section 90 of the EPA Act, are made on a consideration of matters raised not only in submissions to the public hearings of the Inquiry but also in earlier submissions made in response to the exhibition of the EIS and on the Commissioner's inspection of the proposed site and surrounding areas. A list of background documents and the list of submissions are given in Appendices 15 and 12 respectively. The report, and this section in particular, should be read in conjunction with the submissions before the Inquiry and the EIS volumes 1, 2 and 3.

I am satisfied on the submissions before the Inquiry that development consent should be granted to the Glennies Creek underground mine. The proposed mine is capable of operating in an environmentally acceptable manner subject to controls which are recommended as conditions of consent to the development application.

In the course of considering the submissions in the following sections of this report, on the principal issues raised in this Inquiry, comments and findings are made on measures to mitigate environmental impacts.

The report first considers the likely dust impacts, then proceeds to consider likely noise impacts. From there, the report proceeds to consider dwellings likely to be affected by noise and dust above SPCC goals and measures to mitigate those impacts on these dwellings. The report then considers each of the principal environmental issues raised in submissions.

DUST AND NOISE

The issue of cumulative impact of the proposed underground Glennies Creek mine and other open cut mines arises in this Inquiry in relation to potential air quality and noise impacts.

The issue needs to be approached by considering existing mines and the incremental impact that the proposed Glennies Creek mine may add, should it be approved. It is the quality of the existing environment into which this underground mine is to be introduced that is relevant to an assessment of its environmental impact and measures to mitigate those impacts. The two mines which need to be considered in relation to the Glennies Creek mine are the Camberwell open cut mine and the approved, but not commenced, Glendell open cut mine. On the basis of submissions to the Inquiry these are relevant to cumulative impacts. Other mines to the north and north west of Singleton may contribute to a varying, but minor extent, to existing air quality and noise environments in the Glennies Creek locality, but it is the Camberwell and Glendell mines which are the most relevant.

The assessment of cumulative impact in this case is more complex in that Glendell has not yet commenced mining operations. A development consent was granted in 1983 following a Commission of Inquiry. At that time, the SPCC dust and noise criteria were less stringent. Further, although a coal lease has been recently granted, its commencement date remains uncertain and a SPCC licence would need to be issued having regard to the Clean Air Act and the Noise Control Act and SPCC air quality and noise goals. The criteria for dust emissions or noise criteria that may be included in the Glendell licence are unknown.

In their primary submissions to the Inquiry the Applicant, the SPCC and the Department of Planning considered the cumulative impact of the Camberwell and Glennies Creek mine, but not Glendell. Detailed expert evidence on dust and noise impacts was submitted from Dr Nigel Holmes on behalf of the Applicant. In further submissions by Dr Holmes these were expanded to include Glendell. His evidence is considered under Dust and Noise in the following Sections of this report.

Notwithstanding the submission of this expert evidence, Maitland Main Collieries Pty Ltd did "not admit" the appropriateness of cumulative impact in environmental assessment of the Glennies Creek project. Maitland Main's submissions in this regard are not supported. Cumulative impact is a most relevant consideration when assessing a proposed new mine which is entering into an environment where existing mining (and other activities) may join together to cause adverse environmental impacts in the area.

It is not sufficient, for example, to favourably compare the noise and dust performance of the proposed Glennies Creek mine with the Camberwell mine on the basis that consent should follow because Glennies Creek, taken alone, will have less impact than the approved Camberwell mine itself.

A further consideration in cumulative impact assessment and appropriate dust and noise criteria is the existing character of the locality. Notwithstanding the recent start up of the Camberwell mine the locality presently retains its rural character. Should the underground Glennies Creek mine be approved the rural character of much of this locality will not change significantly. There will be some impacts on rural character around the washery and loading facilities and the rejects emplacement area, however, residual areas within the Authorisation will retain their rural character.

A further consideration relevant to environmental assessment of this project and its cumulative impact with other mines are residents of dwellings in the vicinity of the proposed mine. It is not adequate to consider only potential impacts on objectors or the parties who made submissions to the Inquiry. Likely impacts on all residents as well as measures to mitigate those impacts need to be considered.

It should also be noted that SPCC goals and guidelines in relation to dust emissions and noise levels are not standards. They are not levels within which, as of some right, a proposed development is permitted to operate. The circumstances of each case, the existing air quality and noise environment, and other factors may all be relevant to the dust and noise criteria within which a mine should operate. In some cases more stringent control on a specific mine may be appropriate, particularly in circumstances of cumulative impact assessment.

Dust Emissions

The proposed underground mine will generate dust arising from surface activities which relate in the main to coal stock piles at the rail loop, loading, transport of coal by truck on the private haul road within the mine site, and the transport and emplacement of reject material within the site.

The Applicant relied upon dust predictions and analyses undertaken by Dr Holmes contained in the EIS and in supplementary submissions (submissions 1.33 and 1.37) by Dr Holmes concerning cumulative impact of dust emissions from the nearby approved open cut mines, Glendell and Camberwell together with the proposed Glennies Creek underground mine. This supplementary submission is attached to this report in Appendix 16.

The Commission of Inquiry heard submissions from the State Pollution Commission Control (SPCC) on dust impacts also supplemented by further submissions in response to matters raised by the Commission of Inquiry. The SPCC has not carried out its own dust modelling, but relied on its assessment of the EIS (that is, Dr Holmes' report) and its own experience in relation to mining in the Upper Hunter Valley.

Two objectors, before the Inquiry, occupants of residences No.1 (Hall) and No.2 (Andrews) raised concerns about adverse impacts from dust at their dwellings. A third objector, Bowman, raised concerns about dust impact in the locality.

At the time of the Inquiry, the Applicant Company had acquired a number of properties around and including the areas of surface activities. These properties are shown in the EIS Figure 4.16 (Appendix 4). The Company does not propose to acquire any further properties. The Camberwell mine had also acquired a number of properties in the vicinity in relation to that projects. Camberwell open cut mine commenced operation in 1990.

There are agreements between Camberwell Mine and the owners for the purchase of properties No.1 (Andrews) and No.2 (Hall), at the respective owners, request, subject to certain conditions in those agreements.

On the evidence before this Inquiry, I am satisfied that, it is likely that Camberwell will acquire these properties at future dates to be determined by either the Halls or the Andrews in accordance with the terms of their respective agreements. In the case of Andrews, the date is likely to be some time before the 12 February 1995, and in respect of the Halls some future date they shall determine in accordance with their agreement. That may be when Camberwell commences mining on the southern side of the rail line near the Hall's residence within six, perhaps ten years. At the Inquiry a representative of the Camberwell mine indicated the timing of extraction to the south of the rail line was uncertain and could extend by some years beyond its original estimate of six years.

Residence No.1 (Andrews) sought conditions of consent to enable them to move from their dwelling pending its acquisition by the Camberwell mine. The Halls opposed consent to the project but also proposed conditions should approval be granted.

No other residents sought acquisition on the grounds of dust or other impacts from the proposed underground mine in submissions to the Inquiry. The only two residents

who appeared at the Inquiry were Hall and Andrews. Other residents in the vicinity of the mine raised concerns in their submissions to the EIS but did not appear at the Inquiry hearings or make further submissions. A third submission was received from Mrs Bowman.

The Applicant states in the EIS that existing air quality in the Hunter region is dominated by coal mining, power generation, and agriculture. The background dust deposition level in the proposed project area has an upper limit of approximately 2 g/sq.m/mth. The SPCC believes that the background dust deposition level nominated by the Applicant adequately depicts the present air quality situation in the locality.

The Commissioner notes that no background dust concentration data was submitted to the Inquiry however a background dust concentration of 30ug/cu.m (annual mean) was accepted by parties to the Commission of Inquiry for the Rixs Creek Mine which commenced in 1990.

Dr Holmes analysed air quality impacts for this project on the basis of an underground mine and surface facilities already described in this report. His analysis includes:

- . an analysis of the operation of the mine for Year 3 with Stage I and Stage II overlapping (the year he expected to give rise to the greatest dust generation). He developed estimates of dust that would be generated from components of the surface mining operations.
- . estimates of dust emissions (used with a long-term dispersion model and meteorological data from Glendell) to estimate annual average dust deposition rates and dust concentrations at a grid of points surrounding the mine.
- . an analysis of the cumulative effect of the proposal with the Camberwell Mine. In this analysis he assumed that Year 3 in the Glennies Creek development will correspond to Year 5 of the Camberwell Mine.
- . predictions of dust deposition rates and concentrations as contour plots which can be used to assess the impact of the mine by comparing the predicted deposition rates and concentrations with relevant air quality criteria.
- . use of a dispersion model capable of predicting 24-hour dust concentrations to evaluate impacts that would be expected to occur under "worst-case" episodic conditions.
- . an assessment of the air quality impacts that will be associated with the development of the proposed underground mine and surface facilities.

Dr Holmes' assessment of meteorological conditions in the EIS was not challenged by expert evidence.

In considering the effects of dust on health and amenity, Dr Holmes compares dust deposition rates and dust concentrations with air quality criteria adopted by the SPCC in New South Wales. He considers criteria for both long-term (annual averages) and short-term (24-hour) periods.

Short-Term Impacts

Dr Holmes states that, in respect of the Glennies Creek mine:

"There will be no privately owned residences within the area where short-term episodic conditions would cause concentrations to rise above the US EPA 24-hour primary criterion."

There SPCC stated it has adopted the US EPA 24-hour primary criterion.

There was no evidence presented to the Inquiry of short-term cumulative impacts from approved coal mines in the locality. However, the SPCC concurred with Dr Holmes' assessment on short-term episodic conditions.

On the basis of Dr Holmes and the SPCC submissions, it may be concluded that short-term episodic conditions would fall within the criterion adopted by the SPCC.

Long-Term Impacts

It is the long-term impacts which are potentially more significant.

Glennies Creek Underground Mine Alone

Dust Deposition

The SPCC dust fallout criteria are based on background dust deposition levels plus an acceptable increment up to a maximum deposition rate. The SPCC considered that, for this project, the maximum acceptable incremental dust deposition level is 2 g/sq.m/mth (annual average).

The SPCC criteria are based on a marginal increment in deposition levels before a nuisance level is reached. The marginal increment acceptable under SPCC guidelines depends on the existing dust deposition levels in the locality. According to the SPCC, in rural and semi-rural areas experiencing annual average deposition levels between 1 and 2 g/sq.m/mth, as applies for the present location, dust deposition levels would be allowed to increase by 2 g/sq.m/mth before it would consider that a degradation in amenity had occurred. It is noted that the SPCC's dust deposition criteria are goals and not standards and relate to amenity and not health effects.

The SPCC considered that the EIS, depicts adequately what is believed to be the present background deposition levels. The contours provided by Dr Holmes in the EIS, adequately depicts the likely impact, in the SPCC's view.

Appendix 1 taken from the EIS, illustrates the predictions of increase in dust deposition rates due to emissions from the Glennies Creek mine alone for Year 3, Stage I and II. No residences lie within the +2 g/sq.m/mth (annual average) contour. The SPCC concurred submitting that:

"There are no privately [that is, non mining company] owned residences around the mine site that could experience dust deposition levels above the 2 g/sq.m/mth (annual average) increment for the Glennies Creek Mine alone."

Dust Concentrations

The SPCC refers to the National Health and Medical Research Council (Australia) 90 ug/cu.m annual geometric mean goal when assessing long-term dust concentration impacts. This level is recommended as the maximum permissible level that should be permitted in urban environments.

Appendix 17 shows the predicted increase in dust concentrations for Year 3, when Stage I and II overlap, the period that Dr Holmes believes to represent worst case conditions. There are no non mining company owned residences impacted above 50ug/cu.m increase in annual average dust concentration by the Glennies Creek mine alone.

Cumulative Air Quality Impacts

However, as the Camberwell open cut mine has been approved and has commenced operations and as Glendell has been approved, the cumulative impact of the three mines needs to be considered.

Camberwell and Glennies Creek Mines

Dust Deposition

Appendix 18 from the EIS shows contours for predicted dust deposition for the Glennies Creek and Camberwell Projects. The EIS states that dust fallout levels are below 2 g/sq.m/mth (annual average) for all privately (non mining Company) owned residences except No.1 (Andrews). The SPCC identified residences No.1 (Andrews), 2 (Hall), 3 (unoccupied/derelect), 28 (owned by Camberwell) and 30 (owned by Camberwell) as potentially impacted by the cumulative dust deposition from Glennies Creek Mine and Camberwell Mine. The evidence to the Inquiry is that these residences are either owned by mining companies or have entered into purchase agreements with mining companies. The Department of Planning (DOP), in their Primary Submission, also identify these 5 residences lying within what it refers to as a zone of affectation for cumulative dust deposition. Three residences owned by Maitland Main would be impacted above +2g/sq.m/mth (annual average) dust deposition rate. Andrews and Hall are likely to continue to reside in these dwellings prior to acquisition by Camberwell.

Dust Concentrations

Figure 6.4 from the EIS (Appendix 19) shows contours for predicted dust concentration for the Glennies Creek and Camberwell projects combined. The EIS states that increases in the annual mean dust concentrations for all privately (non mining company) owned residences except No.1 (Andrews) are predicted to be below 50 ug/cu.m.

The SPCC stated it believes that its ambient health goal for dust concentrations could be exceeded at residences 1 (Andrews), 28 (Camberwell) and 30 (Camberwell).

The Commissioner notes that 3 residences owned by Maitland Main would also be impacted above 50ug/cu.m and residences 2 (Hall), 3 (unoccupied) and 31 (Camberwell) are close to the 50ug/cu.m contours.

Glendell, Camberwell and Glennies Creek Mines

Dust Deposition and Concentrations

It became apparent during the course of the Inquiry that the overall cumulative impacts of mining in the area, not just the Camberwell mine and the Glennies Creek proposal, should be considered. The approved Glendell open cut mine, because of its proximity and prospects of its commencement, was relevant to a cumulative impact. Information was sought by the Inquiry from the SPCC, the Department of Planning and the Applicant on cumulative air quality impacts including Glendell. Responses are contained in Dr Holmes' supplementary submissions, SPCC submissions 9.4 and 9.7 and DOP submission 4.8.

The SPCC has not carried out its own independent dust modelling but has used information from the following EISs in its assessments of those projects:

- . Camberwell Coal Company EIS
- . Glendell Coal Company EIS
- . Glennies Creek EIS.

The SPCC stated that the majority of residences in the Glennies Creek area, subject to likely cumulative impacts above SPCC dust amenity criteria and ambient health goals for dust concentration, are mainly affected due to the dust from the Camberwell and Glendell Mines. The SPCC further states that this has been taken into account in the development consents for these mines.

In the Applicant's Submission in Reply, the cumulative air quality impacts that are expected to occur with simultaneous operation of the Glennies Creek underground mine and the Camberwell and Glendell open cut mines was analysed by Dr Holmes.

In his supplementary report, Dr Holmes states that:

- . both the Glendell and Camberwell mines have changing areas of impact as the mines develop over their respective lives;
- . the Camberwell mine is in its first year of development and its development over time is reasonably well defined and is set out in the Camberwell EIS;
- . the Glendell Mine now holds both a development consent and a mining lease, therefore commencement of mining is now a commercial decision and may take place in the near future;
- . there is a high probability that there will be a concurrent operation of these three mines; and
- . other mines in the Hunter Valley will also contribute to the cumulative impacts with the Glennies Creek Mine.

Dr Holmes selects a period in his report when the locations of mining operations will be such as to give rise to a "worst case" impact. He considers that Glennies Creek will be at its worst in terms of environmental impact in Year 3, Camberwell in Year 5 and Glendell in Year 2. In Dr Holmes' view, if these three mining years were all to occur in the same actual year, then this would represent the period of "worst case"

cumulative impact. Dr Holmes believes that this scenario is "a reasonably likely outcome". Year 3 of Glennies Creek would be most likely to occur with Year 5 of Camberwell. If Glendell were to commence mining more than 12 months after Glennies Creek commences then clearly there would be no possibility that Year 2 of Glendell would coincide with Year 3 of Glennies Creek, but a reasonable approximation to this situation (in terms of dust emissions) could occur.

Emission inventories for dust from Glennies Creek and Camberwell are presented in their respective EISs. Dr Holmes states that his emissions inventory for Glendell was developed using the Glendell EIS interpolated for Year 2 using the same emission factors and particle size distributions and general methodology as for the other two mines. The Inventory of Dust Emissions employed by Dr Holmes in his supplementary report is contained within Appendix 16.

Dr Holmes noted that there is a significant reduction in dust from the coal haul road at the end of Stage I for the Glennies Creek Mine. Consequently, after Stage I of the Glennies Creek Mine the total dust emission could be estimated at being 60% of the original figure. At the Inquiry the Applicant submitted Stage I would finish within about 4 years or less. Glennies Creek would have significantly less dust in terms of emissions after the transport of coal within the site by private haul road ceases.

The volumes of dust from the respective mines vary in comparison with each other. Taken from Dr Holmes' report, the total dust emission figure for Glennies Creek in Year 3 is 604.2 tonnes per year (tpa), compared with the estimated figure for Camberwell of 2647.3 tpa, and the estimated figure for Glendell, in Year 2, of 9644.9 tpa. The total dust emission figure for Glennies Creek declines to 340.2 tpa with the completion of the road haulage of coal. That is, when trucks no longer haul coal by road from the Barrett Seam Entry, this is the end of Stage I. It can be seen that total dust emissions from Glennies Creek are relatively low, after completion of Stage I.

Dr Holmes has used a dispersion model (DUSTGLC) to predict the dust deposition and concentration in the area for his emission figures. These are shown in Appendix 16.

Dr Holmes concludes in his supplementary submission, that the effects of the Glennies Creek mine are limited in area and make little difference to the impacts that will be experienced in the locality from the other two mines. He states that:

"This is not unexpected given the relatively small proportion of dust that will be generated by the Glennies Creek mine compared to the other two."

In the opinion of Dr Holmes, the consideration of Glendell in the assessment of cumulative impact of mining in this area of the Hunter Valley results in a significant change in the areas affected by predicted increase in dust fallout levels above the 2 g/sq.m/mth (annual average) increment adopted by the SPCC. Dr Holmes compares the southern portion of the cumulative 2 g/sq.m/mth contour with the equivalent area for Glendell alone. These contours show the area considered likely to be affected by dust at a level that would be "inconsistent with amenity". The southern extent of these curves are similar until the area is reached where Camberwell (and to a lesser extent Glennies Creek) begin to contribute dust to the ambient air. Dr Holmes notes that these two mines (being much later in time) were not considered in the 1983 Commission of Inquiry into the Glendell Mine. The development applications for these two mines had not been lodged at the time of the Glendell Inquiry. Dr Holmes

does not compare the northern portions because his analysis looks at the "worst case" with respect to Glennies Creek, which is when Glendell activity is high in the southeast corner of that mine particularly the overburden haul roads and waste emplacement area.

Dr Holmes analyses changes in air quality that are predicted by the model for residences 1 (Andrews) and 2 (Hall) for two different assumptions concerning mine development, one assuming all three mines proceed and the other assuming that Glendell and Camberwell proceed:

RESIDENCE 1 At residence 1 (Andrews), when all three mines are taken into account, the predicted dust deposition is 7 g/sq.m/mth compared with 6 g/sq.m/mth when only Camberwell and Glendell are operating, that is 1 g/sq.m/mth addition from Glennies Creek.

RESIDENCE 2 At residence 2 (Hall) dust deposition is decreased by 0.5 g/sq.m/mth with the exclusion of Glennies Creek from the dust deposition assessment (from 4.5 g/sq.m/mth with the three mines operating to 4 g/sq.m/mth with only Camberwell and Glendell operating).

Dr Holmes concludes that emissions from the Glennies Creek mine are a relatively minor consideration when compared with emissions from the other two mines even for residences close to the Glennies Creek mine.

The SPCC was also asked whether, in assessing cumulative impact:

"Are any dwellings which may be inhabited likely to be subject to dust depositions/concentrations in excess of National/State Health Standards? If so, what measures should be applied to reduce impacts to acceptable health risk levels?"

In response to this question, the SPCC noted that residences 1 (Andrews), 28 (owned by Camberwell) and 30 (owned by Camberwell) would be likely to be subject to dust concentration in excess of its health criteria which is adopted from the NH&MRC (National Health and Medical Research Council). The SPCC does not refer to Maitland Main owned dwellings. Its response did not separate out dust emission rates and dust concentration. The SPCC believes that modification could be carried out on residences so that dust exposure levels could be reduced while people are inside the residences. This would also reduce the 24 hour and yearly exposure level but in most cases would be intolerable to the inhabitants because of their loss of amenity.

Nevertheless from later submissions the Applicant and the SPCC are generally in agreement in regard to an area of affectation for the Glennies Creek Mine alone and the area of affectation for the Glendell, Camberwell and Glennies Creek mines. Having regard to the SPCC submissions, it would appear that residences in addition to those above are also likely to experience dust concentrations approaching the SPCC ambient health criteria once background concentrations are added. Both the SPCC and the Applicant submitted that the effect of the dust from the proposed Glennies Creek Mine would be small in comparison with the Camberwell and Glendell open cut mines.

The Department of Planning (DOP) responded to the supplementary report from Dr Holmes. The DOP stated that *"the dust generation activities at Glendell would need to be further checked as an update of prediction,"* and compared to other mines in the area. The DOP noted the advice from Glendell Coal Limited (Mr Shea) stating, in relation to Dr Holmes' analysis, that:

"... the predictions of dust depositions and concentration of total suspended particulates in the ambient air are likely to have been overstated as far as the Glendell contribution is concerned."

Mr Shea went on to say that the Glendell mine would use modern mining equipment and techniques and air quality safeguards set by the SPCC similar to comparable mines such as Camberwell, Howick, Rixs Creek, Bulga and Narama.

However, Dr Holmes points out that Glendell dust emission rates would be greater than those experienced at Camberwell and Rixs Creek as a result of:

- . the large amounts of overburden required to be removed at the Glendell mine;
- . the long haul distances at the Glendell mine compared to Camberwell and Rixs Creek;
- . the smaller haul trucks proposed to be used at Glendell (information from the Glendell EIS) compared to the Camberwell mine. However, this may change.

In relation to the supplementary contours (within Appendix 16) produced by Dr Holmes in respect of cumulative impact of dust deposition and dust concentrations for Camberwell and Glendell and for Camberwell, Glendell and Glennies Creek together, it is important to note Dr Holmes' assumptions and his "worst case" scenario. This could vary on, for example, start up time for Glendell, extension of Stage I at Glennies Creek and variation to timing of mine development at Camberwell. Further, the impacts from Glendell and Camberwell will change through the life of the mines as mining operations (open cut and emplacement sites) move across the terrain.

Dr Holmes' contours show that numbers of dwellings in the vicinity of the three mines will be affected by dust depositions/concentrations exceeding SPCC amenity and health guidelines without Glennies Creek mine. Many dwellings, including Camberwell village, appear to exceed SPCC amenity and health criteria based on Dr Holmes' contours and underlying assumptions and would appear to contravene licence conditions usually attached by the SPCC to its licence under the Clean Air Act for coal mines. In relation to Camberwell and Glendell, these are matters which need to be controlled under SPCC licences and conditions of consent for those mines.

On the basis of Dr Holmes and SPCC submissions, I therefore find that in the worst case scenario addressed by Dr Holmes, the following impacts are likely:

- . There are no residences impacted by Glennies Creek alone above +2 g/sq.m/mth dust deposition rate (annual average).
- . There are no residences impacted by Glennies Creek alone above +50 ug/cu.m increase in dust concentration (annual average).

- . Residences 1, 2, 3, 28, 30 are impacted by Glennies Creek and Camberwell above 2 g/sq.m/mth increase in dust deposition rate (annual average) (residence 10 is in a borderline situation).
- . Residences 1, 3, 28, 30, 31 are impacted by Glennies Creek and Camberwell above +50 ug/cu.m increase in dust concentration (annual average) (residence 2 borderline).
- . The analyses of meteorological conditions for the locality are acceptable.
- . Background dust deposition rates in the locality, generally in the range of 0.8 to 1.8 g/sq.m/mth are reasonable.
- . Background dust concentrations of 30 ug/cu.m are reasonable.
- . Mine dust emission rates for this underground mine are estimated in Year 3 at 0.24 kg/t of dust for production of 2.55Mt ROM coal. Total dust emissions, in the "worst case scenario", that is towards the end of Stage I are estimated at 604.2 tpa. This will almost halve to 340.2 tpa in Stage II. These total dust emissions need to be compared with Dr Holmes' estimates of Camberwell 2647.3 tpa and Glendell 9644.9 tpa. (The Glendell emission rates may depend on conditions of SPCC licences). Glennies Creek's contribution and total emissions are small compared with Glendell and Camberwell.
- . Dr Holmes' air quality analyses and modelling predictions are supported by the SPCC.
- . Dr Holmes has produced a series of contours which indicate areas of affectation related to dust concentrations and emission rates for Glennies Creek alone and with the Glendell and Camberwell mines. These are also accepted by the SPCC.
- . Dr Holmes' contours provide a reasonable basis to determine dwellings which may be affected by dust impacts. However, the contour lines involve a degree of sensitivity, so that monitoring of "borderline dwellings" would be appropriate.
- . Residents at property No.1 (Andrews) are likely to experience cumulative air quality impacts in excess of both SPCC health and amenity criteria from Camberwell and Glennies Creek. Mitigation measures would required in respect of the continued occupancy of the dwelling by the Andrews family.
- . Residents at property No.2 (Hall) may experience cumulative impacts above health criteria from Camberwell and Glennies Creek mines, but it is the Camberwell mine which is primarily responsible for the extent of impact. Residents at this property may also experience cumulative impacts above SPCC amenity criteria from Glennies Creek and Camberwell, but Camberwell would be primarily responsible for the extent of the impact.
- . There are three Maitland Main owned residences that are likely to be impacted above the health and amenity criteria.
- . Other affected residences have been acquired by the mining companies.

The Glendell open cut project received development consent in 1983 under the less stringent air quality criteria adopted by the SPCC at that time and that the Glendell mine is subject to conditions requiring acquisition/compensation in respect of adverse impacts.

With the additional cumulative impact of Glendell, if and when it commences, many residences in the area are likely to be above both SPCC health and amenity criteria unless dust emissions are reduced from those estimated in its EIS under a SPCC licence for Glendell, or properties are acquired under the terms of the Glendell consent.

It is noted that a condition of consent of the Glendell project requires the Applicant to obtain all statutory approvals required under the Clean Air Act (inter alia) prior to commencement of construction of the proposed development, from the SPCC. No license have been issued by the SPCC. It is open to the SPCC to issue licenses with conditions designed to mitigate air quality impacts from the Glendell mine having regard to current health and amenity criteria, Dr Holmes' analysis (with which the SPCC agrees), and the cumulative impacts in the vicinity of Camberwell, Glennies Creek and Glendell. I also note that revised or additional conditions related to mitigating dust emissions may be imposed under SPCC licenses at any time during the life of a mining project and one expects that, for example, exceedence of health criteria would not be acceptable to the SPCC at any dwellings in the vicinity of these mines.

Residence No.1 (Andrews) with Camberwell and Glennies Creek mines both operating, (including the construction phase of Glennies Creek) the air quality impacts would be severe on the occupants. The Andrews should be relocated as per the condition recommended. In view of the agreement regarding acquisition by Camberwell, no acquisition of this property by Maitland Main is recommended.

Residence No.2 (Hall) known as "Dulwich". The likely impact on dust for the occupants of this residence is a marginal or borderline situation should impacts at Stage I or Stage II of Glennies Creek cause SPCC goals to be exceeded. Mitigation measures to SPCC requirements should be undertaken by the Applicant and needs to be mitigated during the time that the Halls remain in residence prior to the Camberwell mine commencing the mine workings south of the rail loop. The dwelling should be monitored in terms of health and amenity criteria and remedial measures undertaken as required by the SPCC at the cost of Maitland Main to ensure that SPCC health and amenity criteria are not exceeded for the occupants of the dwelling. Remedial measures may involve modification of the mining equipment and operations or measures at the residence.

In respect of the heritage significance of "Dulwich", conditions are recommended to ensure its protection from vibration impacts from the Glennies Creek mine and in the event of unexpected impact occurring to the dwelling from vibration, remedial work should be undertaken at the cost of Maitland Main. No acquisition clause is recommended in view of the agreement between Camberwell and the Halls. No measures are recommended in respect of dust for the dwelling itself. Evidence is that the contribution of

dust from Glennies Creek mine alone would not be significant in regard to the building itself.

Monitoring in respect of other residences in the vicinity should be undertaken and if SPCC criteria are exceeded, remedial measures should be undertaken at the cost of the Applicant to SPCC requirements. It is unlikely other residences will be affected by Glennies Creek alone. It will be Camberwell and Glendell which are the dominant influences.

Noise

Submissions to the Inquiry raised concerns about the extent of noise impacts on residents in the vicinity of the proposed mine. The principal sources of noise are the surface facilities at the rail loop, train movements and truck movements (trucks and equipment) within the proposed coal lease area for the transport of coal to the rail loop area and for the movements of reject material to the emplacement area within the site. Increased traffic flows to and from the mine on Bridgman and Middle Falbrook Roads are also sources of noise.

The SPCC has set noise goals for this mine from its noise control manual in respect of rural areas in the north and for an area already affected by mining in respect of areas to the south of the mine. Although the Applicant disputed the rural classification, I find that, based on an inspection of the area, and notwithstanding the recent Camberwell mine and other mining activity north of Singleton, the Glennies Creek area retains its rural character. Therefore the SPCC goals for rural areas are appropriate to assist in the noise impact assessment of this project for the purposes of considering the development application for the mine under the EPA Act. The area's rural character will change in the future when Camberwell mine moves to the south and if and when Glendell commences mining. At the time of the Inquiry the future timing of activities at both mines is uncertain.

In its submission the SPCC set the following noise goals to the north of the mine site:

- L(A90)T of 35dB(A) nighttime;
- L(A90)T of 45dB(A) daytime;
- L(A10) not more than 5dB(A) greater than L(A90)T (background).

The SPCC submitted, that, in its view residences to the south, because of the more predominant mining nature of the area, were judged on a 40dB(A) nighttime/daytime goal "*...because of the proximity of the Camberwell mine*". However, it is noted at present that the Camberwell working area is some kilometres from residences in the south of Glennies Creek. SPCC noise goals are related to "neutral atmospheric conditions" and noise modelling, as presented in the EIS, is also related to neutral conditions. Higher noise levels could result (infrequently) in certain meteorological conditions.

The EIS states that, in order to limit the potential offensiveness of noise from a specific source, any increase in the background noise levels should generally not exceed 5dB(A). This increase is determined as the difference between the L10 value at the receptor with the intrusive noise occurring and the L90 value determined in its absence.

The SPCC agrees with the Applicant's design criterion for L(A10)T presented in the EIS, that is, that L(A10)T should not exceed the background L(A90)T by more than 5dB(A).

In the EIS the average minimum background noise levels to be used for noise impact assessment purposes, based on lowest measured levels, are 30dB(A) at all receptors during nighttime operations and 35dB(A) at all receptors during daytime operations. The SPCC agrees with the average minimum background noise levels and design goals for the mine as presented by Dr Holmes in the EIS.

Predicted Noise Impacts

Noise level contributions during full capacity operation of the proposed mine are shown by contours on Figure 6.6 of the EIS (Appendix 20) and in more detail in supplementary submissions by Dr Holmes. Calculated noise levels for individual receivers are shown in Table G.7 of the EIS (Appendix 21). Dr Holmes has considered a worst case scenario in his noise modelling, that is a period when there will be some possible overlap of coal supply to the washery from the Hebden Seam Entry Drift Conveyor, and by truck from the Barrett Seam Entry, while the changeover from Stage I to Stage II is taking place. Under this scenario truck haulage would be taking place whilst the washery and rail loop facilities are at maximum production. Dr Holmes' analysis is based on 3 main sources of noise - the surface plant facilities, the rail loop, and truck movements within the site for 'daylight shifts'. Truck movements in relation to the transport of coal cease at the end of Stage I. Dr Holmes also states that the noise level contours shown in the EIS are model derived contours and are indicative levels only.

Dr Holmes concludes that:

- . Noise levels at Camberwell Village clearly comply with the noise level design goals for both daytime and nighttime periods of operation.
- . Noise levels from truck haulage of coal along the private haul road do not exceed a daytime design level of 45dB(A) except at receivers 1 (Andrews), 2 (Hall), 3 (unoccupied), 28 (Camberwell), 29 (Camberwell) and 30 (Camberwell).
- . Noise levels from all stationary sources, that is plant facilities, do not exceed nighttime goals except at receiver locations 1 (Andrews), 2 (Hall), 3 (unoccupied), 28 (Camberwell), 29 (Camberwell) and 30 (Camberwell).
- . Design goals for rail traffic noise are achieved at all receiver locations.

However, I note that Dr Holmes' second and third conclusions above have excluded impacted residences when regard is had to the SPCC stated design criterion that the L(A10)T from the mine should not exceed background by more than 5dB(A). See Table G.7 (Appendix 21).

Area of Noise Affection

In determining a contour to delineate an area of noise affection for the Glennies Creek mine alone the SPCC made reference to the L(A10)T, 35dB(A) and 40dB(A) contours.

The SPCC considered the residences likely to experience noise above its noise goals are as follows:

- | | |
|-------|------------|
| No.1 | Andrews |
| No.2 | Hall |
| No.3 | unoccupied |
| No.7 | Richards |
| No.10 | Klasen |

No.19 Gardner
No.25 Evans
No.28 Camberwell
No.29 Camberwell
No.30 Camberwell.

The SPCC also identified residences which could experience noise levels "consistent" with their goals. These are:

No.11 Donohue
No.12 Kemp
No.13 Shadlow
No.15 Noble
No.16 Noble
No.17 Noble
No.22 Payne.

"Consistent" here may place these dwellings in "borderline situations".

The SPCC excluded residences 8, 9 and 54 due to their proximity to the main northern railway line.

The SPCC considered that noise impacts at Singleton Heights, Bridgman Road and Camberwell Village would be below its noise goals.

Cumulative Impacts

Glennies Creek and Camberwell

Dr Holmes considered the cumulative effects of the Camberwell and Glennies Creek mines. Figure 6.7 from the EIS shows an overlay of the 40dB(A) noise contours for both Glennies Creek and Camberwell Projects (Appendix 22).

Dr Holmes concluded:

- . Background noise levels will be increased at the residences to the north and northwest of the Project area because of the combined noise emissions from the two mines by about 3dB(A); and
- . This increase in noise will be perceived as a distant background component probably only discernable above existing noises from the railway and New England Highway on very still nights, and is commensurate with the character of the area changing from rural to industrial-mining; and
- . The increase will not cause the SPCC's noise level criteria to be exceeded. It is noted the 3dB(A) increase does not appear to alter the contours for Glennies Creek alone.

I again note that Dr Holmes' conclusions are not based on the criterion stated as appropriate by the SPCC.

Furthermore, Figure 6.9 (Appendix 23) in the EIS indicates the combined noise impact of the Glennies Creek and Camberwell mines. Figure 6.9 when compared

with Figure 6.6 indicates that residences to the north through west are little impacted by noise from the Camberwell project, but that to the south residences 1, 2, 3, 4, 5, 6, 28, 29, 30 and 31 would be affected by both the Glennies Creek mine and the Camberwell mine.

Glennies Creek, Camberwell and Glendell

The SPCC states that residences impacted by the proposed Glendell mine include:

No.52		No.12 Kemp
No.53		No.13 Shadlow
No.54		No.14 Donnellan
No.8	Klasen	No.15 Noble
No.9	Circular Quay Holdings	No.16 Noble
No.11	Donehue	

Dr Holmes' assessment of the impact of the Glendell mine indicates that residences to the south of the Glennies Creek mine would not be impacted by noise from the Glendell mine.

Residences to the north (from about residence 16) through to the west would, however, be subject to the cumulative impact of the Glendell and Glennies Creek mines. Residences 8, 9, 10, 11, 12, 13, 14, 52, 53 and 54 would be impacted above an L(A10)T of 40dB(A) by cumulative mine generated noise and residences 15 and 16 between an L(A10)T of 35dB(A) and 40dB(A) by cumulative mine generated noise. Moreover, residences 8, 9, 10, 11, 12, 13, 14, 52, 53 and 54 would likely be impacted at or above and L(A10)T of 40dB(A) by the Glendell mine alone (Glendell EIS).

Summary

In considering Dr Holmes' and SPCC submissions in relation to noise certain qualifications are important, namely:

- the contours provided by Dr Holmes are derived from modelling and are indicative only; the contour lines involve degrees of sensitivity, they are not precise survey lines; additional detail is however provided in Table G.7;
- truck movements on site are confined to daylight shifts as per Dr Holmes analysis; scraper and bulldozer movements in relation to nighttime operations are not addressed;
- noise from traffic movements (staff and service vehicles) to and from the mine are unlikely to be significant.

On the basis of Dr Holmes' and SPCC submissions and Figures 6.6, 6.9 and Table G.7 of the EIS, I find, therefore, that the noise impacts are likely to be as follows:

1. Glennies Creek Alone

Daytime: Residence in excess of L(A10) 40dB(A)

Maitland Main Dwellings	No.15 Noble
No.1 Andrews	No.22 Payne

No.2 Hall
 No.3 Unoccupied/derelict
 No.7 Richards
 No.10 Klasen

No.25 Evans
 No.28 Camberwell Mine
 No.29 Camberwell Mine
 No.30 Camberwell Mine

Daytime: Residence between L(A10) 35dB(A) and 40dB(A)

No.4* Thurlow
 No.5* Camberwell Mine
 No.6* Camberwell Mine
 No.8** Klasen
 No.9** Circular Quay Holdings
 No.11 Donehue
 No.12 Kemp

No.13 Shadlow
 No.16 Noble
 No.17 Noble
 No.19 Gardner
 No.31 Camberwell Mine
 No.54**

* It could be inferred these residences would experience noise levels above L(A10) 35dB(A) but below 40dB(A).

** Close to rail line and unlikely to be impacted because of higher background noise.

Nighttime: Residences in excess of L(A10) 40dB(A)

Maitland Main owned dwellings

No.1 Andrews
 No.2 Hall
 No.3 Unoccupied/derelict
 No.28 Camberwell Mine
 No.29 Camberwell Mine
 No.30 Camberwell Mine

Nighttime: Residence between L(A10) 35dB(A) and 40dB(A)

No.6 Camberwell
 No.7 Richards
 No.8 Klasen
 No.9 Circular Quay Holdings
 No.10 Klasen
 No.15 Noble

2. Camberwell and Glennies Creek

The impact of the Camberwell mine adds only marginally to the noise levels at residences to the north of the Glennies Creek mine.

Residence Nos. 1, 2, 3, 4, 5, 6, 28, 29, 30 and 31 to the south of the Glennies Creek mine would be impacted above SPCC goals due to the Glennies Creek and Camberwell mines either individually and/or cumulatively. Moreover, the impact at all residences would be greater due to the cumulative impact of the two mines.

3. Glennies Creek and Glendell

Residences impacted by the Glennies Creek mine alone to the north, commencing at residence 16, through to the west of the Glennies Creek mine would also be impacted by the Glendell mine by reference to the Glendell EIS.

The impact at these residences would be greater due to the cumulative impacts of the two mines. These residences are not impacted to any significant extent by the Camberwell mine.

These residences are also within the "defined area" for dust impact from the Glendell mine.

Acquisition as a Means of Mitigation

In regard to noise affected dwellings the SPCC submitted that;

"... residences if not already owned by mining interests, within the contour (LA10 40 dB(A)) should be catered for, in any Development Consent, with an acquisition condition. We have also added to Figure 1 (Appendix 24) the LA1035 dB(A) contour for Glennies Creek [disputed by Dr Holmes] mine and suggest that residences 11 to 17, on this line, are catered for in any Development Consent with a condition that requires, if adverse impact is monitored, the use of noise reduction techniques on these residences. Residences 8, 9, 54, because of proximity to the rail line, have not been included in this recommendation."

I am not satisfied there is a need for acquisition of properties affected by noise in the circumstances of this proposed mine, this matter is referred to later. Mitigation measures are appropriate.

Blasting at "Dulwich"

Residence 2 (Hall) is a property of local heritage importance.

The Department of Planning sought the inclusion of two conditions of consent relating to "Dulwich". Firstly the DOP asks the Applicant to monitor all blasts at "Dulwich" as required by the SPCC. Secondly, the DOP requires the Applicant to design all surface construction blasts to limit the peak particle velocity at the "Dulwich" residence to a maximum of 2 millimetres per second, or if the property is acquired by the Applicant, all blasts will be designed so as not to cause any structural damage to the "Dulwich" residence, in accordance with the requirements of the SPCC.

The Applicant does not agree with these proposed conditions of consent. Regarding the first condition of consent, the Applicant considers it sufficient to meet the airblast overpressure and vibration design goals set by the SPCC in place of monitoring blasts at "Dulwich". The Applicant does not propose to acquire "Dulwich" and points to the agreement for acquisition by Camberwell. Instead of the second proposed condition of consent set out by the DOP, the Applicant suggests a condition of consent requiring the Applicant to sound sirens before and after blasting at set intervals. I am satisfied that "Dulwich" has local heritage significance and should be protected from vibration impacts. Condition 3 recommended to control vibration and remedy any unanticipated damage.

Road Traffic

There will be increased traffic flows on Bridgman and Middle Falbrook Roads during the construction and operation of the mine. The SPCC states that the EIS has not assessed the impact of traffic noise on residences and therefore the SPCC cannot compare their noise goals to the proposed increase in traffic noise. The SPCC "...suggests that these levels be provided prior to development consent being issued." From my inspection of the area, consideration of the number of movements, together with upgrading of roads, I do not consider the noise associated with staff and service vehicles is likely to be significant. However, I note the construction phase could give rise to adverse impacts on the Hall and Andrews residence. I support the temporary closure of Middle Falbrook Road at the rail crossing and suggest its closure should be extended indefinitely, if feasible, on safety grounds.

Rail Noise

The SPCC's criteria for rail traffic, Leq (24 hours) and L(A MAX), will not be exceeded at any residences according to the EIS from Glennies Creek alone.

I now turn to consider the impacts of noise and dust in relation to an area of affectation where monitoring and mitigation measures in relation to both dust and noise are likely to be required.

Hours of Operation - Rejects Disposal

The EIS is vague on the hours of operation of haulage trucks of coal and/or rejects on the private haul road. It is also vague on the times for operation of scrapers in relation to transport of rejects to the emplacement area and reject compaction, and in relation to bulldozer operation on the emplacement area.

Reference is made to daylight shifts. The feasibility of joint use of trucks and scrapers for transport of rejects was left open in the EIS.

The EIS states:

"... a number of options exist for reject transport and the road haulage option adopted may be modified in Stage II when the handling characteristics of the reject material has been established." (Vol.1, p.31)

However, in the noise assessment of the mine project, Dr Holmes assesses the maximum noise level with all equipment, including trucks and scrapers, but has not assessed maximum noise which would occur due to operation of all stationary equipment, with scrapers and/or trucks, bulldozers at night, in Stage II. Additional dwellings could be impacted under these nighttime conditions.

Dr Holmes' worst-case situation is the overlap of Stages I and II during daylight shifts. These are not defined. Dr Holmes addresses the night-time noise impact for stationary sources only. He does not consider a scraper operating alone, or scraper and trucks operating together, or bulldozer operating with scraper/trucks at night.

I am satisfied that, in respect of daytime noise impact, noise levels would be in the range assessed by Dr Holmes. However, in the absence of an adequate nighttime

noise assessment, scraper transport, truck movement and bulldozer operations should be restricted to the hours 7.00am to 10.00pm each day.

Affected Dwellings

In considering both the cumulative impact of the three mines and the impact of the proposed Glennies Creek mine alone in regard to both noise and dust impacts on residences or dwellings in the vicinity of Glennies Creek, I have had regard to the uncertainties in relation to the Glendell mine:

- . its uncertain date of commencement;
- . its earlier environmental assessment on the basis of SPCC noise and dust guidelines applying at that time;
- . the absence of an SPCC licence setting conditions for noise levels and dust emissions for the project.

The SPCC may impose conditions to require noise and dust controls at or below current goals and guidelines. There is also the acquisition of properties by the Glendell project under its existing terms of consent which is likely to include dwellings considered in the cumulative impact of the Glennies Creek project.

Properties to the north through to the west of the Glennies Creek Rail Loop

Noise

- . Glennies Creek mine alone is likely to cause nighttime noise impacts above 35dB(A) in respect of dwellings 7, 8, 9, 10 and 15, and perhaps 16. It may cause daytime noise impacts above 40dB(A) in respect of dwellings 7, 8, 9, 10, 15, 16, 22 and 25.
- . In considering the contribution to the cumulative impact of the Glennies Creek mine, Glendell is likely (subject to the above qualifications) to have more impact on these dwellings and Camberwell is likely to have minimal noise impact in this area. Of these dwellings it would appear that dwellings 8, 9 and 10 would be significantly impacted by Glendell and that dwellings 7 and 15 would experience levels in the order of 35dB(A) from Glendell (Glendell EIS). (Other dwellings in this area which are not affected by Glennies Creek are likely to be significantly impacted by Glendell).
- . The proposed nighttime noise goal for this northwest area should be 35dB(A) in accordance with the SPCC submissions and not 40dB(A). I find that 35dB(A) is more appropriate given the existing character of the area and the distance from the Camberwell mine. The appropriate daytime goal is 45dB(A). The appropriate L(A10)T nighttime design criteria for the mine in this area is 35dB(A) and for daytime 40dB(A) as stated in the EIS.
- . The relevant dwellings for consideration, I find, are 7, 8, 9, 10, 15, 16, 22 and 25. I note that 8 and 9 are close to the railway line and because of that are not included by the SPCC.
- . With Glendell and Glennies Creek mining at the same time 7 and 15 are also likely to be affected above 40dB(A) and dwelling No.16 may be affected above 35dB(A) due to the combined operation of the two mines at nighttime.

Noise and Dust

- . When one compares the 35dB(A) nighttime noise contour from the proposed Glennies Creek mine alone with the contours for dust from the Glennies Creek mine, none of the dwellings to the northwest are likely to be affected by dust emission rates or dust concentration in excess of the SPCC goals.
- . When one makes a comparison of the 35dB(A) nighttime noise contour for Glennies Creek mine with the dust contours for Camberwell and Glennies Creek together, none are likely to be affected in relation to SPCC dust goals.
- . However, with Glendell, the above dwellings are likely to be affected in excess of SPCC current dust goals (subject to qualifications mentioned above) as they lie within the "defined area" for dust deposition rate for the Glendell mine. As noted above, these properties are also likely to be significantly impacted by noise from the Glendell mine.
- . Therefore in respect of properties to the north and west of the rail loop area of Glennies Creek, I find that a condition requiring acquisition of these properties is not required in the circumstances of this mine.
- . Dwellings affected by the Glennies Creek mine alone to the north and west of the proposed rail loop, that is, dwellings 7, 10, 15, 16, 22 and 25 should be monitored in respect of daytime and/or nighttime noise impact and mitigation measures undertaken to SPCC requirements to ensure these dwellings are within the 35dB(A) nighttime and 40dB(A) daytime SPCC L(A10)T goal. Dwellings 8 and 9 are not included due to their proximity to the main northern railway line. These measures should be undertaken at the request of the owners, who should have access to monitoring information. The SPCC requirements could be relaxed in the event of the existing residents vacating the dwellings, for example, upon acquisition by the Glendell mine.

Properties to the South of the Rail Loop

Noise

For the properties to the south of the rail loop, I accept that an appropriate night-time noise goal is 40dB(A) by reason of the presence of the Camberwell Mine and the rail line in this area. The appropriate L(A10)T nighttime design criteria for the mine in this area is 35dB(A) as stated in the EIS.

- . Glendell would appear to have minimal nighttime noise impact on dwellings in this area.
- . Camberwell alone is likely to impact in excess of 40dB(A) in respect of properties 1, 2, 3, 4, 28, 30 and 31. Of these, only dwellings 1, 2 and perhaps 4 are of significance, the others being owned by Camberwell.
- . With the commencement of the Glennies Creek mine exceedences above 40dB(A) would increase for dwellings 1, 2, 3, 4, 28, 29, 30, and 31, that is the same dwellings as affected by Camberwell. Dwellings 5 and 6 would also exceed 40dB(A).

. In this regard all the above properties except perhaps 4 are either owned by Camberwell Mine or agreements for acquisition at future dates are in place. No.3 is unoccupied and derelict. Monitoring and mitigation measures would be required from Glennies Creek while existing occupants remain in residence, that is in respect of dwellings 1, 2 and perhaps 4.

Noise and Dust

. Dust emissions from Glendell and Camberwell together are likely to impact on the dwellings at the south of the rail loop. SPCC dust amenity criteria are likely to be exceeded in respect of 1, 2, 3, 4, 28, 29, 30 and 31, together with 5 and 6. In respect of dust concentrations there is likely to be exceedence in respect of 1, 2, 3, 28, 29, 30 and 31.

. With the commencement of Glennies Creek Mine, SPCC dust amenity goals would be further exceeded at 1, 2, 3, 28, 29, 30 and 31. However, there would only be a small increment to both the dust deposition and concentration contours from Glennies Creek, that is, with the three mines operating. The increased impact on residences 4, 5 and 6 from dust from Glennies Creek mine would be insignificant.

. When one compares the 40dB(A) contour and the dust contour, the dwellings impacted beyond noise or dust goals in the area to the south are 1, 2, 3, 4, 5, 6, 28, 29, 30 and 31.

. Therefore, I find that in respect of the properties to the south of the rail loop which remain in non-mining company ownership, that monitoring and mitigation measures in respect of noise and dust are required where SPCC goals may be exceeded.

. These would involve monitoring and mitigation measures in respect of noise and dust during the continued occupation of the Hall family (No. 2), Andrews (No.1), and for Thurlow (No.4) in respect of noise.

SUBSIDENCE

Submissions to the Inquiry raised concerns about the impact of subsidence from underground mining, and in particular, the impact on Glennies Creek, and on ground water in the vicinity of the underground workings.

The proposed underground mine involves first and second workings. It is the second workings which involve longwall mining, which will cause subsidence of the surface terrain. The mine seam entries and proposed mining are described in the 'Background' Section of this Report. The underground mine layouts are shown in Appendices 6, 7 and 8.

The EIS assesses the degree of subsidence across the rural terrain from mining. Dr Holla of the Department of Mineral Resources made an independent assessment of subsidence for the Commission of Inquiry.

Expert evidence is that a high degree of control can be exercised over the extent of likely subsidence by controlled underground workings, and that, generally within a margin of about 10% accuracy, subsidence impacts can be reasonably predicted in advance. Greater subsidence can occur at times due to geological structures but the effect would be localised. The Department of Mineral Resources plays a major role in predicting subsidence and imposing controls on extraction to protect surface features and improvements. The Applicant must also consult with and obtain approval from the Department of Mineral Resources in respect of workings. The Department assesses subsidence predictions and may impose controls on mining and retention of pillars.

The EIS concludes that the physical expression of surface subsidence is likely to be the generation of broad swales over extracted panels, which given the general undulating nature of the area will be almost undetectable. It notes that:

"Some damage may occur to buildings and surface improvements within the zone affected by subsidence. In addition, there will be changes to landform which could temporarily influence the agricultural productivity of the land."

Certain adverse impacts of subsidence are compensatable under the provisions of the Mine Subsidence Act. The Act compensates for damages to surface improvements resulting from mining. The Act does not include damage to rural land, which may cause loss of rural production, loss of water or erosion.

The Applicant is to undertake, prior to mining, a detailed property examination to form a proper basis for compensation claims under the Mine Compensation Act. A condition of consent is recommended in respect of damages falling outside the Act.

Extent of Subsidence

The EIS identifies three areas which will experience surface subsidence.

1. West District (Area 1)

The EIS states that this is the largest single area extracted and gives relatively small overall subsidence - 0.36m maximum. The westernmost workings underlay Bettys Creek and will progressively lower it. The strains are low and the workings are at

significant depth so that creek flow, according to the EIS, should not be significantly affected. The local road crossing the area will also be progressively lowered but the EIS states that these effects should be minor. Dr Holla considers maximum subsidence to be around 1 metre in this area. According to the EIS, there are no rural dwellings in this area.

2. North East District (Area 2)

The maximum subsidence in this area is predicted at 0.8m. The EIS states subsidence in this area should have no significant effect on Main Creek. Strains are low and should not affect the creek flow. Glennies Creek Road will be progressively lowered across the area and a property "Sydenham" in the southern corner will be lowered insignificantly. The EIS claims that effects will be in Category 1 (very slight or negligible damage), and Category 2 (slight damage), "Classification of Subsidence Damage" of the National Coal Board (NCB - now British Coal). The EIS states that few features exist which will exhibit these effects. Dr Holla considers maximum subsidence to be around 1 metre in this area.

3. East District (Area 3)

This area contains the shallowest workings and thickest seam. The EIS states that these workings will generate more significant effects than elsewhere in the Glennies Creek project. It is stated in the EIS that subsidence will reach 2m in the trough above the two main extraction panels and that some significant tilts will also occur. Dr Holla considers maximum subsidence of 2.5m more likely in this area.

In Dr Holla's assessment of the EIS he states that:

"The actual subsidence is likely to be more than the subsidence predicted in the EIS for the following reasons:

1. *Pillars are likely to yield, where depth of mining is 400m or more.*
2. *The stratigraphic section indicates that the overburden consists of shales and mudstones. Massive conglomerates or sandstones usually found in the Newcastle Coalfield do not exist in the subject area.*
3. *The empirical curves developed for the Newcastle Coalfield may not be strictly applicable to this case for geological reasons and especially where the cover is deeper than 200m."*

Dr Holla stated with respect to strains that:

"The strains are likely to be around 2-4 mm/m in the first two areas and as high as 25 mm/m in area 3 (especially if the seam is 4.5m thick, where mining depth is 60m)."

Effect on Structures and Surface Lands

Appendix 25 shows subsidence districts from the mine in relation to the locality.

The West District (Area 1)

In the west district the EIS states that there are no structures. Effects on surface land are likely to be slight.

The Northeast District (Area 2)

Glennies Creek road will be lowered progressively across the area and the property "Sydenham" in the southern corner will be lowered insignificantly. No details of this structure were given as the owner did not appear at the Inquiry.

Dr Holla submitted that depending upon the type and size of construction, damage from strains should be "slight" in respect of any dwelling. Damage would fall within the provisions of the Mine Subsidence Act.

The East District (Area 3)

This district will generate more significant effects than elsewhere in the Glennies Creek Project.

The EIS states that some significant tilts will occur and that these tilts will affect a number of properties:

1. Near the western boundary of the district -
 - Oak Park owned by Maitland Main Collieries
 - Glenelge owned by WA & AM Gardner
 - The property owned by JH Moore.
2. Near the centre of the district -
 - Baime Den owned by Maitland Main Collieries.
3. Near the northern boundary of the district -
 - The property owned by JH Moore
 - The property owned by BW & RA Cherry
 - Glennies Creek Community Hall
 - The property owned by RE Payne
 - The property owned by BH & BL Evans.

The structures located close to the western boundary are above the deeper workings planned in this district which, according to the EIS, will give lower strains than average in this location.

The EIS states that the structures located close to the northern boundary may also be subject to lower strains but this depends on their exact location in relationship to the workings and the subsidence trough generated by the mine.

In general, the EIS states, that effects expected from the full extraction fall in the range of the NCBs Category 2 (slight) to Category 5 (very severe).

The effects on each individual structure will depend not only on the strains expected but on the dimensions of the building and method of construction. The effects may be reduced by leaving specific pillars in the mine to protect particular properties. Each property would first need to be reviewed in detail by the Applicant in consultation with the Department of Mineral Resources.

In this district, Dr Holla states that damages would vary depending upon the strain and would be "very severe" to some structures. Dr Holla could not make a comprehensive assessment due to the absence of structural details. He adds:

"However, giving protection to isolated properties by leaving pillars should not be difficult in non-longwall mining cases."

Dr Holla outlined the process adopted by the Chief Inspector of Mines for secondary workings which provides opportunity for protective measures to be imposed. However, the Mine Subsidence Act contemplates damage may occur and provides a means of compensating damage to structures. It must be assumed therefore that some damage will occur where modification to the mining plan is not considered feasible by the Department of Mineral Resources.

Surface Features

The EIS states that the following surface features will be protected from subsidence effects:

- . The Main Northern Railway
- . Glennies Creek.

The EIS points out that local roads within the coal lease which will be affected at various periods may need intermittent remedial work. Council sought a condition that the Applicant make good any damage to roads from subsidence.

Surface Lands

Surface terrain and pastures will all be affected by subsidence to varying degrees within the three areas. Impact on agricultural activities is likely to be slight, generally, but in particular locations unacceptable adverse impacts may occur. The Applicant should mitigate such impacts in accordance with procedures outlined by Dr Holla in his submission, however, where such measures are not effective the Applicant should undertake remedial work at the Applicant's cost and/or compensate owners for loss of production, or loss of water, or for remedial work on the affected lands.

Subsidence Effects on Groundwater and Glennies Creek

These are considered in the following section under "Water Management Issues".

Findings

On the basis of Dr Holla's evidence I find that:

- . subsidence impacts may be greater than predicted by the EIS, however feasible measures exist, under current practices of the Department of Mineral

Resources, to predict likely subsidence generally with a reasonable degree of accuracy and to impose measures on mining activity to mitigate certain subsidence impacts. However, it is clear that longwall mining impacts in some locations in the coal lease area may be severe, causing damage to either structures or surface lands.

- . notwithstanding the absence of information on structures, I accept Dr Holla's evidence that, in respect of this mine, damage to structures is manageable in certain cases and may be considerable for others. He notes there are no surface improvements in Area 1, and there is only one property in Area 2. In Area 3, he submitted, that giving protection to structures by leaving coal pillars should not be difficult in non longwall mining situations. However, at some locations impact could be severe.
- . subsidence impacts in relation to agricultural uses of lands, in non mining company ownership, may be impacted beyond the measures compensatable under the Mine Subsidence Act in relation to surface lands such as creeks, banks and pastures, bores, groundwater and natural features.
- . Dr Holla stated that any damage to the natural environment not covered by the Mine Subsidence Compensation Act, such as changes to the local drainage pattern, ponding, erosion of creek beds and flooding, would need to be made good by the Applicant. The Applicant accepts this requirement.
- . some subsidence impacts may be more effectively mitigated by remedial works on affected surface lands and pasture, rather than by compensation payment. However in some instances compensation and/or remedial works may be appropriate depending on the extent and duration of impact.
- . the Applicant should be required to meet the costs of remedial works and to pay compensation.
- . a more accessible and relatively quick method to resolve these matters, particularly remedial works, is required rather than relying on the existing coal mining legislation to mitigate environmental impacts.
- . subsidence impacts which fall within the Mine Subsidence Act should be dealt with under that Act.
- . detailed surveys of individual properties likely to be affected by mining should be undertaken prior to mining under these properties and subsidence impacts monitored to the requirements of the DMR and information made available by the Applicant to Council and property owners on request.
- . a condition of consent is recommended to cover these matters.

WATER MANAGEMENT

A number of submissions before this Inquiry raised concerns about the impact of mining on the hydrology of the area and on Glennies Creek. Farmers on surrounding land expressed concern about loss of water. The surface area of the proposed coal authorisation lease area will continue in a large part to be used for grazing and dairy farming.

The SPCC submitted that the objectives of the site water management plan presented in the EIS were supported by the SPCC. The SPCC considers that the proposed mine should not be refused consent on water pollution grounds. However, it recommended that site generated water according to quality and the poorest water used in the washery and for dust suppression. The exact size of dams and reuse procedures would be determined by the SPCC.

Glennies Creek forms part of the catchment of the Hunter River and has two major tributaries - Glennies Creek and Carrow Brook, both extending to the northeast of the proposed project area. The mine area is 9km upstream from the Hunter River confluence. Upstream is Glennies Creek Dam which was constructed by the Water Resources Commission about 35km from the Hunter River confluence. It began storing water in August 1982 and provides an annual increment of about 62,000 megalitres to the Hunter River System via Glennies Creek.

Glennies Creek conveys regulated supplies from the Glennies Creek Dam for stock and domestic, irrigation, industrial and mining purposes and services demand in the Hunter River as far downstream as Maitland. It is an important waterway in this area of the Hunter and needs protection from environmental degradation.

The area included in Authorisations 44 and 128 comprises rolling hills and river valley country with varied hydrological characteristics. The distribution of streams and major watersheds within the area are shown on map (Appendix 26).

Surface hydrology is dominated by Glennies Creek which flows from northeast to southwest across the area in a meandering channel which is incised 4-5m below the surrounding flat river plains. A number of small, creeks discharge into Glennies Creek. These include Main Creek (with a catchment area within the project area) and Station Creek with a catchment that extends outside the mine area to the southeast. The other main catchment within the mine area is Bettys Creek which flows westward out of the area to Bowmans Creek.

The Department of Water Resources (DWR) have three registered ground water bores on their records within the Maitland Main Authorisation. The locations of these bores are shown on Appendix 26. There are numerous other bores in the area, some of which are rarely used but which are important in drought.

Information provided in the EIS on the existing groundwater situation in the proposed project area was limited. The EIS contained brief information from the three bores in the project area, one of which is abandoned. The DWR was not satisfied with the degree of detail provided by the Applicant in regard to groundwater.

Water Balance

The analysis of water needs and discharges in the EIS concludes that generally ample water supplies are available without the need to draw on Glennies Creek and that no discharge of contaminated waters to Glennies Creek is likely.

However, the Applicant has applied for a pumping licence to draw water from Glennies Creek. In some situations, such as, droughts, there may be a need to draw water from Glennies Creek. There are other references made in the EIS where additional water may be required.

According to the EIS, groundwater inflow is estimated at the rate of 315ML per year. The DWR notes that the EIS fails to give any details of the computer model used or how the figure of 315ML per year was obtained.

However, the DWR in relation to water balance noted that water ingress into mine working from groundwater were notoriously difficult to predict within any degree of accuracy and conditions may vary over the life of the mine as a result of droughts or prolonged wet periods.

The EIS considers worst case situations where withdrawal of water from Glennies Creek may be required, and the availability of supply of water from Glennies Creek when Camberwell and Rixs Creek mines are taken into account. The DWR confirmed the availability of water from Glennies Creek should it be required.

Mining Under Glennies Creek

This development application does not include second workings under Glennies Creek. Only development headings (first workings) will be made under the Creek. Dr Holla, the subsidence expert from the Department of Mineral Resources (DMR), submitted that no subsidence under Glennies Creek will occur as it is outside the area of influence of mining. Development headings are made to gain access from one part of the mine to another. The Applicant acknowledged at the Inquiry (supported by DMR and Council) that should it intend, in the future to carry out secondary mining under Glennies Creek (or any other mining beyond the current proposal) that a new development application would have to be lodged and an environmental assessment of that application undertaken by the relevant authorities at that time.

The Department of Planning considers that an application for secondary workings under Glennies Creek would at least be a Part V "activity" under the EPA Act involving a requirement for environmental assessment before any approval was given under the Coal Mining Act.

The SPCC also believes that an environmental assessment would need to be undertaken if the Applicant wished to mine under Glennies Creek at some future date.

The DWR stated that any proposed variation to allow further mining directly under Glennies Creek would unlikely be acceptable to the Department.

Subsidence and Groundwater

The EIS proposes that groundwater inflows anticipated in the underground mine be mostly pumped to the water management system within the rail loop and utilised in process applications.

Shallow groundwater aquifers in alluvial material have been developed for farm and domestic purposes in the mine area. The Applicant acknowledges their importance to farming but submitted that the depth to coal to be mined under alluvial flats containing aquifers will be in excess of 200m and the EIS considers that this should preclude fracturing developing which could cause the surface aquifers to lose water to the mine workings.

The DWR expressed concern with the lack of contingency plans discussed in the EIS to give landholders a substitute supply in the case of loss of groundwater. As a result of this, the DWR has outlined some recommended conditions of approval in relation to groundwater including:

- . monitoring of the groundwater before the commencement of mining and during mining;
- . compensation for potentially affected landholders (in terms of groundwater loss);
- . a report including monitoring data and water level fluctuations be submitted to the Department's regional office annually.

In the EIS the formation of soaks due to subsidence is thought to be unlikely, but there may be evaporative loss of groundwater drawn to the surface by capillary action resulting in salt concentrations at the surface. The Applicant intends to seek advice from the Soil Conservation Service on ways to manage the land without excessive soil erosion.

The DWR expressed concern in relation to salt soaks. It stated that at this stage of the planning for a major project, a more tangible strategy to have been developed for dealing with this potential problem should have been developed. According to the DWR, the extensive planting of salt-tolerant trees in areas expected to be affected would be an option worthy of consideration. The DWR suggested that if trees were planted in the first year of the project they would be well-established prior to subsidence and the effects of rising salt.

The EIS considers that changes in the groundwater or stream level could give rise to localised erosion. If the water table were to rise the areas primarily affected along Glennies Creek would be the present banks, lowest floodplain terraces and point-bar deposits. These areas are presently inundated during high flows. Some abandoned channels may hold water. The volume of ponded water along the stream may increase.

The EIS says that some changes may have to be made to irrigation pump intake points.

The EIS states that subsidence in high ground should not create any problems with respect to water table changes or depression formations.

Contaminated Water

The Applicant intends to recycle contaminated water and no off-site impacts are anticipated. During heavy rainfall, the water control dams may reach capacity and

under such circumstances overflow from the dirty water dam will be directed into the clean water dams or underground storage and excess water from the clean water dam would only be decanted at the rail loop location after it has been tested to ensure the quality meets SPCC discharge requirements. This procedure will provide detention, to allow sediments to settle out, and dilution of the decanted water by high flows off-site.

The proposal states that there will be no water discharged from the rejects emplacement leachate and runoff control dams.

The SPCC stated that excess mine water may be disposed of at Camberwell Coal but that further information on rates of usage at Camberwell and generation at Glennies Creek would be needed. The SPCC could not guarantee that surplus mine waters (which are not anticipated) at Glennies Creek mine could be disposed of at Camberwell Coal.

The Applicant believes that recycling of contaminated water is an option for disposal. The Applicant states that Camberwell would not be able to receive surplus water from Glennies Creek in periods of high rainfall. Further, the Applicant states that a moderate quantity of water could be pumped to a holding tank on the Camberwell property to supply their needs for roadway dust suppression. These measures should be considered by the SPCC in respect of any application of discharge waters to Glennies Creek.

The SPCC agreed with the Applicant's view that it is unlikely that discharges of contaminated waters to Glennies Creek from this mine would arise. The SPCC added that should it do so, the SPCC would consider an approval to discharge related to the flows into Glennies Creek at the time.

Diversion of Station Creek

A section of Station Creek is to be realigned to provide flood protection at the rail loop facilities. Construction of a high flow by-pass is proposed to drain flood waters directly along a new channel to Glennies Creek. The Applicant believes this to be of net benefit for the project's neighbours in that the existing condition of flooding in the land south of the railway will be reduced. The SPCC submitted that practical means are available to minimise pollution arising from stream diversion.

The SPCC considered that issues raised in relation to potential water pollution can be adequately dealt under a licence issued by the SPCC should the proposal gain development consent.

I am satisfied on the basis of information in the EIS together with submissions from the DWR and SPCC that:

- . Ample water for mine usage will generally be available but in some circumstances there may be a need to draw water from Glennies Creek. The DWR agrees in principle to a pumping licence. Impact on stream flow and downstream uses (together with Camberwell and Rixs Creek pumping approvals) are unlikely to be significant.
- . The evidence is that, except in certain worst case situations there would be no need to discharge contaminated waters to Glennies Creek. Where unexpected

situations should arise, SPCC approval would be required. The SPCC confirmed that feasible measures are available to mitigate the impact of such discharge related to stream flow and with the prospect of diverting some water to the Camberwell mine. These are measures that may be adequately dealt with under SPCC licences.

Glennies Creek will not experience subsidence. I am satisfied that this development application does not involve mine activity under Glennies Creek which is likely to cause subsidence impact on the flow of water in Glennies Creek. Sufficient safeguards exist under the EPA Act requiring any future proposal to be adequately environmentally assessed including potential impacts on this important water course. The evidence before me is that subsidence will not impact on Glennies Creek. In Dr Holla's words it is outside the area of influence. Statements in the EIS concerning Glennies Creek gave rise to confusion about subsidence impacts on Glennies Creek. Changes in the hydrology of the area may have impacts on Glennies Creek. This Creek is an important regional waterway and should be protected from environmental degradation during mining in the area. It is important that the Departments of Mineral Resources and Water Resources consult on the details of this mining plan prior to commencement of mining with a view to avoiding impacts and in the event of unexpected impacts occurring on Glennies Creek, the Applicant should be required to meet the cost of remedial work required by the Department of Water Resources.

This mine is likely to change the hydrology of the area within the area of influence of underground mining resulting in loss of groundwater. I accept that the Department of Water Resources' submission that groundwater changes through underground mining are "notoriously difficult to predict" and that in these circumstances, groundwater should be monitored to the requirements of the Department of Water Resources and where loss of groundwater occurs this should be made up by the Applicant at its costs and compensation paid to land owners for loss of production related to changes to groundwater caused by this mine. Water available to the Applicant through its pumping licence, or alternative bores within the Applicant's lands, should be available to land owners at the cost of the Applicant where loss of groundwater results from mining.

Whether rising salt would occur from changes in the hydrology from mining is not clear on the evidence before the Inquiry. Monitoring should be undertaken and rising salt problems in the mine project area should be mitigated at the cost of the Applicant.

In respect of other potential water related impacts from mining activity raised in submissions and by the Department of Water Resources, in relation to ground water and salinity, I am satisfied that these impacts are likely to be of small scale and can be readdressed should they occur, by the conditions of consent recommended in this report.

TRANSPORTATION

Coal product transport from the proposed Glennies Creek Underground mine to Port Newcastle for export will be by rail. Coal will be loaded on trains at a new rail loop to be constructed adjacent of the main northern line near the Nundah crossing on Middle Falbrook Road, Glennies Creek. Road transport may be used in emergency situations.

Rail Transport

The EIS states that Glennies Creek mine does not propose to use the joint rail loading facility to be operated by Camberwell and Rixs Creek. It considers the cost to provide access to it is not justified by savings made on rail works. The Applicant intends to construct their own balloon rail loop and loading facilities.

According to the EIS, the State Rail has indicated that it is able to provide rail transportation for all product coal, which is estimated to necessitate, on average, one 84 CHS wagon train per week during Stage I, and one 84 CHS wagon train per day for Stage II.

Presently, there are approximately 60-64 train movements per day passing Glennies Creek so the Glennies Creek proposal would add one movement per day at its peak mine production.

With respect to the cumulative rail impact of Glennies Creek mine with surrounding mines, the EIS states

"A cumulative transport impact would arise along the rail line south of Glennies Creek if the scheduled developments of Glennies Creek, Camberwell and Rixs Creek were to align. Should this occur, in the early stages of mine production an extra 6 train movements per week would be generated increasing to 6 train movements per day with increased production levels raising the total from 60 to 63 one way trips per day. An increase of just over 3 percent. For the medium term, there is considerable supply capacity on the rail system to handle this increase in traffic volumes."

Emergency Coal Haulage

The Applicant, in the EIS, accepts that no emergency coal haulage will be allowed on local public roads including Bridgman Road. According to the EIS negotiations have been entered into between Maitland Main Collieries Pty Ltd, Camberwell Coal Pty Ltd and Bloomfield Collieries Pty Ltd such that emergency coal haulage through Rixs Creek and/or Camberwell's leases entering the Highway via a private road or Rixs Creek Lane be examined.

The DOP accepted that except for coal and rejects haulage directly across Middle Falbrook Road and any emergency haulage of coal approved by Council, all product coal is to be transported by rail.

The workforce for the mine and service vehicles travelling to the mine would use local roads, either Middle Falbrook Road or Stony Creek Road. There is a prospect to restrict access via Middle Falbrook Road.

Private Haul Road

Transportation within the mine site involves carrying the ROM coal from the Barrett Seam Entry to the raw coal stockpile in Stage I and transportation of the rejects to the rejects emplacement area throughout the life of the mine.

In Stage I of the proposed mine ROM coal will be transported from the Barrett Seam Entry to the washery and rail loop by truck on the private haul road. Mining at the Barrett Seam is expected to finish within four years of commencement of mining.

Truck haulage of ROM coal will then cease completely and ROM coal is brought to the raw coal stockpile by underground conveyor from the Hebden Seam Entry. When the Barrett Seam Entry is closed trucks will only use the haul road to transport rejects to the rejects emplacement area. A scraper may also be used to transport rejects.

The private haul road cuts across the mine site in an east to southwest direction and crosses Middle Falbrook Road just north of the Nundah Railway crossing.

Concern was expressed in terms of local safety and local road deterioration by Council to heavy vehicles crossing this road.

However, Council considers that stop signs and heavy vehicle crossing signs are adequate safety measures at the intersection of the private haul road and Middle Falbrook Road. These measures were agreed to by the Applicant. The SPCC would also require measures at this road crossing to reduce dust deposition on the road surface.

In Stage II there will be a reduction in truck movements on the private haul road, and across Middle Falbrook Road, as coal will be brought to the raw coal stockpile by underground conveyor only from the Hebden Seam Entry. Reject haulage would continue to cross Middle Falbrook Road by truck or scraper.

ROAD WORKS

Local Roads

The site is presently served by the combination of a classified main road (The New England Highway - SH 9) and sections of a number of local shire roads which are administered and fully maintained by Singleton Shire Council. Appendix 3 shows the road layout in the vicinity of the proposed mine.

The Shire roads include:

- . Middle Falbrook Road - This road runs north from the New England Highway for 5.7km to the Nundah rail level crossing. The road continues through the proposed project area to the intersection with the other road serving the mining area, Stony Creek Road.
- . Stony Creek Road - This road runs from the intersection with Middle Falbrook Road to the east for 3.1km to the intersection with Bridgman Road.
- . Glennies Creek Road - This road runs northeast from the intersection with the New England Highway for approximately 3.5km until it crosses the Main Northern Railway. The road then continues for approximately 6km before intersecting with Middle Falbrook Road.
- . Bridgman Road - This road runs south to intersect with the New England Highway in the vicinity of Singleton Heights. The distance from the intersection with Stony Creek Road to the New England Highway is 10.2km.

According to the EIS an inventory of each road section was carried out in 1987. The Applicant believes the inventory to show that the sections of lowest standards include the whole length of Stony Creek Road and sections of Middle Falbrook Road between the Nundah Crossing and the New England Highway.

On inspection, the condition of Middle Falbrook Road from the Highway is good following recent Council surface works.

The EIS states that:

"All roads in the site vicinity are presently running well within their capacity. Apart from the New England Highway the Shire roads are not suitable for extended periods of heavy vehicle movement."

Road Traffic

The workforce traffic travelling to and from the mine site will have an impact on the local and main road networks especially at two intersections, according to the EIS:

1. The New England Highway and Middle Falbrook Road.
2. The New England Highway and Bridgman Road.

It is stated in the EIS that the total employee traffic generated by the mine varies from a maximum of 113 for Year 1 to 347 for Year 7 from the Singleton area, and between

13 and 39 from areas to the northwest of the mine. Peak traffic flow periods were assessed by the Applicant and varied from 20 in Year 1 to 58 in Year 7, on Bridgman Road. The EIS mentions service vehicles are unlikely to effect peak flows as these vehicles tend to be evenly spread throughout the day.

The EIS states that:

"The estimated ten percent of the workforce originating from the north is likely to use Middle Falbrook Road or Glennies Creek Road to access the Barrett Seam mine Entry, as travel distance using these routes would be shorter than travelling via Bridgman Road. Those originating from Singleton will travel via Bridgman Road and Stony Creek Road to access the Barrett Seam."

Access to the rail loop and Hebden Seam Entry will be via Bridgman Road, Stony Creek Road and the Private Haul road. All mine personnel and construction traffic will be requested to use this route in preference to Middle Falbrook Road to prevent deterioration of Middle Falbrook Road."

It is unlikely these intentions can be enforced while Middle Falbrook Road remains open and in its present good condition. For some of the mine personnel and construction traffic the shortest route to the mine site would be via Middle Falbrook Road.

When mining commences in the south pit at the Camberwell mine, Middle Falbrook Road is to be cut and diverted. The date for the mining of Camberwell's south pit is not fixed and may be longer than 1996 (Year 5 of Camberwell's operation), as suggested in its EIS. Camberwell indicated at the Inquiry it could be some years later.

Even though Middle Falbrook Road may become diverted, it is likely to be a preferred route. Concern was expressed about the use of Middle Falbrook Road by construction traffic in relation to impact on residences along the road, for example Hall and Andrew dwellings. There are also safety concerns about shift traffic and service vehicles crossing the main rail line, for example, in fog or heavy rain.

The Council indicated during the course of the Inquiry that the Nundah Railway crossing on Middle Falbrook Road may be temporarily closed in an attempt to stop construction traffic from using Middle Falbrook Road. The Applicant supported this suggestion. The Andrews and the Halls also supported temporary closure subject to access for the school bus. Also, concerns regarding heavy vehicles (Stage I) crossing Middle Falbrook Road would be greatly reduced with the closure of the railway crossing just south of the intersection of the private haul road and Middle Falbrook Road.

The cumulative impact of both the Glennies Creek and Camberwell mines on Bridgman Road is estimated, in the EIS, to result in an approximate 10 percent increase over present traffic volumes. The EIS believes that peak traffic volumes from the two mines will not coincide but if they did it would be advantageous to stagger respective mine operating shifts to reduce peak flows.

The Applicant submitted that:

"The traffic volumes reported in Table D.6 (of the EIS) suggests that there is no justification in any upgrading of the road system to support the initial development other than some realignment and widening of Stony Creek Road."

The Applicant identified the intersection of Bridgman Road and the New England Highway as requiring provision of alternative traffic controls such as traffic signals or roundabouts. However, the EIS states that there is no justification for Maitland Main Collieries and Camberwell being required to pay full cost of road improvements.

According to the SPCC, there is a high potential for solids deposition from coal/waste haulage onto Middle Falbrook Road. If the haul road intersection is allowed in a development consent, the SPCC would be requiring the installation of facilities on the Applicant's property to reduce this potential deposition on Middle Falbrook. However, this is a measure directed towards mitigating sources of dust emissions.

Council Requirements

Singleton Shire Council seeks the following road works and contributions from the Applicant:

- . Upgrade and realign Stony Creek Road at the Applicant's cost. The Applicant agreed to this requirement.
- . Upgrade Middle Falbrook Road from where it intersects with Stony Creek Road to the proposed mine entrance at the Applicant's cost. The Applicant also agreed.
- . The intersection of the proposed haul road with Middle Falbrook Road be strengthened and constructed and ancillary works undertaken to prevent the deposition of debris on public roads and the intersection be marked with stop signs and floodlit with heavy vehicle crossing warning signs erected at Middle Falbrook Road approaches. The Applicant submitted, in regard to these requirements, that they only be carried out if the railway crossing on Middle Falbrook Road remains open.
- . A \$300,000 bond be paid to ensure that any damage caused by construction traffic associated with the proposed mine be restored to the reasonable requirements of Council. The Applicant agreed with the \$300,000 bond but wants the opportunity of carrying out the road works themselves.
- . Roads be constructed to NAASRA specifications or to the reasonable requirements of Council. The Applicant objects to these standards and proposes roads at certain thicknesses, shoulder widths and centre widths with varying overall widths, dependent upon the particular road.
- . Construct and design the intersection of Bridgman Road and Stony Creek Road, and the intersection of Stony Creek Road and Middle Falbrook Road.

The Applicant agrees with Council to pay an amount of \$70,000 for improvements to Bridgman Road but the Applicant specifies that this money only goes towards the improvement of Bridgman Road between Stony Creek Road and the New England Highway.

- . Pay at the beginning of each year \$22,000 in 1991 dollars, CPI indexed, towards the cost of road maintenance. The Applicant states that they will enter into an agreement with Council to pay a sum of money, either annually or in a lump sum, for roadworks on specific roads:

- Bridgman Road between the New England Highway and Stony Creek Road;
 - Stony Creek Road;
 - Middle Falbrook Road.
- . Contribute an amount (not specified) for the maintenance of Middle Falbrook Road from its intersection with the New England Highway to the mine entrance.

RTA Requirements

The RTA requested the following:

- . that the developer provide rural intersection facilities between Bridgman Road and the New England Highway and between Middle Falbrook Road and the New England Highway;
- . approval be obtained from the RTA prior to any road haulage of coal in emergency situations;
- . pay the RTA an amount calculated (on the basis of 3 cents/tonne/km in 1989/90 prices) to compensate for the effect on roads of emergency coal haulage and that records be kept in accordance with RTA requirements for these purposes.

The RTA would require verification of any arrangements proposed by the Applicant to gain entry to the New England Highway via the Rixs Creek Lane.

Findings

I find that the Council and RTA requirements in respect of road works are reasonable. Conditions of consent are recommended to cover Council and RTA requirements. In respect of the dispute between the Applicant and Council on the standards of road works to be undertaken, I am satisfied works should be undertaken to Council reasonable requirements. In the event that the amount of contributions or the appropriate standards cannot be resolved, these should be determined by the Minister.

WASTE EMPLACEMENT

Rejects from the coal washery will be delivered to an overhead truck loading bin located within the loop and will be transported by trucks via the private haul road to an emplacement area on lands owned by the Applicant. This area is shown on Appendix 3. Approximately one in four trucks will be backloaded with washery rejects. In Stage II, with a marked increase in reject tonnages, a scraper and/or trucks would transport rejects to the emplacement area. A scraper may be used in Stage I.

Over the 21-year life of the mine, encompassing the two stages of the mine, about 14 million tonnes of coal washery rejects will be produced. They are produced as semi-dry solid rejects by mixing coarse materials with fine materials. The process eliminates a need for a tailing dam. There are environmental benefits in eliminating a tailing dam.

Substantial rejects emplacement will be progressively undertaken under conditions designed to:

- . minimise water infiltration into the emplacement to minimise leachate;
- . minimise risks of combustion;
- . progressively rehabilitate to reduce exposed areas and visual impact; and
- . contain leachates and high turbidity runoff by adequate water controls.

Rejects will be compacted in layers. The site selected for emplacement is located in proximity to the washery, on lands of poor agricultural value, with no flood potential and a minimal upstream catchment. Although described in the EIS as a valley, on inspection it was seen as a shallow hollow or trough between low shoulder hills on rising ground.

With a bund at the lower end, emplacement extends upward from the bund. The bund will be vegetated and provide some visual screening and noise attenuation.

In Stage I an area of less than 7.0ha would be required. Runoff and leachate are to be directed to a single control dam which drains a catchment of 30ha. Water is pumped to the dirty water dam at the rail loop and recycled as part of the water management scheme.

In Stage II, as the rate of rejects significantly increase additional works are proposed to divert clean water runoff from the undisturbed catchment and to contain contaminated runoff. These works include construction of a dam wall across the mouth of the trough shaped emplacement area. The maximum height is stated to be 8m. It will be constructed of rejects and quarried material from the emplacement area. A spillway is proposed allowing up to 1m of free board and dam capacity of about 270,000 cu.m. Stage II will cover about 56.3ha.

Direct drainage of clean runoff from 41.4ha of undisturbed upstream areas will be diverted.

Emplacement is progressively undertaken by clearing, topsoil storage and resspreading each section of the emplacement area after its design height is reached. A maximum of 7ha will be the cleared working area at any one time.

A scraper will be used to deliver, spread and compact rejects.

The larger dam of Stage II will store only runoff from the active and future rejects emplacement area. It will be a source of water for the project. It would contain leachate and high turbidity water.

After filling, topsoil cover and planting, areas will drain and flow around the perimeter contours through a series of sediment stilling dams at 200m intervals and eventually to below the dam wall.

The planned final emplacement contours are shown on Figure 6.14 of the EIS (Appendix 27). The area will be drained to achieve the proposed drainage system and the final face will consist of the dam wall and benched final batter. The final batter will be up to 25m high with a slope of about 10%.

I am satisfied that these measures for emplacement of rejects are adequate. The measures are feasible to contain runoff from the emplacement area, for containing leachate and turbid water and for reuse of water from the emplacement area in the project. The SPCC did not challenge the emplacement proposal in the EIS and the details of final design are subject to SPCC approval. The SPCC should ensure that clearing and working locations are kept to minimum areas (that is, 7ha or less) of exposed land. The emplacement area will be visible from Middle Falbrook Road and some distant views. Screening and planting should be carried out to Council's requirements. These would reduce this impact, but not eliminate it. There are matters related to the transport of reject materials but these are considered in the noise section of this report.

VISUAL IMPACT

Several of the parties to the Inquiry identified visual impact as an issue of concern in relation to the proposed underground mine.

The Glennies Creek underground mine will have a visual impact in the vicinity of Hebden Seam Entry, Barrett Seam Entry and Rejects Emplacement Area. The visual impact can be wholly or partially mitigated through screening (tree planting) and bund wall erection as required by Council. In respect of some structures and surface areas of the mine, however they will be visible from Middle Falbrook Road and from some residences.

The Rail Loop Surface Facilities

The surface facilities of the Hebden Seam Entry will have a relatively large visual impact because of its proximity to several residences including Hall and Andrews.

In respect of the Andrews, there is no concern regarding the mitigation of visual impact due to the recommended relocation of this family.

In respect of the Halls, although the existing screening on the Main Northern Railway serves to partially mitigate the visual impacts of the Hebden Seam surface facilities, these facilities will still be clearly visible to the Halls. Additional planting would mitigate the visual impact of the rail loop in the locality and in relation to the "Dulwich" residence (Halls).

The Barrett Seam Entry

The Barrett Seam Entry will have a small visual impact on the Glennies Creek area as it is to be located in a more heavily wooded section of the project area and it is not near residents, and will be decommissioned at the conclusion of Stage I. Buildings at the Barrett Seam Entry will be small in scale and taken away at the end of Stage I. There will be some interrupted views of the Barrett Seam Entry from Stony Creek Road.

Rejects Emplacement Area

The Rejects Emplacement Area will be visible from parts of Middle Falbrook Road and from several positions to the west of the area including "Sydenham" property.

In Stage II a bund wall will be placed at the lower end of the valley, from which the rejects emplacement will extend up the valley in time. The visual impact of the rejects emplacement area will be minimised by planting and vegetation cover as well as the bund wall. The area of clearing and fill is to be restricted to about 7ha at each stage of emplacement.

Findings

In relation to visual impact from Middle Falbrook Road, if Council, with SRA approval, proceeds to close Middle Falbrook Road at the Nundah rail crossing, the majority of traffic using Middle Falbrook Road will be mine employees or mine related traffic.

From my inspection of the area it is clear that the rail loop surface area and the emplacement area will have adverse visual impact in the locality. However, many residences in the area are already in mining company ownership and the open cut workings of Camberwell will change the visual character of the areas on both sides of Middle Falbrook Road.

Additional tree planting around the rail loop and at the emplacement area (with bunding) will reduce but not eliminate the visual impact of these aspects of the mine.

"DULWICH" RESIDENCE

Submissions raised two aspects of the potential impact of this mine in relation to the property known as "Dulwich" owned by Mr and Mrs Hall. One was the potential impact of Glennies Creek mine alone, and with Camberwell and Glendell on the continued residence of the Hall family in the house. The other was the potential impact on the dwelling itself as an item of local heritage.

The Occupants

The impact of Glennies Creek mine needs to be seen in the context of the impact from, in particular, the open cut Camberwell mine which commenced operation last year. Camberwell mine as it develops will give rise to a severe impact on the Hall family while they continue to reside there from dust, noise as well as visual impact. As already mentioned, the Hall's have an agreement with Camberwell which enables them at a date of their choosing to call upon Camberwell to acquire the property at an already established sale price under the terms of the agreement. It is likely that the Halls will continue to reside there until the impact from Camberwell mine becomes intolerable to them. That could be when mining south of the rail line near "Dulwich" begins, that is, six to ten years approximately.

The impact from Glennies Creek, in terms of noise and dust is relatively small compared with Camberwell. As previously assessed in this report however, the likely impact of dust and noise from Glennies Creek mine alone may require mitigating measures while the Hall's continue to reside at "Dulwich", that is, prior to the severe impacts from Camberwell.

In respect of dust, the impact would need to meet the SPCC health and amenity criteria. This may involve some treatment to the dwelling or modification of mining operations and equipment (particularly haul road trucks) to meet the SPCC goals accepted in this Inquiry. Dust impact from Glennies Creek mine will be substantially reduced at the end of Stage I - three to four years. However, as Camberwell mine moves towards "Dulwich", its impact on the Halls will be the dominant one. Conditions are proposed which require the Applicant to undertake such measures required by the SPCC to mitigate potential noise and dust on occupants, that is, the Halls themselves. This would involve monitoring at the commencement of Stage I and Stage II.

The Department of Planning submitted that this property should be subject to an acquisition condition requiring the Applicant to acquire the property. I do not accept that submission in the circumstances of this mine. Having regard to the existing agreement between the Hall's and Camberwell and the extent of impact from Glennies Creek alone, I find that the identified potential impacts on the Hall family may best be addressed by mitigating those impacts during their continued habitation of the "Dulwich" dwelling.

In respect of the local heritage value of the "Dulwich" property, protection of the dwelling against impacts of vibrations from blasting should be required. A condition of consent to control vibration is recommended. In respect of the impact of dust on the dwelling itself and its structures, I am not satisfied that a condition should be imposed on the Glennies Creek mine to undertake measures at the dwelling itself in respect of dust. The dust impact from Glennies Creek mine is unlikely to have significant impact on the dwelling itself or its local heritage value.

In respect of visual impact, inspection of the property and the rail loop site revealed that the proximity of the two will enable exposed views from "Dulwich". This impact may be reduced by further plantings at the rail loop site and at "Dulwich", if requested by the Halls.

RESIDENCE OF MR AND MRS ANDREWS

In my findings in relation to noise and dust earlier in this report, I determined that the impacts from Glennies Creek, alone and cumulatively, with Camberwell and Glendell would be unacceptable for the Andrews family. I note again that an agreement exists for the acquisition of this property. It is my judgement on the evidence before the Inquiry that the Andrews are likely to vacate their dwelling under this agreement in 1995. During the interim period of residence they would suffer an unacceptable noise and dust impact. In addition, by reason of the dwelling's proximity to the rail loop facilities, despite some screening, those facilities would be clearly visible.

In the circumstances, I consider the Andrew's should, at their request, be located in another dwelling in Singleton, at the Applicant's expense, rent free until the date of acquisition by Camberwell under the agreement, that is 1995. In addition, I find the Applicant should pay a sum, in addition to the costs of removal, related to the early disturbance of the family. That sum should relate to a situation that the Andrew's under the Camberwell agreement are likely to vacate in 1995, that is they are being required to move by Glennies Creek mine approximately four years in advance. A disturbance sum should relate to this period and take account of the family being required to move earlier than otherwise expected and the rent free accommodation provided under the recommended condition. There is not sufficient evidence before the Inquiry to determine a precise amount.

FURTHER MINING

The development application before this Inquiry relates to the mine proposal set out in the EIS. Some confusion arises from the wording of the EIS leading to a number of submissions to the Inquiry raising concerns about mining under Glennies Creek.

It was acknowledged by the Applicant during the course of this Inquiry that this development application does not propose second workings under Glennies Creek. On the evidence of Dr Holla, an acknowledged expert in the field of subsidence, first workings, that is access ways under Glennies Creek, will not cause subsidence.

The Applicant further acknowledged during the Inquiry that departure from the mining proposal, such as second workings under Glennies Creek itself, would require a further development application and would need to be environmentally addressed under the provisions of the Environmental Planning and Assessment Act. This requirement was also acknowledged by the Department of Mineral Resources and Singleton Shire Council.

It is also worth noting that departures from the mining plans requiring approvals under the Coal Mining and related Acts are "activities" within the meaning of the Environmental Planning and Assessment Act which require environmental consideration by the relevant authority which, on application to the Land and Environment Court, are subject to judicial review.

This Commission of Inquiry has therefore considered the environmental impacts of the proposed mine on the basis of the mining plan as shown in the EIS and on the basis of no second workings under Glennies Creek.

CONDITIONS OF DEVELOPMENT CONSENT

Development consent to the Glennies Creek underground mine project is therefore recommended subject to the conditions of consent set out in this report. Conditions are recommended to mitigate potential environmental impacts assessed on the basis of submissions to this Inquiry.

The following brief comment is made in respect of certain matters related to recommended conditions of consent.

Dust and Noise: Mitigating Measures

It is clear from the cumulative impact analysis in submissions before the Inquiry that difficulties arise in devising practical means by way of conditions of consent in respect of likely noise and dust exceedences of the SPCC goals for this mine.

Dwellings on the south of the rail loop facilities may experience exceedences of SPCC dust criteria or noise goals after the commencement of Glennies Creek mine. However, Dr Holmes analysis involves worst case situations, and impacts may not, in fact, be experienced from the Glennies Creek mine in excess of SPCC goals. On the other hand as Camberwell mine moves towards this southern area it will be the dominant contributor to noise and dust impacts in that area. For these reasons I find that the conditions related to acquisition and mitigation as proposed by the DOP and the modifications sought by the Applicant to those proposed conditions are unlikely to be workable in practice. It would be unreasonable to visit upon the Applicant for the Glennies Creek mine measures, either by acquisition, or other means, to mitigate the dominant impacts of the Camberwell mine.

Similar complexities are likely in the north and to the west of the rail loop. If and when Glendell commences operations it will be the dominant contributor to noise and dust in this area, and certain properties are likely to be acquired under the conditions of its development consent. Again the Glennies Creek mine should not have to mitigate the impacts caused, or largely caused by Glendell.

In the circumstances of this mine, I find that no provision requiring the Applicant to acquire additional properties is appropriate. However, there is an interim period in which Glennies Creek may impact on dwellings, that is, before the dominant impacts of Glendell or Camberwell mines are felt. Specific mitigation measures should be required of Glennies Creek during these periods.

In respect of mitigation measures for dust and noise above SPCC criteria or goals accepted by this Commission of Inquiry, these measures should not be open ended, that is to say, that the measures should be designed to reduce the impact on dwellings in non mining company ownership during the time when the Glennies Creek mine is likely to cause exceedence of the SPCC goals. It is unreasonable to impose specific mitigation measures on Glennies Creek, to be undertaken at a time when either Camberwell or Glendell mines are causing the dominant impacts on air quality or noise south or north of the rail loop. SPCC criteria or goals would be exceeded without the Glennies Creek mine. It would be, for practical purposes, too difficult, if not impossible to separate and attribute impacts and assign mitigation measures to the Glennies Creek mine.

In view of relative contribution to dust and noise impacts of the Glennies Creek mine in the cumulative impact analysis, I find that, in this situation specific dust and noise mitigation measures should be confined to impacts arising from Glennies Creek at the commencement of Stage I and II. These should be based on monitoring information for dwellings in the south, and in the north - to west of the rail loop taken during a period of three months from the commencement of extraction of coal in Stage I and again in Stage II. Monitoring data should be collected and form the basis for mitigation of noise or dust in relation to specific dwellings to SPCC requirements.

In the event of exceedences of the SPCC criteria or goals accepted in this Inquiry at any non mining company owned dwellings, the Applicant should be responsible for measures, which the SPCC considers appropriate to mitigate impacts to within these SPCC criteria or goals. This may involve treatments of dwellings or modification of mining operations, or both. Any further noise or dust impacts that may arise subsequently in relation to other mines and cumulative impacts should be controlled under SPCC licences and reviewed periodically in relation to monitoring data.

I am satisfied that, given Dr Holmes' worst case analysis, feasible mitigation measures for this mine are available to enable the SPCC criteria or goals accepted in this Inquiry to be met at dwellings around the Glennies Creek mine. Special measures are required in respect of residence No.1 'Andrew' which are covered by a recommended condition related to that family.

Further Property Acquisition

It should be noted that no condition for further acquisition of property is recommended for the reasons summarised above and referred to in this report. I do not accept the Department of Planning submissions and submissions on behalf of Mr and Mrs Hall for acquisition provisions. The modifications to those conditions proposed by the Applicant appear to be unworkable in practice.

I am also satisfied that, given the arrangements between the Camberwell mine and the Andrews and Hall families for acquisition of their properties, in the circumstances of this case, it is sufficient to ensure that adequate measures to mitigate impacts are undertaken by the Applicant for each of these occupants.

Operating Hours

The proposed mine is intended to produce coal 24 hours per day Monday to Saturday. Surface activities will continue 24 hours per day, 365 days per year.

The EIS indicates that the haulage of coal/rejects by truck on the private haul road is confined to daylight shifts only. In the absence of a night time noise assessment of haulage of reject material no haulage of coal/rejects on-site at night or workings on the reject emplacement area should be permitted so as to avoid disturbance during sleeping hours.

A condition restricting haulage of coal/rejects on-site between 7am and 10pm is therefore recommended. These hours of operation could be varied, when monitoring information is available, by the SPCC, provide nighttime noise goals as accepted in this Inquiry are not exceeded.

Rail Crossing

The temporary closure of the Nundah rail crossing is supported to reduce environmental impact during the construction phase and for safety reasons. The crossing is hazardous for local traffic and would be for mine related traffic, particularly during adverse weather conditions and fog. The feasibility of its temporary and permanent closure should be investigated by the Council and the State Rail Authority.

It is not appropriate to impose this requirement on the Applicant as closure is outside of its power and control.

RECOMMENDED CONDITIONS OF DEVELOPMENT CONSENT

1. The Applicant shall carry out the development of the Glennies Creek Coal Mine generally in accordance with Environmental Impact Statement (EIS) dated 20 August 1990 prepared by Dames & Moore in accordance with Section 77(3) of the Environmental Planning and Assessment Act, and certified by Warren Atkinson and supplementary information supplied by the Applicant to the Singleton Shire Council by letter dated 20 November 1990, 19 February 1991 and, as may be modified by these conditions.

Duration

2. This consent shall lapse 21 years from the date of the notification of this development consent or 21 years from the date of issue of a coal lease in respect of this development whichever is the later.

Blasting

3. The Applicant shall:
 - a) Not blast during the construction of mine entries within 500 metres of a public road while it is open for traffic unless it has obtained permission of the Council.
 - b) Liaise with other coal operators and shall refrain from blasting at the same time as other operators.
 - c) Design all surface construction blasts to limit the peak velocity at "Dulwich" residence to a maximum of 2 millimetres per second. The Applicant shall also monitor to the satisfaction of the State Pollution Control Commission (SPCC) the impact of its blasting on "Dulwich".
 - d) In the event of any damage to "Dulwich" arising from blasting, upon request of the owners, pay the costs of repairs to the dwelling to restore it to its former condition prior to blasting damage.
 - e) Within the 5 minutes preceding the detonation of any blast cause a siren to be sounded for 2 minutes as a general warning to those residences or persons within an audible range. After the blast the Applicant shall cause the siren to be sounded 3 times.

Landscaping

4.
 - a) Within 6 months of the date of granting of this consent or within such further period as the Singleton Shire Council (Council) shall agree the Applicant shall submit to the Council for its approval:
 - i) A detailed landscaping plan for planting and establishment of trees and shrubs both prior to and during the construction stage, showing existing stands of vegetation and the location of plantings around the surface facilities and the rejects emplacement area. This plan shall incorporate erosion control

and sedimentation control practices for earthworks associated with the development.

- ii) Details of treatments related to visual appearance of the structural components of the development including paint colours and specifications for buildings and structures.
 - iii) A comprehensive plan of landscape management, which shall include detailed plans, programmes to be undertaken, maintenance of all landscape works and planting and maintenance of building materials and cladding.
- b) The Applicant shall carry out the landscaping plans programmes and treatments in accordance with Council requirements.

Visual Amenity

5. The Applicant shall also carry out during the life of the mine the requirements of Council in respect to any supplementary planting and visual amenity enhancement works immediately outside the proposed coal lease area which may be identified by Council to reduce visual impact of the development in the local area.

Noise and Dust

6. i) The Applicant shall monitor noise levels in accordance with SPCC requirements in relation to the following dwellings referred to in Figure 6.1 of the EIS (Appendix 1) during a period of three months from the commencement of extraction of coal in Stage I of the mine and during a period of three months from the commencement of extraction of coal in Stage II - dwelling nos. 2, 4, 7, 10, 15, 16, 22 and 25.
- ii) The Applicant shall submit the monitoring data to the SPCC and to the owners or occupiers of such dwellings forthwith after the expiration of each of the three month period. In respect of these dwellings where the daytime or nighttime noise would exceed SPCC design noise goals submitted by it to the Commission of Inquiry at any one or more dwellings in the opinion of the SPCC, the Applicant shall, upon request of the owner or occupier, meet the costs of measures required by the SPCC to maintain a noise level within the SPCC noise design goals at such dwellings. In the event of acquisition of a dwelling by a coal mining company the requirements of this clause shall cease.
- iii) The Applicant shall monitor dust deposition rates and dust concentrations in accordance with SPCC requirements in relation to dwelling No.2 (Hall) referred to in Figure 6.1 (Appendix 1) of the EIS during a period of three months from the commencement of extraction of coal in Stage I of the mine and during a period of three months from the commencement of extraction of coal in Stage II. The Applicant shall submit the monitoring data to the SPCC and the owner of dwelling No.2 forthwith after the expiration of each of the three month period.

- iv) Where dust deposition rates or concentrations would exceed SPCC health and amenity criteria submitted by it to the Commission of Inquiry at this dwelling in the opinion of the SPCC, the Applicant shall, upon request of the owner, meet the costs of measures required by the SPCC to maintain dust deposition rates or concentrations within the SPCC criteria at such dwelling. In the event of acquisition of the dwelling by a coal mining company the requirements of this clause shall cease.

State Pollution Control Commission Approvals

- 7. The Applicant shall prior to commencement of construction of the proposed development obtain from the State Pollution Control Commission ("the SPCC") all statutory approvals and licenses as may be required under the Clean Air Act, 1961, the Clean Waters Act, 1970 and the Noise Control Act, 1975, together with such other approvals or licenses as may be required under legislation or regulations for the conduct of the proposed development. The Applicant shall conduct the development in accordance with the terms of such approvals and licenses.

Coal Transportation

- 8. Except for coal and rejects haulage directly across Middle Falbrook Road and any emergency haulage of coal approved by the Council, the Applicant shall ensure that all product coal is transported by rail.

Flood Lighting

- 9. All floodlighting on the site shall be constructed to the satisfaction of the Council. The Applicant shall not construct on-site floodlighting which will directly emit light into the line of sight of nearby dwellings. The light emitted from any direct flood lighting and any vehicle headlights shall be directed away from dwellings and public roads to the satisfaction of the Council.

Environmental Monitoring - General

- 10.
 - a) In addition to the specific monitoring requirements in condition 6, the Applicant shall install dust deposition gauges and in each calendar month shall determine the dust deposition rate in grams per square metre per month (gm/sq.m/mth) such that +2gm/sq.m/mth incremental isopleth for dust arising from mining operations is able to be plotted on an annual basis, with a baseline defined by the SPCC.
 - b) The Applicant shall annually measure and record the L90 noise level over a 72 hour period at locations as required by the SPCC.
 - c) The Applicant shall analyse to the satisfaction of the SPCC all waters (other than uncontaminated stormwater) to be discharged from the mining, coal preparation, water storage and reject disposal areas of the mine site.
 - d) The Applicant shall measure and record levels of subsidence to the requirements of the Department of Mineral Resources, and report such information to the Department and make copies available to the Council

on its request. The Applicant shall make available such information to any land owner within the coal lease area on request from that land owner.

- e) The Applicant shall on a quarterly basis provide a summary of the all monitoring results to the Council.
- f) The Applicant shall provide a copy of such results to a land owner or occupier of one of the properties shown in Figure 6.1 (Appendix 1) the EIS on request.

Discharge of Water

- 11. The Applicant shall obtain the prior approval of the SPCC before discharging any waters other than uncontaminated stormwater from the mine site.

Annual Report

- 12. a) Within six (6) months of the commencement of the construction of the proposed development, the Applicant shall ascertain the requirements of the Director of Planning ("the Director") in relation to an annual report to be submitted to the Director, the SPCC and the Council in respect of the performance of the development. Each report shall be in respect of the calendar year ending 31st December and each report shall be submitted by 31st March of the following year. The first report is to be submitted in 1993. The Applicant shall agree to the Council making the reports publicly available.
- b) The annual report shall provide the following information:
 - i) the performance of the development in relation to the Environmental Impact Statement, the statutory requirements of public authorities, in particular the SPCC, and in relation to the conditions of development consent;
 - ii) the implementation and effectiveness of the environmental controls and conditions relating to the development;
 - iii) results of environmental monitoring in respect of air, water and noise pollution, groundwater variations in the coal lease area, how these results compare with the predictions in the EIS and whether the results indicate compliance with the conditions of consent and information related to discharges of water (other than uncontaminated stormwater) from the mine site;
 - iv) mining operations undertaken during the preceding 12 months;
 - v) workforce characteristics of the development;
 - vi) modifications to mining operations, if any, to mitigate any adverse environmental impacts;

- vii) socio-economic impact of the development other than covered in (v) above;
 - viii) results of subsidence monitoring and subsidence impacts upon the natural and built environment, and measures implemented to rectify any damage caused;
 - ix) quantities of water drawn from Glennies Creek and times and duration of pumping.
- c) A description of the physical works undertaken in the preceding 12 months.

Environmental Officer

13. The Applicant shall employ or contract the services of a qualified Environmental Officer for the proposed development to be responsible for ensuring that all environmental safeguards proposed for the development and as required by this consent and other statutory approvals are enforced and monitored from the commencement of construction.

Groundwater

14. a) The Applicant shall upon request of a landowner provide an alternative source of water supply and/or pay compensation in respect of loss of groundwater which, on the basis of monitoring data, is attributable to the underground mine workings. In the event that the Applicant and a land owner are unable to agree upon the adequacy of replacement of water and/or compensation, the Minister shall determine the matter after referring the dispute to a Commissioner of Inquiry and after receiving the Commissioner's recommendations.
- b) The Applicant shall install a minimum of two piezometers within the alluvium adjacent to Glennies Creek and one deep piezometer into the Permian coal measure sequence beneath the Glennies Creek Alluvium at locations approved by the Department of Water Resources prior to installation.
- c) The Applicant shall install the piezometers, referred to in subclause (b) herein, at least 12 months prior to the commencement of secondary mine workings beneath the alluvium in order to obtain baseline water level and chemistry data. Piezometers are to be fitted with continuous data loggers in order to monitor water level fluctuations so that sudden events can be recorded.
- d) The Applicant shall measure and record electrical conductivity (EC) of groundwater from each piezometer quarterly (four times per year) with a full analysis (EC, pH, Alkalinity, major anions and cations) annually.
- e) The Applicant shall submit a report annually to the Department of Water Resources including monitoring data and water level fluctuations and provide, on request of a landowner, copies of such report.

Station Creek Diversion

15. The Applicant shall liaise with the Department of Water Resources and the Soil Conservation Service and meet their requirements for the design, construction and maintenance of any diversion of Station Creek associated with the development.

Financial Contributions

16.
 - a) In addition to the Section 94 contributions in respect of road works, the Applicant shall pay to the Council those additional financial contributions made necessary by the development, pursuant to Section 94 of the Environmental Planning and Assessment Act, 1979.
 - b) In the event that the Applicant and the Council cannot agree on the amount of such contributions, the Minister shall determine the said amount, after referring the dispute to a Commissioner of Inquiry and after receiving the Commissioner's recommendations.

Rental Housing

17. The Applicant shall liaise with the Council to monitor local housing demand during the construction stage of the project and, in the event of a shortage of rental accommodation, provide additional temporary accommodation facilities for use by its construction workforce in accordance with Council requirements.

Road Works

- 18.1 The Applicant shall prior to the commencement of Stage I of the mine:
 - a) Upgrade and realign Stony Creek Road between Bridgman Road and Middle Falbrook Road with a bitumen sealed pavement to 7 metres to Council's reasonable requirements at the Applicant's cost.
 - b) Upgrade Middle Falbrook Road from its intersection with Stony Creek Road to the proposed mine entrance by widening and resealing of the existing bitumen pavement to 6 metres to Council's reasonable requirements at the Applicant's cost.
 - c) Contribute an amount to Council for the upgrading of Middle Falbrook Road from its intersection with the New England Highway to the proposed mine entrance to the Council's reasonable requirements.
 - d) Design and construct the intersection of Bridgman Road/Stony Creek Road and the intersection of Stony Creek Road/Middle Falbrook Road being to Council's reasonable requirements at the Applicant's cost.
 - e) Strengthen and construct the intersection of the proposed haul road with Middle Falbrook Road to a bitumen sealed or concrete standard either side of Middle Falbrook Road, install stop signs, floodlighting and heavy vehicle crossing warning signs erected at the Middle Falbrook Road approaches to Council's reasonable requirements. Completion of this work may be postponed, in the event of a temporary closure of the

Nundah rail crossing, but shall be completed prior to the reopening of the crossing.

- f) Construction of the intersection of the Middle Falbrook Road/new mine entrance as described in the EIS being to Council's reasonable requirements.
- g) Pay to the Council a construction damage bond of \$300,000 to ensure that any road damage caused as a result of construction traffic associated with the proposed mine is restored by the Applicant to the requirement of the Council.
- h) Pay to the Council an amount of \$70,000 to be applied to the upgrading of Bridgman Road.

18.2 No local roads under the care and control of the Singleton Shire Council shall be used by heavy traffic associated with the proposed development without the express written approval of the Council.

18.3 The Applicant shall pay an annual contribution to Singleton Shire Council to be applied to road maintenance of the Middle Falbrook, Stony Creek and Bridgman Roads. The contribution shall be \$22,000 in 1991 dollars CPI indexed from the date of consent.

18.4 In relation to a dispute between the Council and the Applicant arising under this condition, the Minister shall determine the matter.

Aboriginal Heritage

19. The Applicant shall not remove or destroy any item of aboriginal heritage without first obtaining the consent of the National Parks and Wildlife Service.

Dust Suppression

20. a) The Applicant shall:

- i) take all steps in accordance with the procedures outlined in the EIS necessary to minimise the emission of dust from all activities associated with the development and in accordance with SPCC requirements;
- ii) maintain sufficient equipment with the capacity to apply water to the rejects disposal area, local roads and all trafficked areas at the rate of at least one litre per square metre per hour over the dust generating area;
- iii) undertake regeneration with vegetation and watering of all disturbed areas in surface construction sites and reject emplacement areas to minimise the generation of wind erosion dust in accordance with SPCC requirements;
- iv) install automatic water sprays on all stockpiles and coal handling facilities. Such sprays to be wind activated and capable of manual activation in accordance with SPCC requirements;

- v) spray with water all exposed dust surfaces at the rate of 1 litre per square metre per hour to ensure there is no dust emission.

Disputes

- 21. In the case of dispute between the Applicant and the Council or a statutory body in the implementation of the conditions of this consent the matter shall be referred to the Minister of Planning for resolution.

Andrews

- 22. a) The Applicant shall provide a home with up to four bedrooms in Singleton free of rent until the 12th February 1995 upon Andrews giving six months prior notice in writing that they are unable to continue to reside near the development. Such home is to be acquired on consultation with the Andrews and modified by the Applicant in a suitable fashion so as to provide wheelchair access and other facilities normally or reasonably required by a handicapped person.
- b) Upon the giving of the notice referred to in (a) above the Applicant shall pay Andrews a sum by way of compensation for disturbance arising out of their having to move from their property. In the event that agreement cannot be reached as to the sum, the Minister shall determine the amount.
- c) The Applicant shall pay all reasonable removal and incidental costs incurred by Andrews in moving into Singleton.
- d) The Applicant shall pay Andrews reasonable legal costs with respect to the implementation of paragraphs (a), (b) and (c) together with any reasonable disbursements incurred with respect thereto.

Roads and Traffic Authority

- 23. The Applicant shall pay to the Roads and Traffic Authority an amount toward the following road works to be undertaken in accordance with the requirements of the Authority:
 - the upgrading of the intersection of the New England Highway and Bridgman Road; and
 - the upgrading of the intersection of Middle Falbrook Road and the New England Highway.

In determining the amount in respect of these roadworks regard shall be had to the extent of construction and mine operation related traffic which may use Middle Falbrook Road during the construction phase of the development and/or during the mining operations and temporary road closure of Nundah rail crossing.

Operating Hours

24. The Applicant shall not transport coal by truck within the mine site from the Barrett seam entry nor transport rejects to the reject disposal area, nor work with scrapers or bulldozers or similar machinery on the emplacement area during the hours of 10.00pm to 7.00am, unless otherwise approved by the SPCC after its consideration of monitoring data for the mine in relation to noise levels at residences referred to in condition 6.

Approvals

25. The Applicant shall forward to Singleton Shire Council copies of all approvals of authorities related to the development.

Glennies Creek

26. In the event of impacts such as bank erosion, channel obstruction along Glennies Creek due to changes in the hydrology caused by underground mining, the Applicant undertake at its cost, remedial measures in accordance with the requirements of the Department of Water Resources.

Rising Salt

27. In the event of rising salt occurring within the proposed coal lease area by reason of changes to the hydrology caused by underground mining, the Applicant shall at the request of the landowner affected, undertake at its cost remedial measures in accordance with the requirements of the Department of Water Resources.

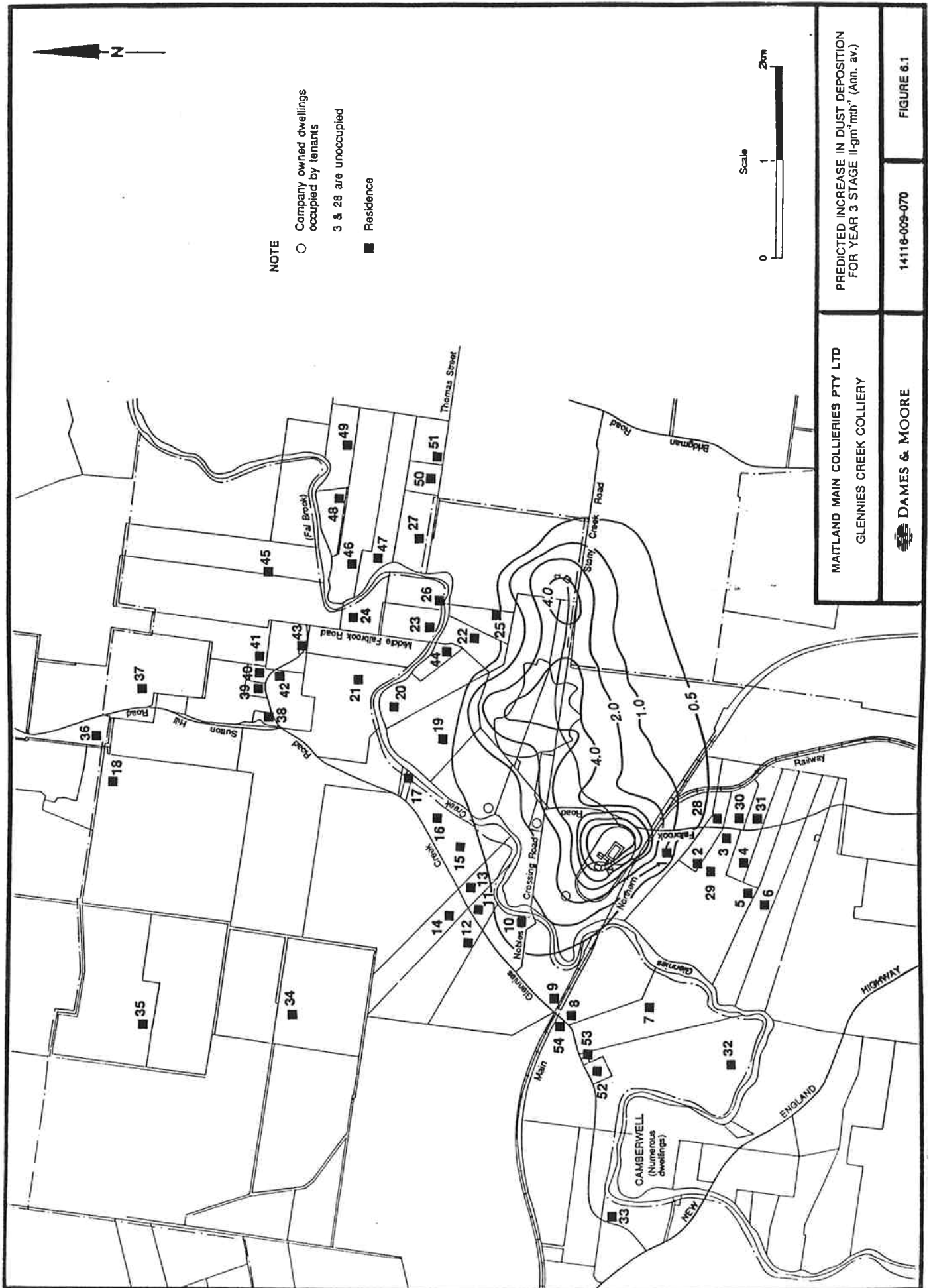
Note

This approval does not relieve the Applicant of the obligation to obtain any other approval which may be required under the:

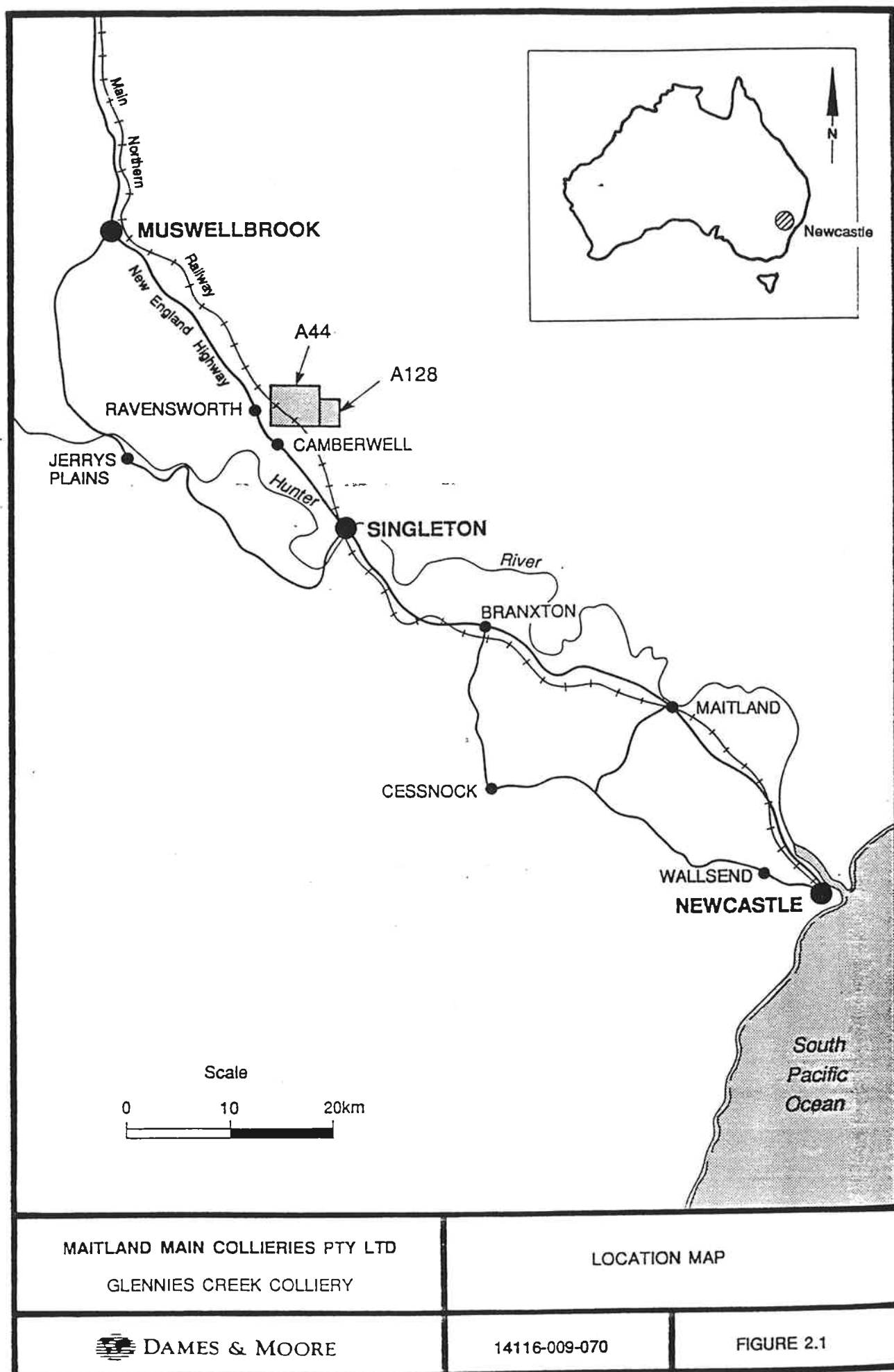
1. Clean Air Act 1961, Clean Waters Act 1970 and Noise Control Act 1975;
2. Local Government Act 1919, as amended and the ordinances made thereunder (including approval of building plans);
3. National Parks and Wildlife Act 1974;
4. Dams Safety Act 1978;
5. Rivers and Foreshores' Improvement Act 1948;
6. Water Act 1912;

or any other Act.

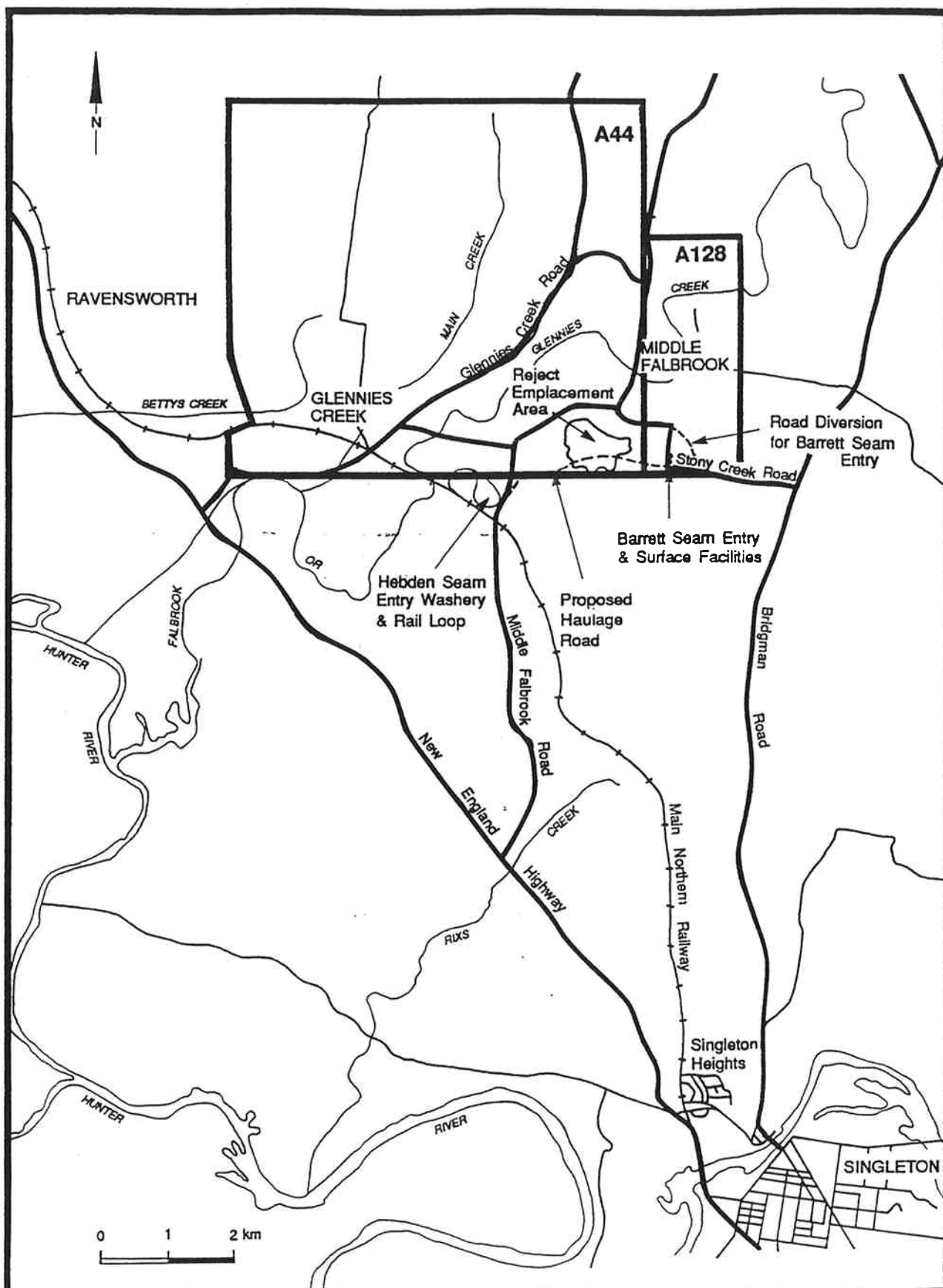
Appendix 1



Appendix 2

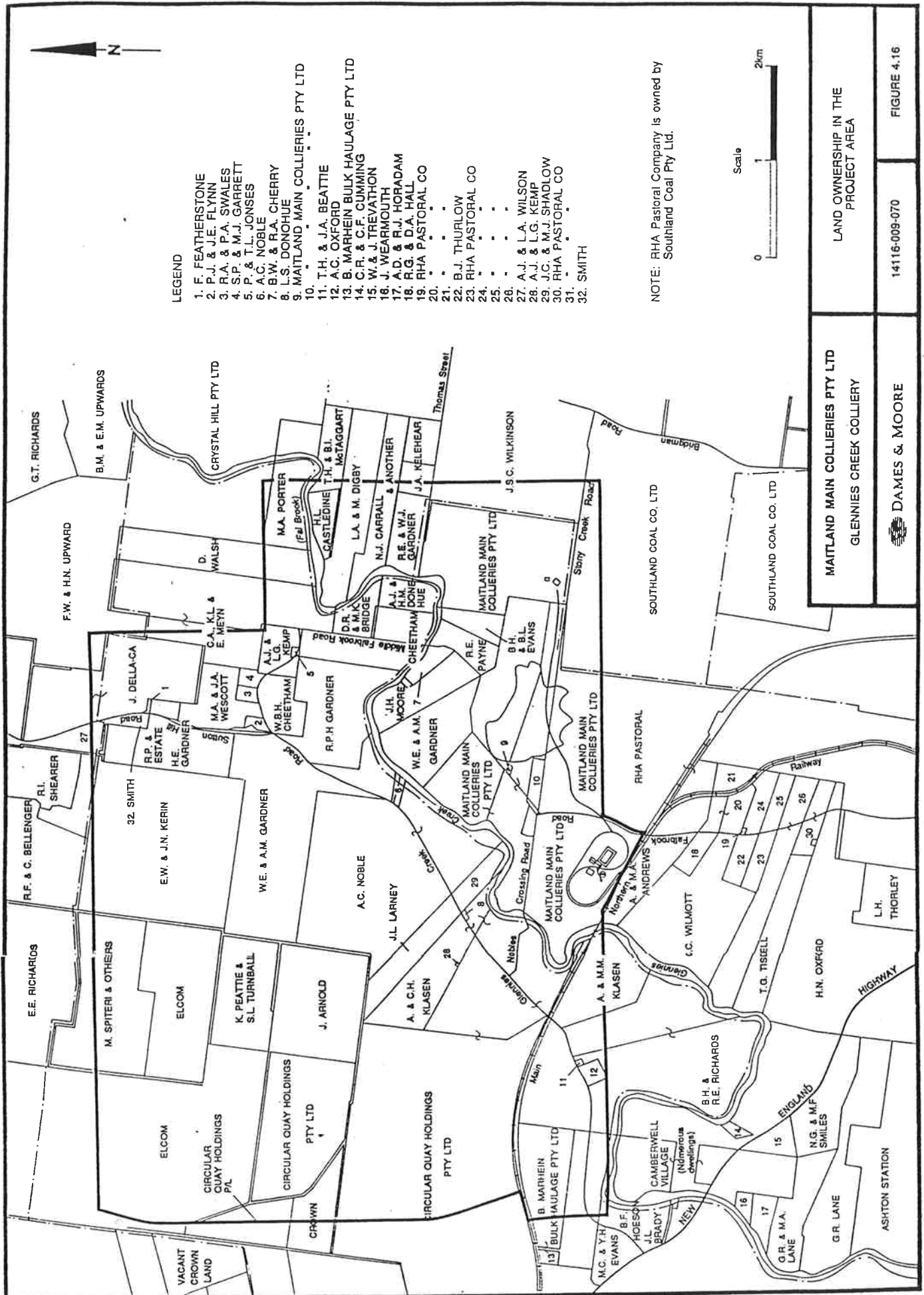


Appendix 3



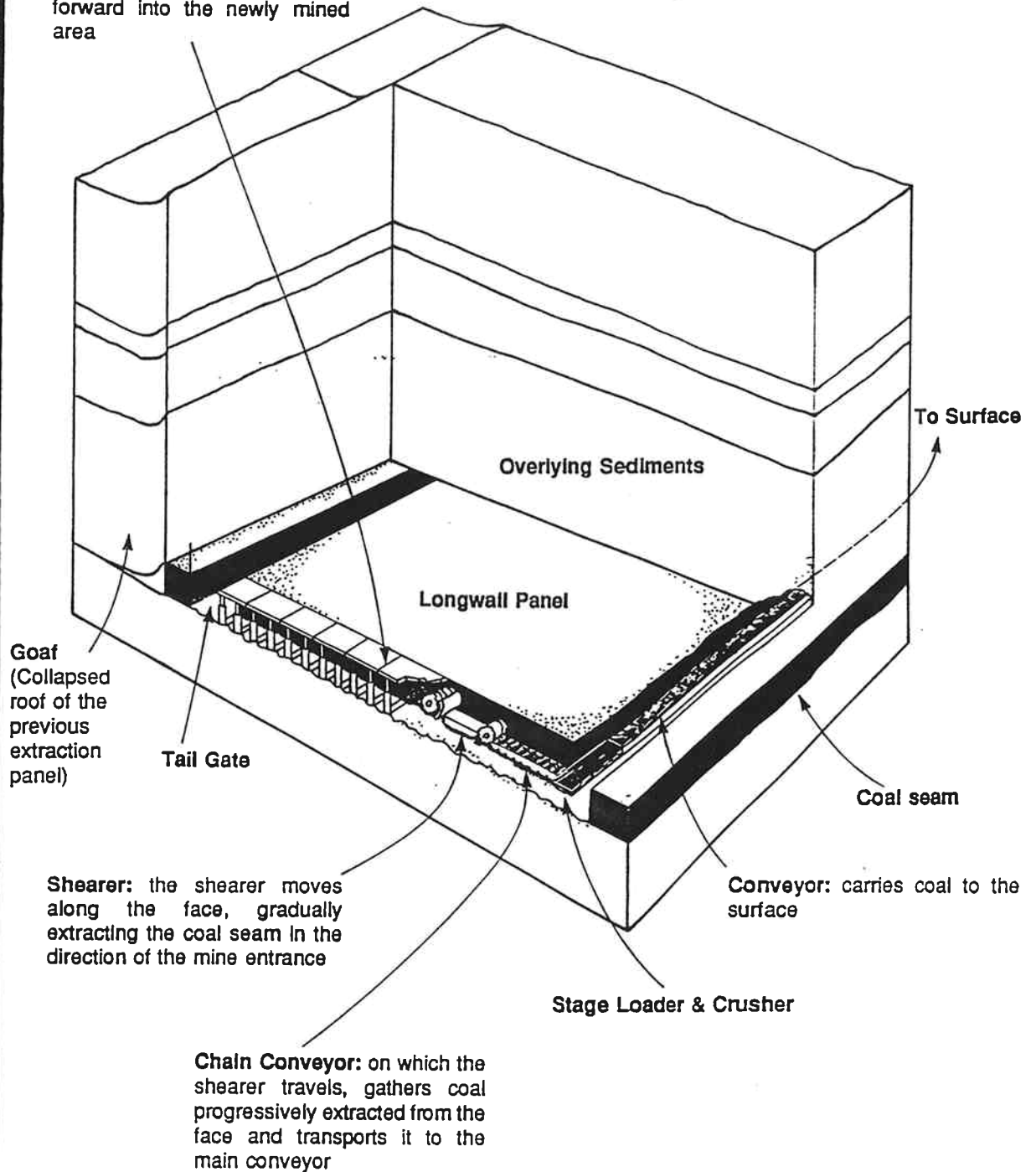
MAITLAND MAIN COLLIERIES PTY LTD GLENNIES CREEK COLLIERY	GENERAL LOCATION FEATURES	
 DAMES & MOORE	14116-009-070	FIGURE 4.1

Appendix 4



Appendix 5

Hydraulic Jacks: support the roof during Longwall Mining operations. As the coal is extracted, the jacks are moved forward into the newly mined area



Source: Australian Coal Association

MAITLAND MAIN COLLIERIES PTY LTD
GLENNIES CREEK COLLIERY

SCHEMATIC CROSS-SECTION
OF A TYPICAL LONGWALL PANEL

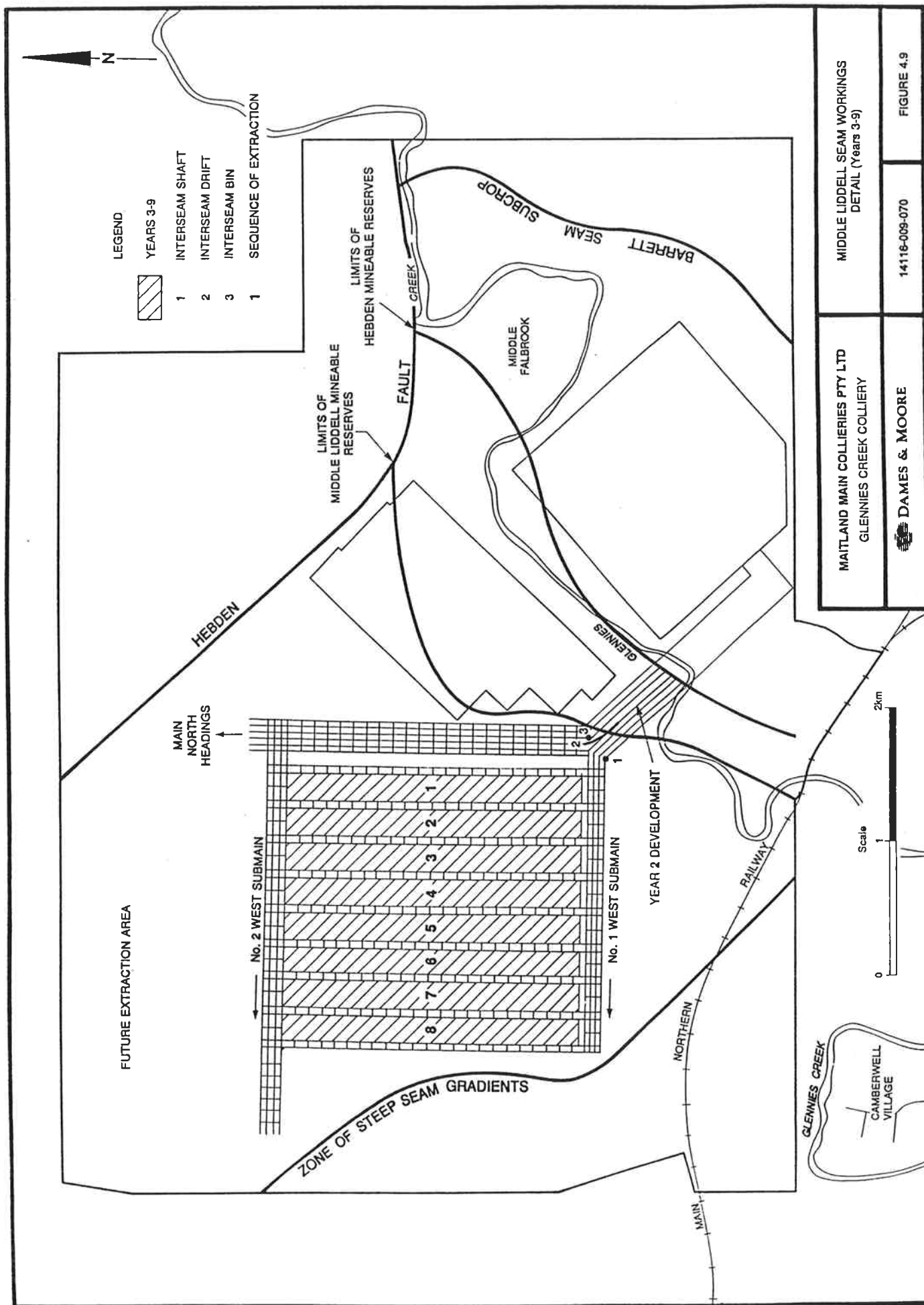


DAMES & MOORE

14116-009-070

FIGURE 4.12

Appendix 6



MAITLAND MAIN COLLIERIES PTY LTD
GLENNIES CREEK COLLIERY

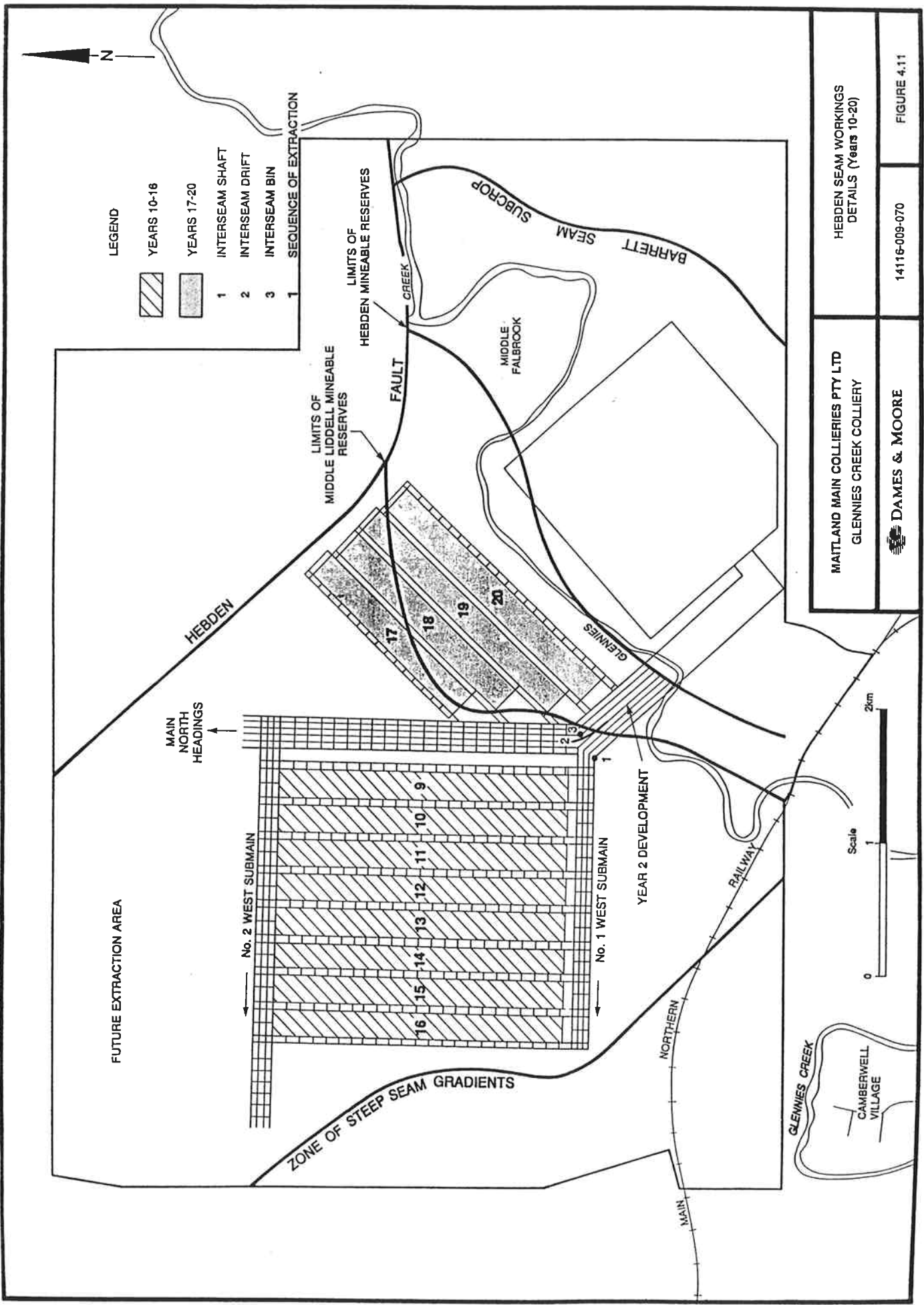
MIDDLE LIDDELL SEAM WORKINGS
DETAIL (Years 3-9)

DAMES & MOORE

14116-009-070

FIGURE 4.9

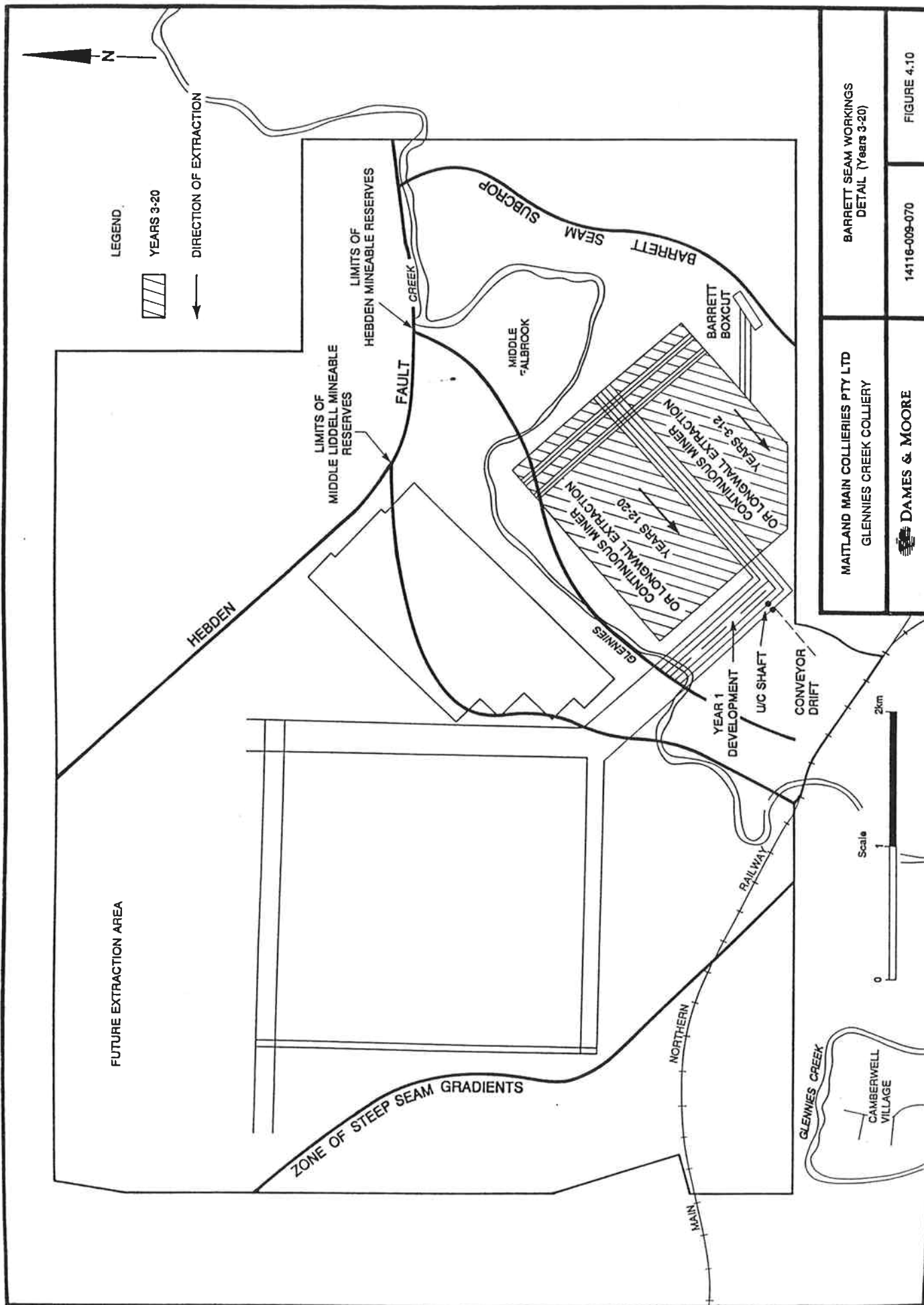
Appendix 7



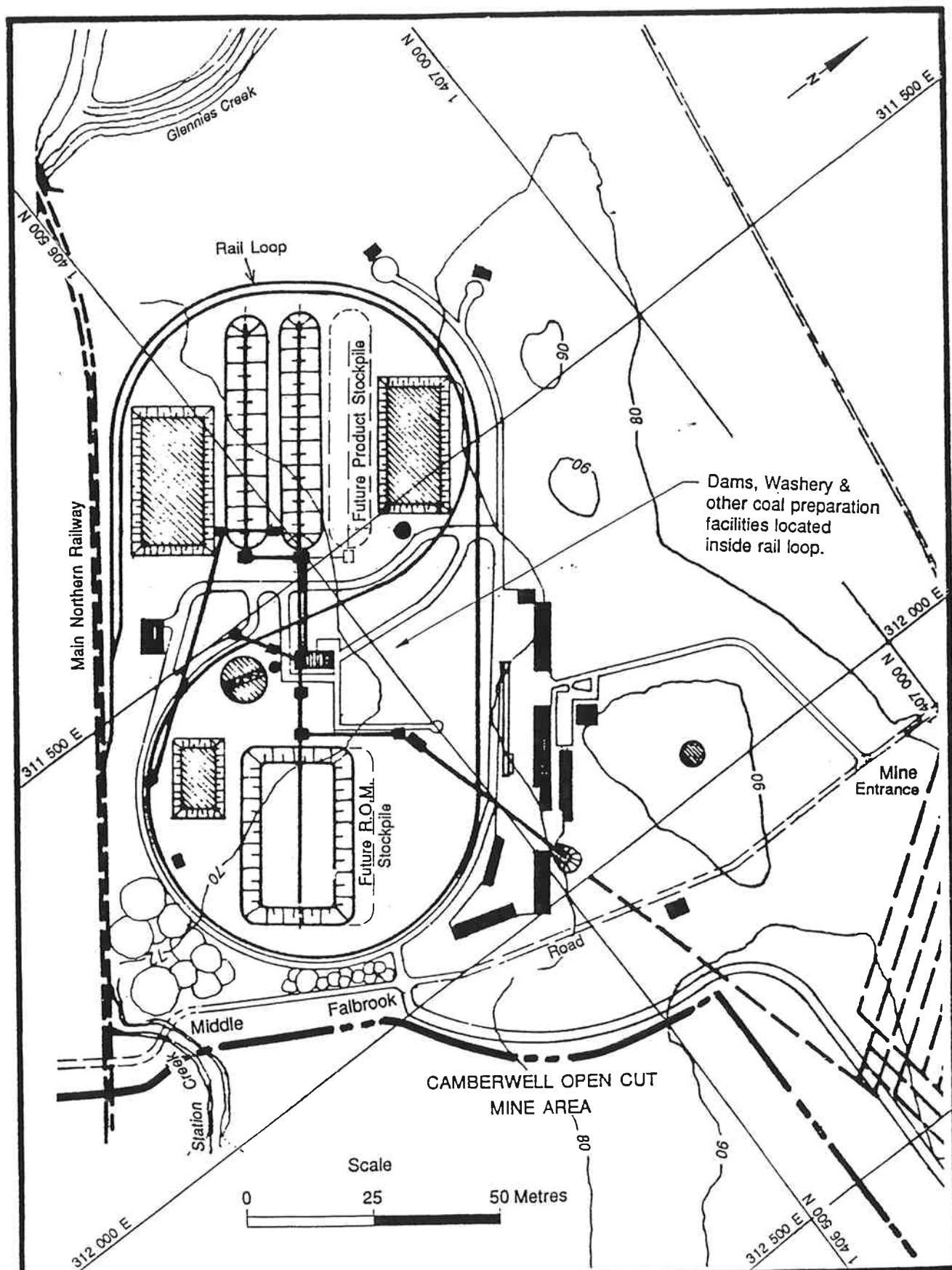
MAITLAND MAIN COLLIERIES PTY LTD GLENNIES CREEK COLLIERY	HEBDEN SEAM WORKINGS DETAILS (Years 10-20)
14116-009-070	FIGURE 4.11

DAMES & MOORE

Appendix 8



Appendix 9



MAITLAND MAIN COLLIERIES PTY LTD
GLENNIES CREEK COLLIERY

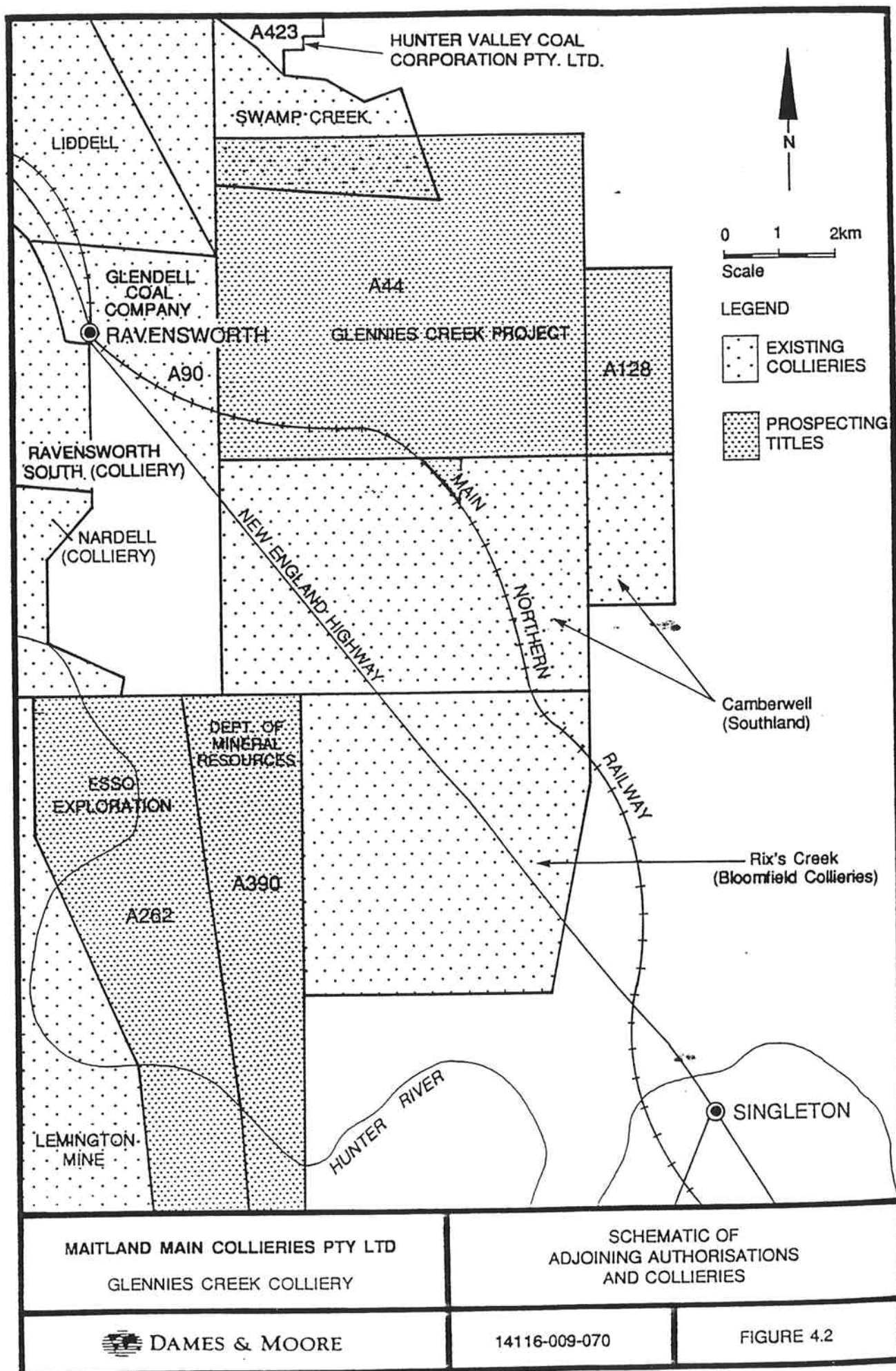
HEBDEN SEAM ENTRY RAIL LOOP
AND COAL HANDLING FACILITIES

 DAMES & MOORE

14116-009-070

FIGURE 4.14

Appendix 10



Appendix 11

GLENNIES CREEK PROPOSED UNDERGROUND COAL MINE

ISSUES IDENTIFIED BY PARTIES

1. AIR

- quality
- dust
- wind roses

2. NOISE

- of proposed development
- blasting (especially impact on 'Dulwich')

3. WATER

- quality
- loss
- ground water

4. SUBSIDENCE

- effect on land
- effect on residences
- water impacts

5. IMPACT OF PROPOSED DEVELOPMENT ON RESIDENTIAL AND RURAL PROPERTIES INCLUDING "DULWICH"

6. LAND ACQUISITION

7. ROAD

- safety
- financial contributions to Council

8. VISUAL IMPACT

9. MONITORING OF PROPOSED DEVELOPMENT

10. WATER RETENTION AND WASTE MATERIALS

11. COMPENSATION

12. CONDITIONS OF CONSENT

Appendix 12

**MAITLAND MAIN COLLIERIES PTY LIMITED
PROPOSED GLENNIES CREEK COAL MINE, SINGLETON**

LIST OF SUBMISSIONS

1. Maitland Main Collieries Pty Limited
 - 1.1 EIS Vol 1: Summary
 - 1.2 EIS Vol 2: Supplementary Studies
 - 1.3 EIS Vol 3: Figures
 - 1.4 Letter to Singleton Shire Council Re Responses to Submissions Made to the EIS (20.11.90)
 - 1.5 Letter to Singleton Shire Council Re Update to Responses to EIS (14.1.91)
 - 1.6 Letter to Singleton Shire Council Re Proposed Road System (19.2.91)
 - 1.7 Minister's Determination on the Camberwell Coal Project (19.3.90)
 - 1.8 Option Agreement Between Camberwell Coal Pty Limited and Mr and Mrs Hall (12.2.90)
 - 1.9 Agreement between Camberwell Coal Pty Limited and Mr and Mrs Andrews
 - 1.10 Camberwell Coal Joint Venture - EIS (October 1989)
 - 1.11 Findings of the Wardens Inquiry into the Glennies Creek Coal Mine Proposal and Purport of His Report to the Minister (16.3.90)
 - 1.12 Mining Wardens Report to the Minister (23.3.90)
 - 1.13 Questions to A and MA Andrews
 - 1.14 Questions to RG & DA Hall
 - 1.15 Questions to the Department of Minerals and Energy
 - 1.16 Questions to State Pollution Control Commission
 - 1.17 Questions to Camberwell Coal Pty Limited
 - 1.18 Questions to Singleton Shire Council
 - 1.19 Questions to the Department of Planning
 - 1.20 Answers to Questions from Commissioner John Woodward (by letter dated 25.6.91)
 - 1.21 Report by Anderson Rea Pty Limited Re Budget Costing
 - 1.22 Board of Photographs - Views from Andrews and Hall Properties (one copy)
 - 1.23 Board of Maps Outlining Transport and Infrastructure of Mine Proposal (one copy)
 - 1.24 Plan Showing Land Ownership in the Project Area
 - 1.25 Report by Clive Lucas Re Heritage Value of 'Dulwich' Nundah
 - 1.26 Curriculum Vitae for Clive Lucas
 - 1.27 Transcript from Mining Warden Inquiry dated 22.2.90
 - 1.28 Transcript from Mining Warden Inquiry dated 23.2.90
 - 1.29 Observations from View (Site Inspection) dated 3.7.91
 - 1.30 Aerial Photograph Showing Subject Site (one copy)
 - 1.31 Topographical Map (one copy)
 - 1.32 Draft Conditions of Consent
 - 1.33 Submission in Reply
 - 1.34 Letter dated 1.7.80 Re Coal Lease Application
 - 1.35 Further Submission in Reply

- 1.36 Answers to Questions from RG & DA Hall
- 1.37 Submission in Reply to Submissions by SPCC and Department of Planning
- 1.38 Supplementary Information Re Noise supplied at Commissioner Woodward's request

2. Singleton Shire Council

- 2.1 Primary Submission
- 2.2 Answers to Questions from Commissioner John Woodward (by letter dated 25.6.91)
- 2.3 Answers to Questions from Maitland Main Collieries Pty Limited
- 2.4 Submission in Reply

3. Department of Mineral Resources

- 3.1 Primary Submission
- 3.2 Answers to Questions from Commissioner John Woodward (by letter dated 25.6.91)
- 3.3 Report by Dr L Holla dated 1.7.91 Re Assessment of EIS, in Particular Subsidence Predictions

4. Department of Planning

- 4.1 Primary Submission
- 4.2 Question to Maitland Main Collieries Pty Limited
- 4.3 Answers to Questions from Commissioner John Woodward (by letter dated 25.6.91)
- 4.4 Answers to Questions from Maitland Main Collieries Pty Limited
- 4.5 Answers to Questions from Commissioner John Woodward (by letter dated 1.7.91)
- 4.6 Draft Conditions of Consent
- 4.7 Revised Conditions of Consent
- 4.8 Submission in Reply

5. Department of Water Resources

- 5.1 Primary Submission
- 5.2 Draft Conditions of Consent

6. Camberwell Coal Pty Limited

- 6.1 Primary Submission

7. Andrews, A and MA

- 7.1 Primary Submission
- 7.2 Answers to Questions from Maitland Main Collieries Pty Limited
- 7.3 Draft Conditions of Consent

8. Hall, RG & DA

- 8.1 Primary Submission
- 8.2 Questions to Maitland Main Collieries Pty Limited
- 8.3 Answers to Questions from Maitland Main Collieries Pty Limited
- 8.4 Points for Consideration in Preparing Conditions of Consent
- 8.5 Draft Conditions of Consent
- 8.6 Submission in Reply
- 8.7 Judgement by His Honour Mr Justice McLelland - Parancool v North Sydney Municipal Council and ADC Properties, May 1982

9. State Pollution Control Commission

- 9.1 Primary Submission
- 9.2 SPCC Licences - Camberwell Coal Project
- 9.3 SPCC Licences - Rixs Creek Coal Project
- 9.4 Answers to Questions from Commissioner John Woodward (by letter dated 25.6.91)
- 9.5 Answers to Questions from Maitland Main Collieries Pty Limited
- 9.6 Letter from Maitland Main Collieries Pty Limited dated 13.12.90 - Supplementary Information to EIS
- 9.7 Answers to Questions from Commissioner John Woodward (verbal questions - 2.7.91)
- 9.8 Answers to Questions from Commissioner John Woodward (by letter dated 1.7.91)

10. Bowman, WG

- 10.1 Primary Submission (received after final hearing - 1.8.91)

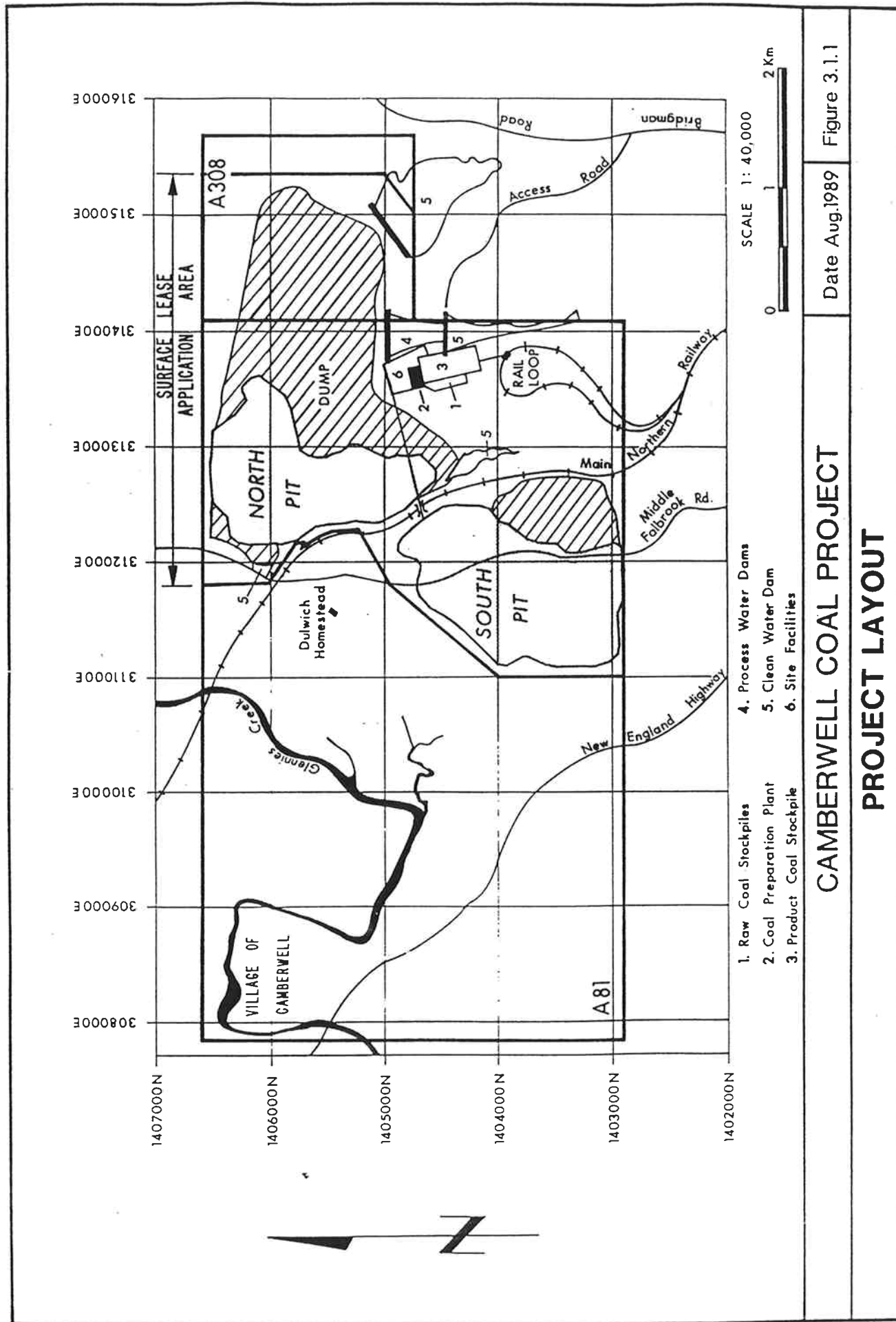
Appendix 13

DRAFT SITE INSPECTION ITINERARY
COMMISSION OF INQUIRY
INTO GLENNIES CREEK MINE

- 10.00 am* Depart Council Chambers travelling to mine site office via State Highway No. 9 (New England Highway), Middle Falbrook Road, and visiting the residences numbered 1, 2, 3, 28, 29 and 30 en route.
- 10.30 am Arrive at Mine site office, travel to infrastructure site (location of rail loop, stock piles, etc)
- 11.00 am Depart from infrastructure site, viewing Nobles Lane/Crossing prior to travelling to the proposed location of pit openings and emplacement area, via Middle Falbrook Road
- 11.30 am Depart from emplacement area, viewing residences numbered 22 and 25, then travelling to the Trig Station off Glennies Creek Road, north of "Sydenham", for an over view of the proposal and Middle Falbrook/Glennies Creek area.
- 12.00 pm Depart Trig Station, travelling down Glennies Creek Road to view residences numbered 10, 11, 12, 13, 15, 16 and 17, then via Middle Falbrook, Stony Creek and Bridgman Roads, visiting the Camberwell/Rixs Creek Joint User facility, then returning to Council Chambers by 1.00 pm.

* Note : Site Inspection Itinerary moved forward and commenced at 8.30 am on 3 July 1991 instead of 10 am

Appendix 14



CAMBERWELL COAL PROJECT

PROJECT LAYOUT

Date Aug.1989 Figure 3.1.1

Appendix 15

**COMMISSION OF INQUIRY
MAITLAND MAIN COLLIERIES PTY LIMITED PROPOSED
COAL MINE AT GLENNIES CREEK**

BACKGROUND DOCUMENTS

- A. Instrument of Appointment (1.5.91)
- B. Development Application to Singleton Shire Council (23.8.90)
- C. Maitland Main Collieries Pty Limited - Glennies Creek Coal Mine EIS - Volume 1: Summary (August 1990)
- D. Maitland Main Collieries Pty Limited - Glennies Creek Coal Mine EIS - Volume 2: Supplementary Studies (August 1990)
- E. Maitland Main Collieries Pty Limited - Glennies Creek Coal Mine EIS - Volume 3: Figures (August 1990)
- F. Submissions Received by Singleton Shire Council in Response to the Exhibition of the EIS
- G. Singleton Shire Council's Decision on the Matter (20.3.91)
- H. Singleton Shire Council - Manager/Town Planner's Report
- I. Camberwell Coal Joint Venture - Camberwell Coal Project, Glennies Creek, NSW EIS (October 1989)
- J. Minister's Determination on the Camberwell Coal Project (19.3.90)
- K. Option Agreement Between Camberwell Coal Pty Limited and Mr and Mrs Hall (12.2.90)
- L. Findings of the Wardens Inquiry into the Glennies Creek Coal Mine Proposal (16.3.90)
- M. Letter from Maitland Main Collieries Pty Limited to Singleton Shire Council Regarding Responses to Submissions made to the EIS (20.11.90)
- N. Letter from Maitland Main Collieries Pty Limited to Singleton Shire Council - Update Regarding Responses to the EIS (14.1.91)
- O. Letter from Maitland Main Collieries Pty Limited to Singleton Shire Council Regarding Proposed Road System (19.2.91)
- P. Department of Planning - Draft Conditions of Consent

- Q. Extract from Local Planning Instrument - Singleton Planning Scheme
- R. Relevant Clauses of the Hunter Regional Environmental Plan 1989
- S. Mining Warden's Report to the Minister (23.3.90)

Appendix 16

**SUPPLEMENTARY REPORT
TO ASSESS CUMULATIVE AIR QUALITY IMPACTS FROM MINING
NEAR THE GLENNIES CREEK PROJECT**

Prepared

for

Maitland Main Collieries Pty Limited

by

**Nigel Holmes & Associates
80 Curtis Road
Balmain NSW 2041**

12 July 1991

CONTENTS

1.0 INTRODUCTION	1
2.0 EMISSIONS FROM NEIGHBOURING MINES	1
3.0 DISCUSSION	3
4.0 CONCLUSIONS	3

1.0 INTRODUCTION

This report has been prepared to assess the cumulative air quality impacts that are expected to occur with simultaneous operation of the Glennies Creek underground mine and the Camberwell and Glendell open cut mines. These latter mines lie to the southeast and west-northwest of the Glennies Creek mine. The two open cut mines will have changing areas of impact as the mines are developed over their respective lives. The Camberwell mine is in its first year of development and its development over time is reasonably well defined and is set out in the environmental impact statement for the project. The Glendell Project now holds both development consent and a mining lease. Commencement of mining is now a commercial decision. As such, the development schedule of the Glendell mine relative to Camberwell and Glennies Creek (assuming development consent is granted for Glennies Creek), is now more certain. Apart from a brief discussion on Page 47 of Volume 1 of the Environmental Impact Statement (EIS), Glendell was not included in the assessment of cumulative impacts in the EIS, which was written in March and April 1990, because at that time Glendell did not have a mining lease.

However, given the high probability that now there will be concurrent operation of these three neighbouring mines, it is necessary to prepare an air quality assessment assuming simultaneous operation of all three mines. Other mines in the Hunter Valley will also contribute to cumulative impacts but the contributions in the vicinity of the Glennies Creek Project will be minor compared with the contributions from Glendell and Camberwell.

2.0 EMISSIONS FROM NEIGHBOURING MINES

To undertake the assessment it is necessary to select a period when the locations of mining operations of the open cut mines will be such as to give rise to the "worst-case" impact and to prepare an inventory of dust emissions from each of the mines. Examination of the environmental impacts for each of the mines indicates that the cumulative impacts will be at their worst in Year-3 of Glennies Creek, Year-5 of Camberwell and Year-2 of Glendell¹. If these three mining years were all to occur in the same actual year, then this would represent the period of "worst-case" cumulative impact. This scenario is also a reasonably

¹ The Glendell Environmental Impact Statement does not present a detailed description of the mine development schedule in terms of years after commencement. The estimated working area and level activity referred to above as Year-2 has been determined by linearly interpolating Figures 4.8 and 4.9 in the Glendell EIS, which presents the development of the mine and overburden emplacement areas in Years-4 and -8). During this early stage in the life of the mine (Year-2) mining will be taking place in the southeast corner of the pit and waste disposal will be taking place on the eastern side of the waste disposal area, that is close to the Glennies Creek surface facilities. This represents a period of high dust production for the Glendell Project because of the activity associated with out-of-pit emplacement of waste is at a high level.

likely outcome. Year-3 of Glennies Creek would be most likely to occur with Year-5 of Camberwell. If Glendell were to commence mining after Glennies Creek then clearly there would be no possibility that Year-2 of Glendell would coincide with Year-3 of Glennies Creek, but a reasonable approximation to this situation (in-terms of dust emissions) could occur.

Emissions inventories for dust from Glennies Creek and Camberwell are presented in the respective Environmental Impact Statements for these mines. The emissions inventory for Glendell was developed for the interpolated Year-2 using the same emission factors and particle size distributions and general methodology as for the other two mines.

Table 1 summarises the estimated dust emissions for each of the major dust producing operations. Some adjustments (grouping of dust from similar or related activities) have been made to the inventories to allow a comparison between the dust emissions from similar activities on each mine.

TABLE 1
INVENTORY OF DUST EMISSIONS

Activity	Estimated Camberwell Year 5	Emission - (t.year ⁻¹)	
		Glendell Year ~2	Glennies Creek Year 3
Hauling overburden/Waste	668.5	4924.2	166.8
Loading overburden	626.8	1968.8	-
Dumping overburden	300.8	945.0	-
Drilling	0.5	0.5	-
Blasting	33.7	30.0	-
Hauling coal	180.1	423.5	264.0
Loading coal	58.0	104.4	16.2
Dumping coal	20.0 ²	36.0	1.0
Ripping coal	312.1	809.4	-
Dozer on overburden	0.7	0.7	-
Scraper on overburden/top soil	86.7	86.7	-
Graders	2.3	2.3	-
Stockpile wind erosion	63.1	30.8	22.9
Mine wind erosion	175.0	82.5	-
Waste dump/roads wind erosion	87.6	82.5	36.8
Dozer on stockpile/clean up	29.4	117.6	93.3
Loading trains	1.0		
Loading product to stockpile	1.0		3.2
TOTAL	2647.3	9644.9	604.2

² In the Camberwell EIS the dust emission rates listed in the Table 7.4.9 of the Environmental Impact Statement show dust from coal dumping as 200 tonnes per year. The correct value is 20 tonnes and this value has been used in all dispersion modelling runs including those in the Camberwell EIS and in this present report.

In the mining years for which the assessment is undertaken, the assumed raw coal production from each mine and dust to coal ratios are as follows:

- o Glendell 3.60 Mt and 2.68 kg of dust per tonne of raw coal (open-cut mine),
- o Glennies Creek 2.55 Mt and 0.24 kg of dust per tonne of raw coal (underground mine), and
- o Camberwell 2.00 Mt and 1.32 kg of dust per tonne of raw coal (open cut mine).

3.0 DISCUSSION

A dispersion model (DUSTGLC) has been used to predict the dust deposition and concentration in the area for the emission conditions summarised by Table 1 above. Two scenarios are presented, one in which all three mines are operating and one in which Glennies Creek does not operate but Glendell and Camberwell do. The results are presented in Figures 1 to 4.

It is clear that the effects of the Glennies Creek mine are limited in area and make little difference to the impacts that will be experienced. This is not unexpected given the relatively small proportion of dust that will be generated by the Glennies Creek mine compared with the other two.

4.0 CONCLUSIONS

The consideration of Glendell in the assessment of cumulative impact of mining in this area of the Hunter Valley results in a significant change in the areas affected by predicted increase in dust fallout levels above the $2 \text{ g.m}^{-2}\text{.month}^{-1}$ increment. However, the introduction of Glennies Creek emissions represents a relatively minor increment in the overall impact from the two larger open cuts. It is also interesting to compare the southern portion of the $2 \text{ g.m}^{-2}\text{.month}^{-1}$ isopleth in Figure 1 with the equivalent area on Figure 1 of the Glendell Coal Mine Commissioners of Inquiry report of January 1983. This figure shows the area considered likely to be affected by dust at a level that would be "inconsistent with amenity". The southern extent of these curves are similar until the area is reached where Camberwell (and to a lesser extent Glennies Creek) begin to contribute dust to the ambient air. These latter two mines were not considered in the 1983 Inquiry into the Glendell Mine. The northern portions cannot be compared because the present assessment only looks for what might be the "worst-case" with respect to Glennies Creek, which is when Glendell activity is high in the southeast corner of that mine and waste disposal area.

Table 2 summarises the changes in air quality that are predicted by the model for Residences 1 and 2 for two different assumptions concerning mine development; one assuming all three mines proceed and the other assuming that Glendell and Camberwell proceed.

TABLE 2
COMPARISON OF AIR QUALITY FOR DIFFERENT
DEVELOPMENT ASSUMPTIONS¹

	Residence 1	Residence 2
Predicted increase in dust deposition ($\text{g.m}^{-2}.\text{month}^{-1}$)		
Glendell/Glennies/Camberwell	7.	4.5
Glendell/Camberwell	6.	4.
Predicted increase in dust concentration ($\mu\text{g.m}^{-3}$)		
Glendell/Glennies/Camberwell	150	90
Glendell/Camberwell	120	80

¹ Note, the figures in the table have been read from Figures 1 to 4 by interpolating between the contours. The accuracy of the interpolation in the vicinity of residences to the immediate south of the rail loop (ie those in Table 2) is approximately $0.5 \text{ g.m}^{-2}.\text{month}^{-1}$ for deposition and $10 \mu\text{g.m}^{-3}$ for concentration. The accuracy in the positions of the contours for other locations has not been checked.

Clearly the emissions from the Glennies Creek Mine are a relatively minor consideration when compared with emissions from the other two mines even for residences close to the mine.

Nigel Holmes & Associates

Nigel Holmes

Nigel Holmes PhD
Atmospheric Physicist

Date: *12/July/1991.*

Report dated July 18, 1991

by

Dr Nigel Holmes

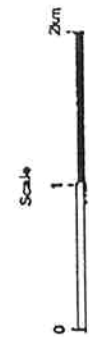


NOTE

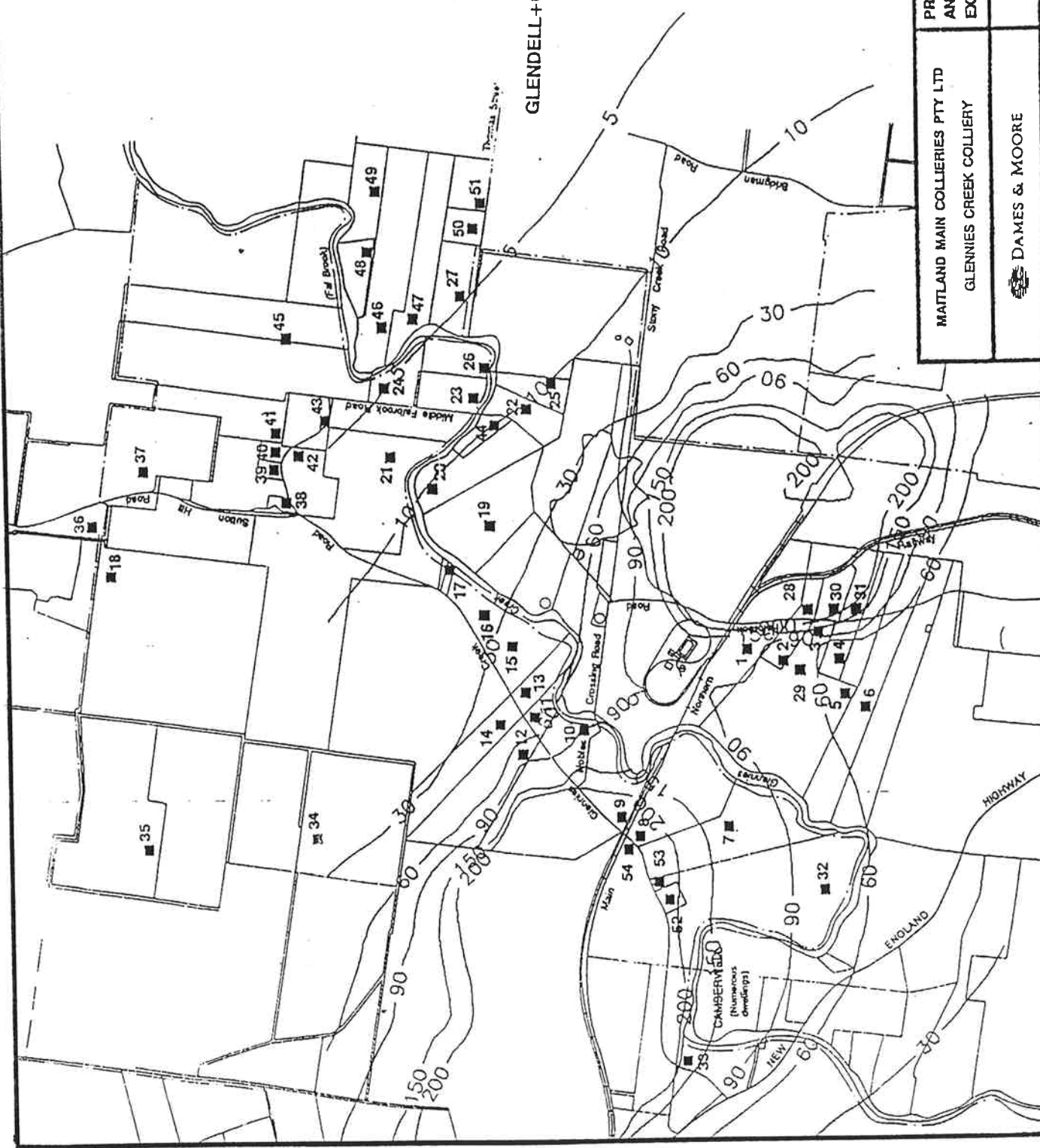
○ Company owned dwellings occupied by tenants

3 & 28 are unoccupied

■ Residence



GLENDELL+CAMBERWELL



PREDICTED INCREASE IN CUMULATIVE ANNUAL AVERAGE DUST CONCENTRATION EXCLUDING GLENNIES CREEK - ($\mu\text{g}/\text{m}^3$)	FIGURE 4
MAITLAND MAIN COLLIERIES PTY LTD GLENNIES CREEK COLLIERY	14116-009-070
DAMES & MOORE	



NOTE

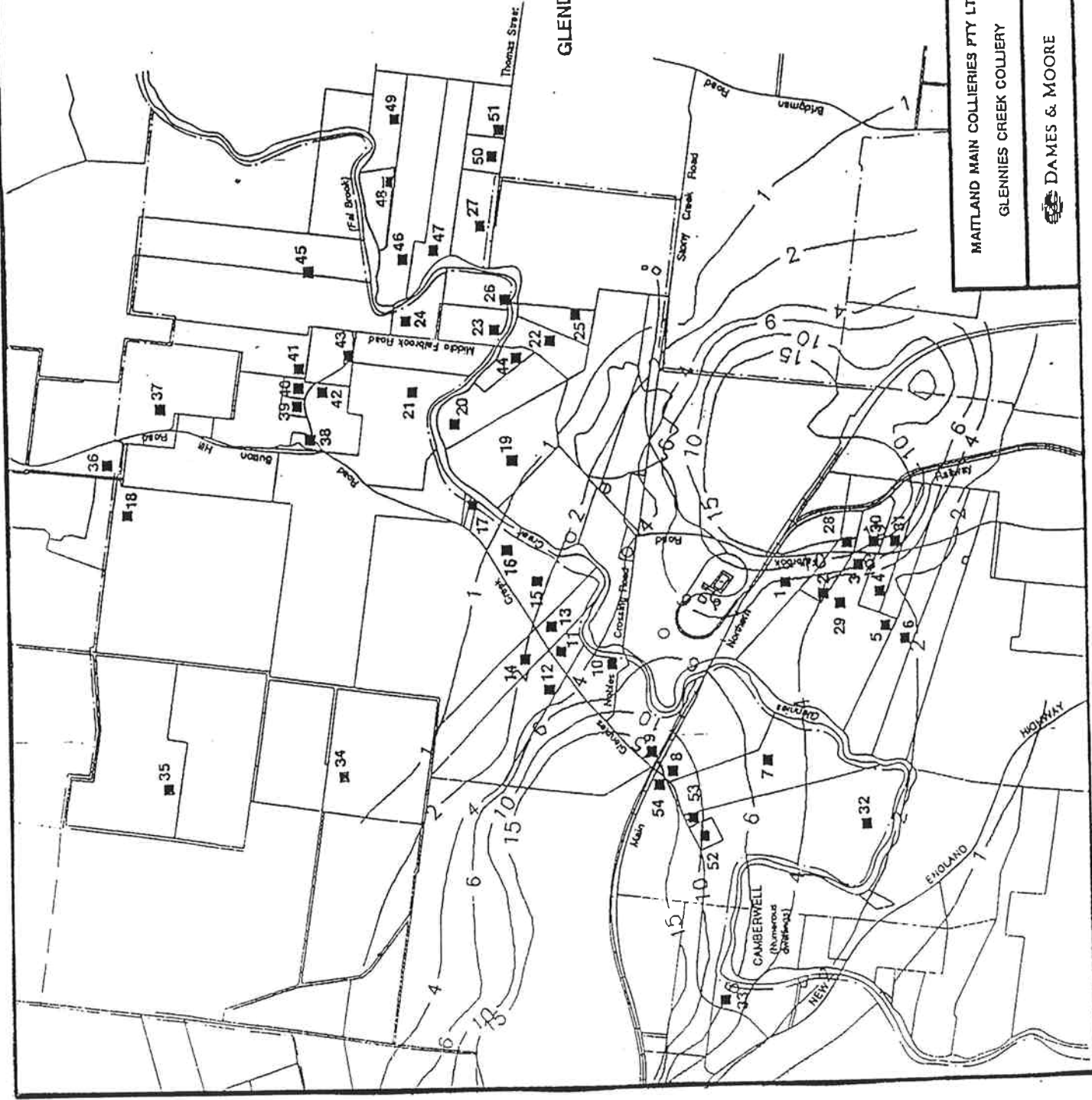
○ Company owned dwellings occupied by tenants

3 & 28 are unoccupied

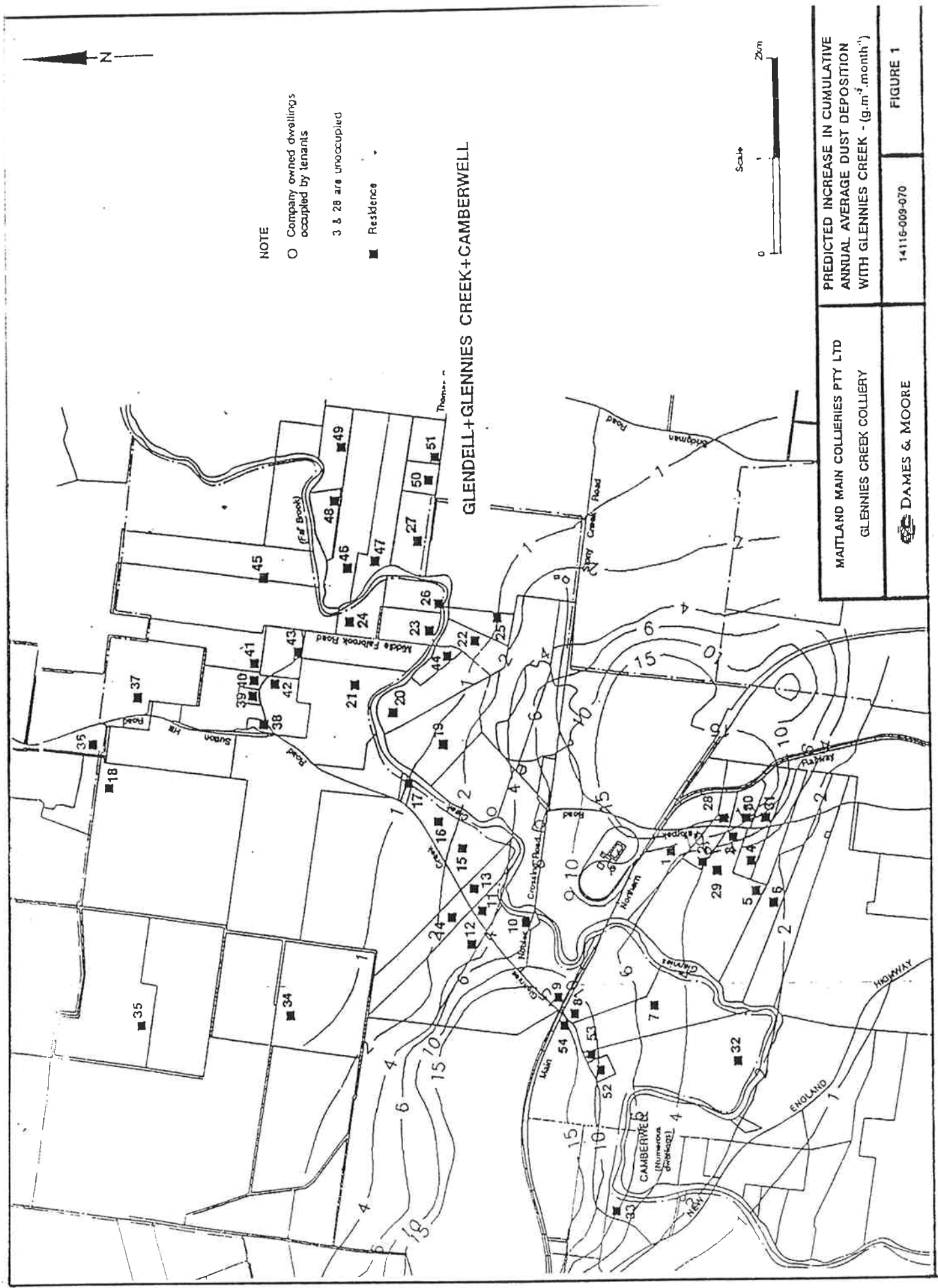
■ Residence



GLENDALL + CAMBERWELL



PREDICTED INCREASE IN CUMULATIVE ANNUAL AVERAGE DUST DEPOSITION EXCLUDING GLENNIES CREEK - (g.m ² .month ⁻¹)	MATT LAND MAIN COLLIERIES PTY LTD GLENNIES CREEK COLLIERY
14116-009-070	DAMES & MOORE
FIGURE 3	



NOTE

- Company owned dwellings occupied by tenants
- 3 & 28 are unoccupied
- Residence

GLEND+GLENNIES CREEK+CAMBERWELL

MATLAND MAIN COLLIERIES PTY LTD GLENNIES CREEK COLLIERY	PREDICTED INCREASE IN CUMULATIVE ANNUAL AVERAGE DUST DEPOSITION WITH GLENNIES CREEK - (g.m ² .month ⁻¹)
DAMES & MOORE	14116-009-070 FIGURE 1

FIGURES

Nigel Holmes & Associates

80 Curtis Road
Balmain NSW
Australia 2041
Telephone: (61-2) 810 8224
Facsimile: (61-2) 810 8224
ACN 003 741 035

FACSIMILE MESSAGE

To: Warren Krass - Ternes & Salier
From: Nigel Holmes - Sydney (Phone 61-2-810-8224
Fax 61-2-810-8224)
Date: 18 July 1991
Subject: GLENNIES CREEK - RESPONSE TO DEPARTMENT OF
PLANNING SUBMISSION

Number of pages is 2 including this page

I have reviewed the Department of Planning's (DoP) final submission to the Inquiry. Here are my comments.

The DoP state that "The assumed dust generation activities (proposed) at Glendell need to be further checked as an update of prediction". I assume that this means either that the DoP do not accept the cumulative impact assessment that I prepared (at least as far as the contribution from Glendell is concerned), or they have not done the checking themselves. On either basis of non-acceptance its doubt appears to result from a comparison of the lower amounts of dust per tonne of coal that are estimated for Camberwell, Rixs Creek, Howick and Narama. I can comment on the differences for Rix's Creek and Camberwell, but I can't do so for the other mines without considerable effort (and time).

The main reason why Glendell's dust to coal ratio is higher than for the other mines is because of the large amounts of overburden that are required to be removed and the fairly long haul distances that have to be used compared with Rixs's Creek and Camberwell. It is not really related to the use of modern mining equipment or other factors. The emissions inventories were all calculated assuming the use of modern equipment and mining techniques. Notwithstanding this Glendell could reduce dust emissions by using larger haul trucks, and they may do so when they actually commence mining (see later).

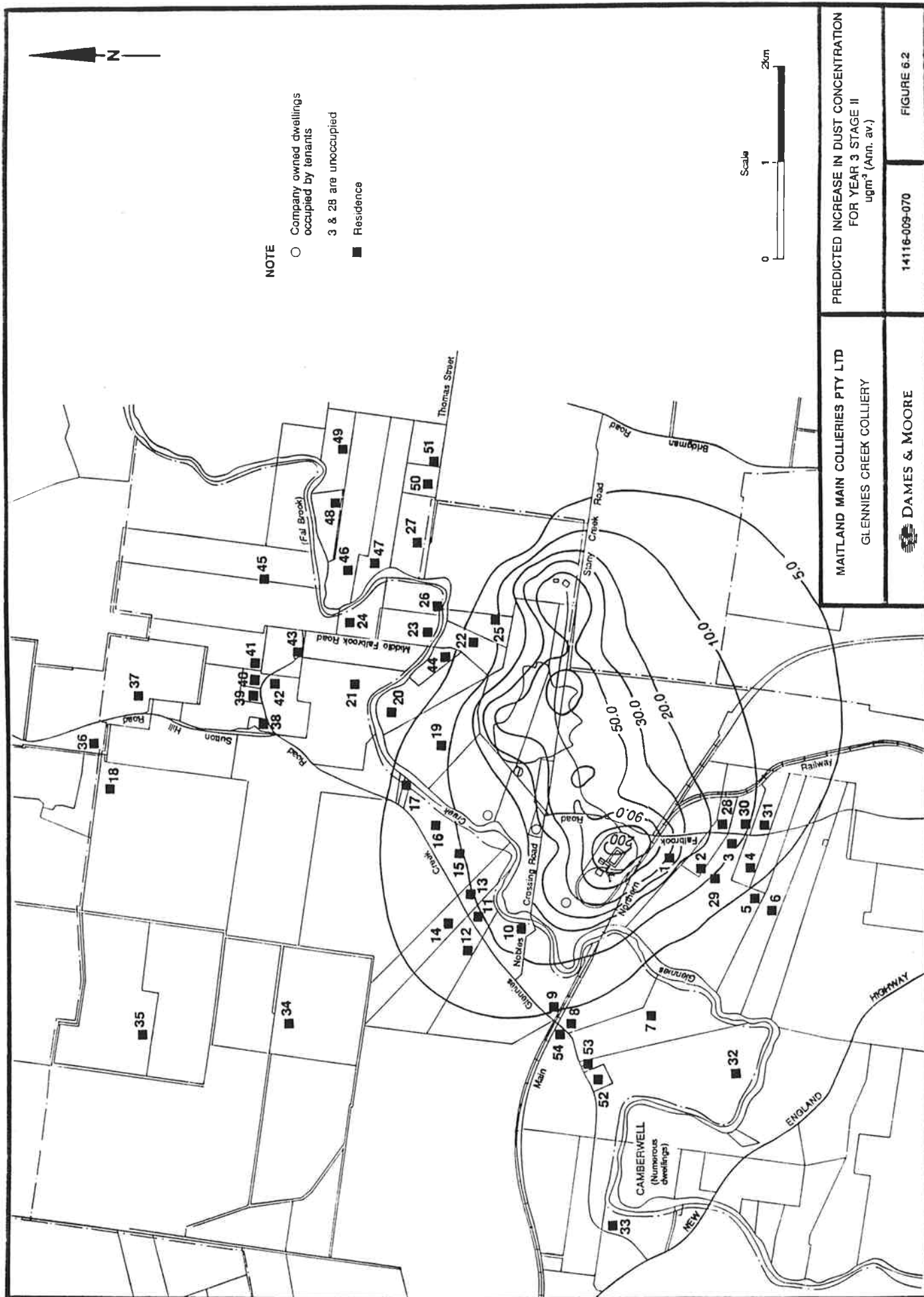
For the year modelled (Glendell Year-2), I assumed that the amount of overburden moved was 31.5 million bank cubic metres and that this would be moved in 154 t trucks through an average haul distance of 6.5 km return. Overburden haulage

accounts for about half the dust estimated for Glendell in Year-2. If this assumption is substantially incorrect then the estimated amount of dust will of course be correspondingly incorrect. However, the equipment inventory for Glendell supports the proposition as it lists thirty five 154 t (see Table 4.4 of the Glendell EIS). Camberwell uses seven 240 t trucks for the same activity (see Table 1 of the air quality report for Camberwell). (Rix's Creek uses scrapers for this activity and much shorter haul distances and so cannot be compared in this simple way).

Nigel Holmes

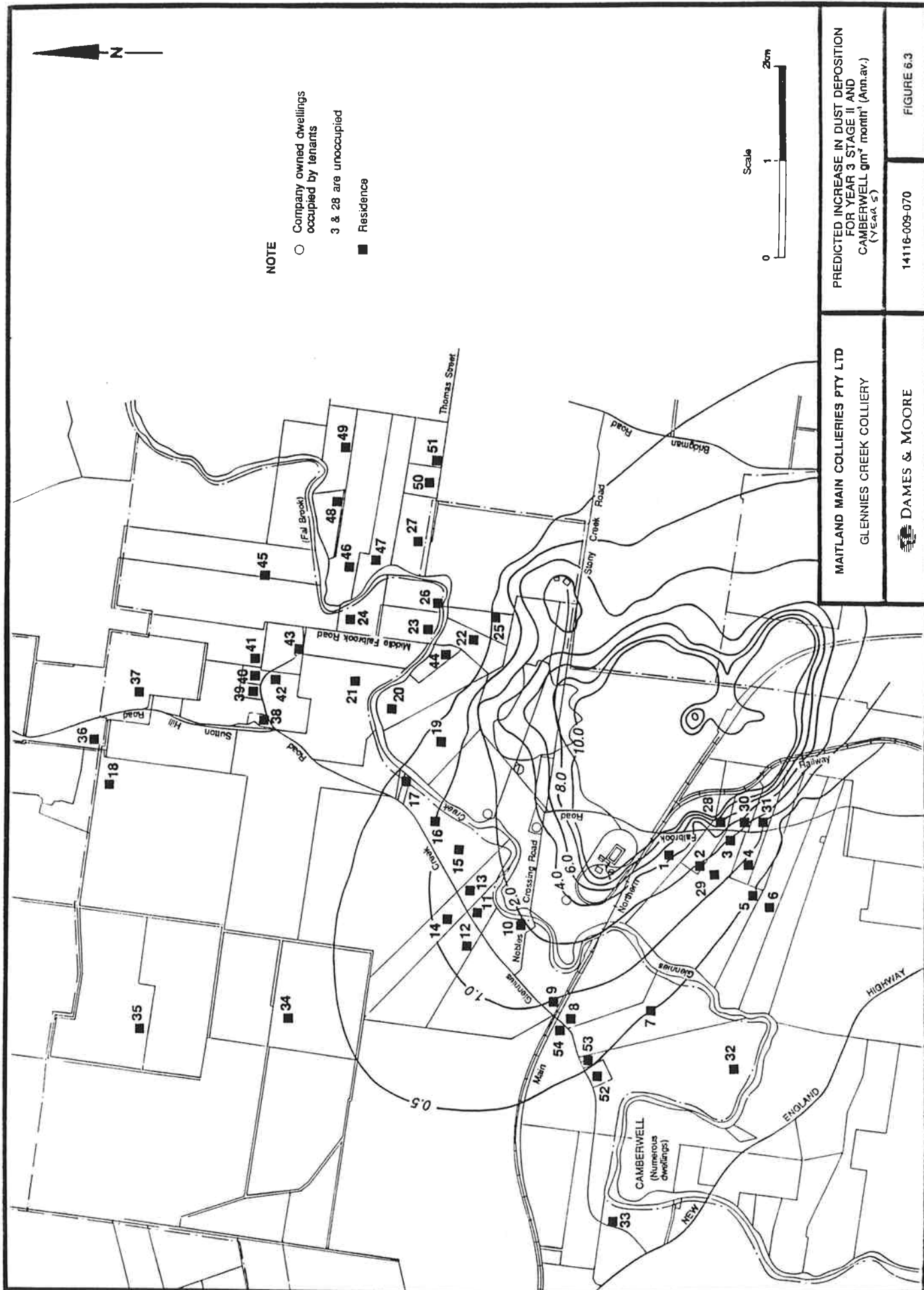
Nigel Holmes PhD
Atmospheric Physicist

Appendix 17



PREDICTED INCREASE IN DUST CONCENTRATION FOR YEAR 3 STAGE II μgm^3 (Ann. av.)	MAITLAND MAIN COLLIERIES PTY LTD GLENNIES CREEK COLLIERY
14116-009-070	DAMES & MOORE
FIGURE 6.2	

Appendix 18

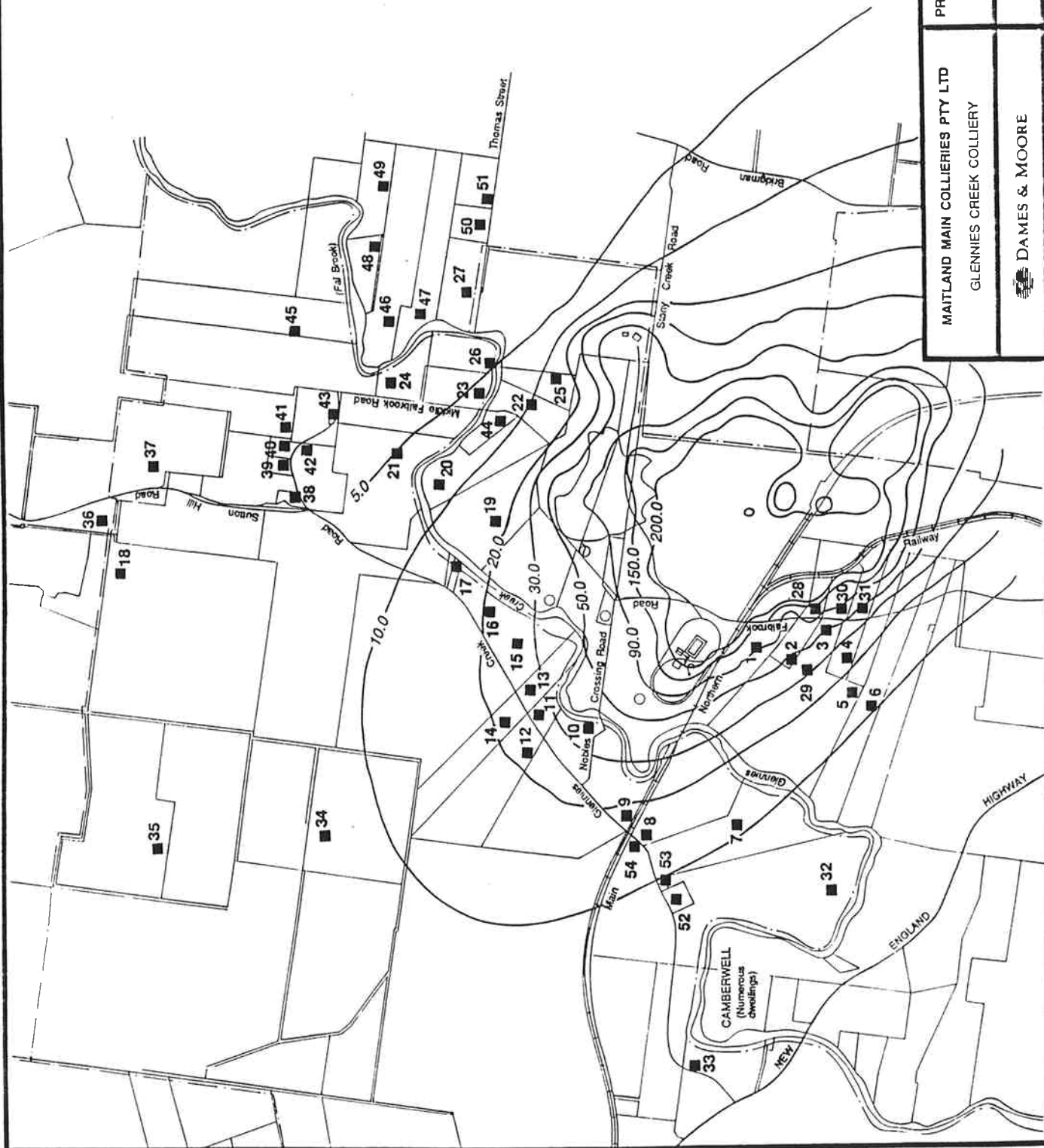
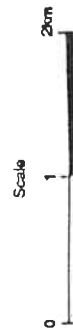


Appendix 19



NOTE

- Company owned dwellings occupied by tenants
 - Residence
- 3 & 28 are unoccupied



PREDICTED INCREASE IN DUST CONCENTRATION
FOR YEAR 3 STAGE II AND
CAMBERWELL ug/m^3 (Ann. av.)
(YEAR 5)

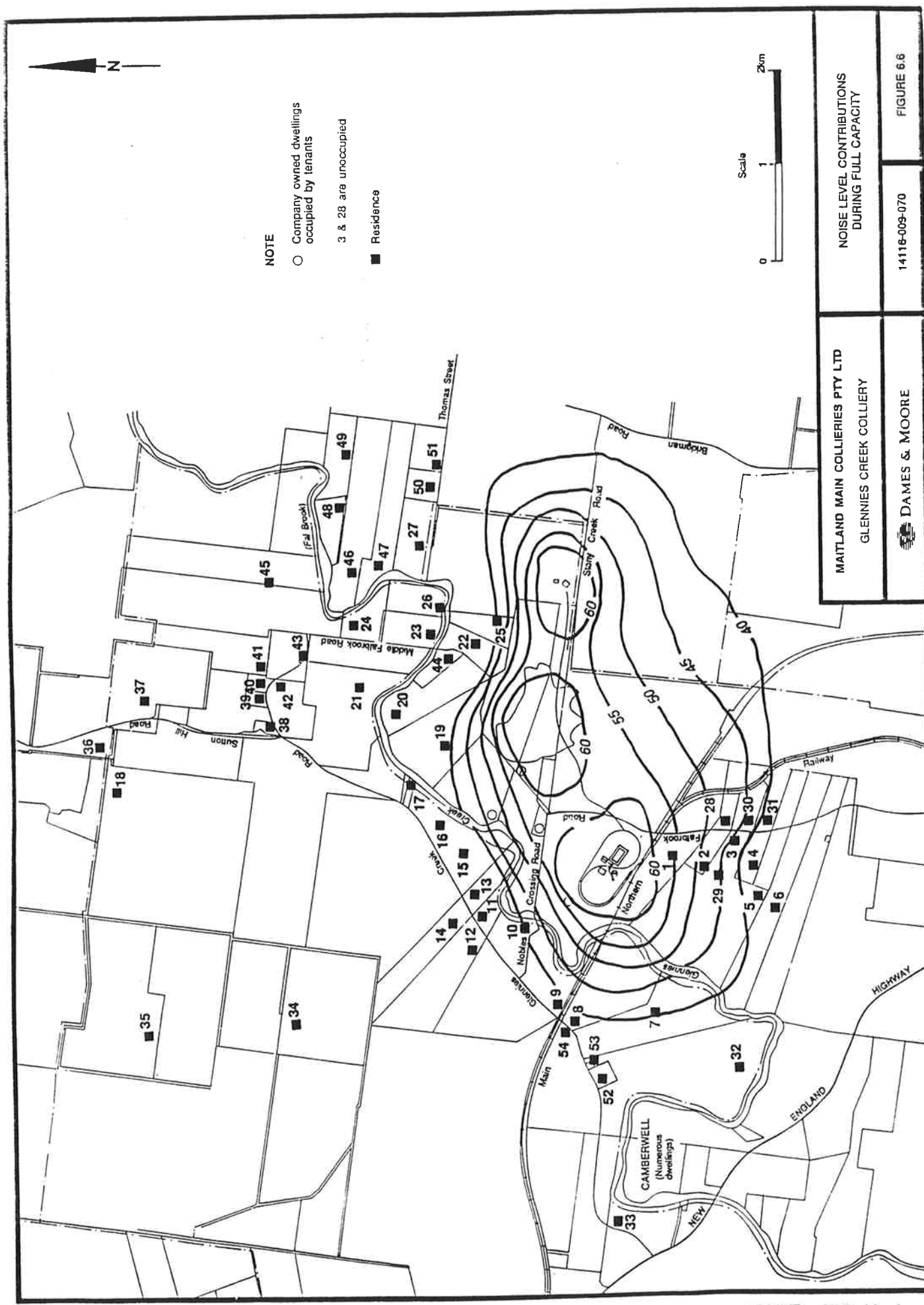
MAITLAND MAIN COLLIERIES PTY LTD
GLENNIES CREEK COLLIERY

DAMES & MOORE

14116-009-070

FIGURE 6.4

Appendix 20



NOTE

- Company owned dwellings occupied by tenants
- 3 & 28 are unoccupied
- Residence

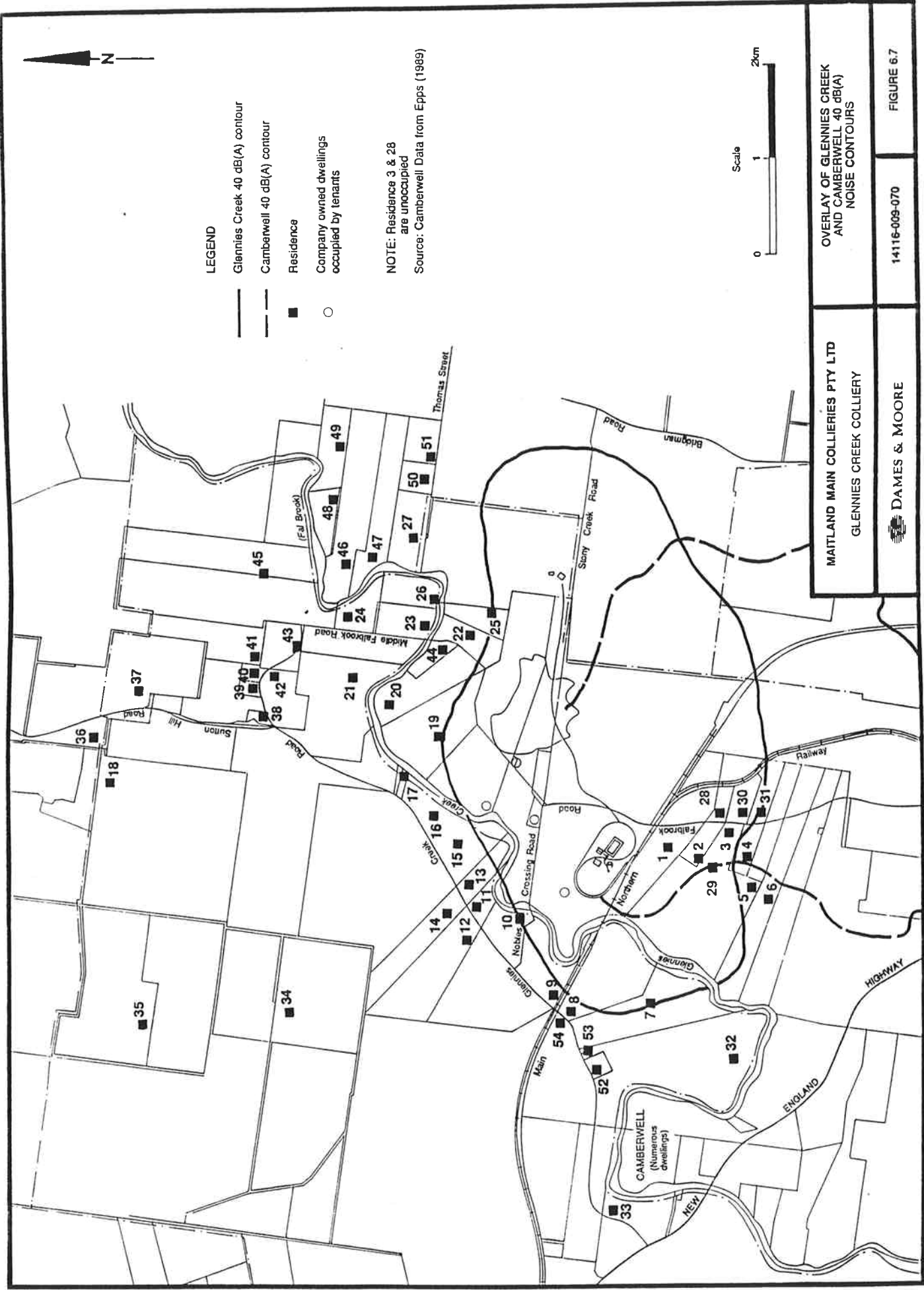
MAITLAND MAIN COLLIERIES PTY LTD GLENNIES CREEK COLLIERY	NOISE LEVEL CONTRIBUTIONS DURING FULL CAPACITY
14118-009-070	FIGURE 6.6

Appendix 21

TABLE G.7
CALCULATED MAXIMUM NOISE LEVELS

Receiver	Contribution from Stationary Equipment	Exceedance of 40 dB(A)	Contribution from Truck Haulage	Exceedance of 45 dB(A)
1	53	13	57	12
2	49	9	51	6
3	45	5	46	1
4	26	-	35	-
5	31	-	35	-
6	36	-	32	-
7	39	-	39	-
8	38	-	37	-
9	39	-	39	-
10	36	-	44	-
11	20	-	39	-
12	29	-	30	-
13	31	-	30	-
14	27	-	35	-
15	39	-	41	-
16	34	-	39	-
17	31	-	37	-
18	3	-	13	-
19	20	-	38	-
20	14	-	37	-
21	17	-	33	-
22	19	-	41	-
23	11	-	36	-
24	8	-	36	-
25	21	-	40	-
26	14	-	34	-
27	14	-	38	-
28	47	7	54	9
29	45	5	46	1
30	44	4	46	1

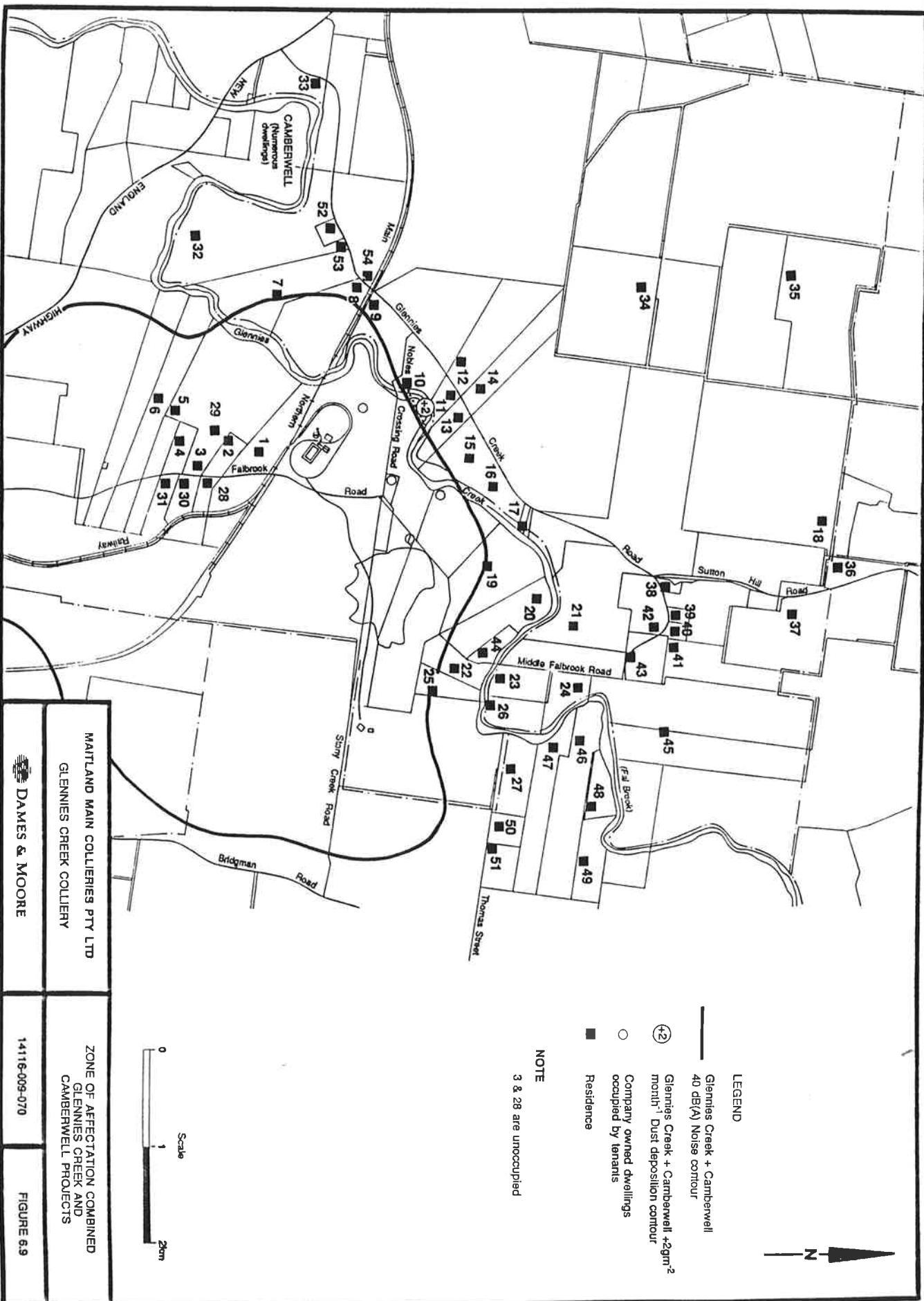
Appendix 22



MAITLAND MAIN COLLIERIES PTY LTD
GLENNIES CREEK COLLIERY

OVERLAY OF GLENNIES CREEK
AND CAMBERWELL 40 dB(A)
NOISE CONTOURS

Appendix 23



Appendix 24

Appendix 25

COMPILATION OF FIGURE 5.37
AND SUBSIDIARY OVERLAY FROM
THE EIS

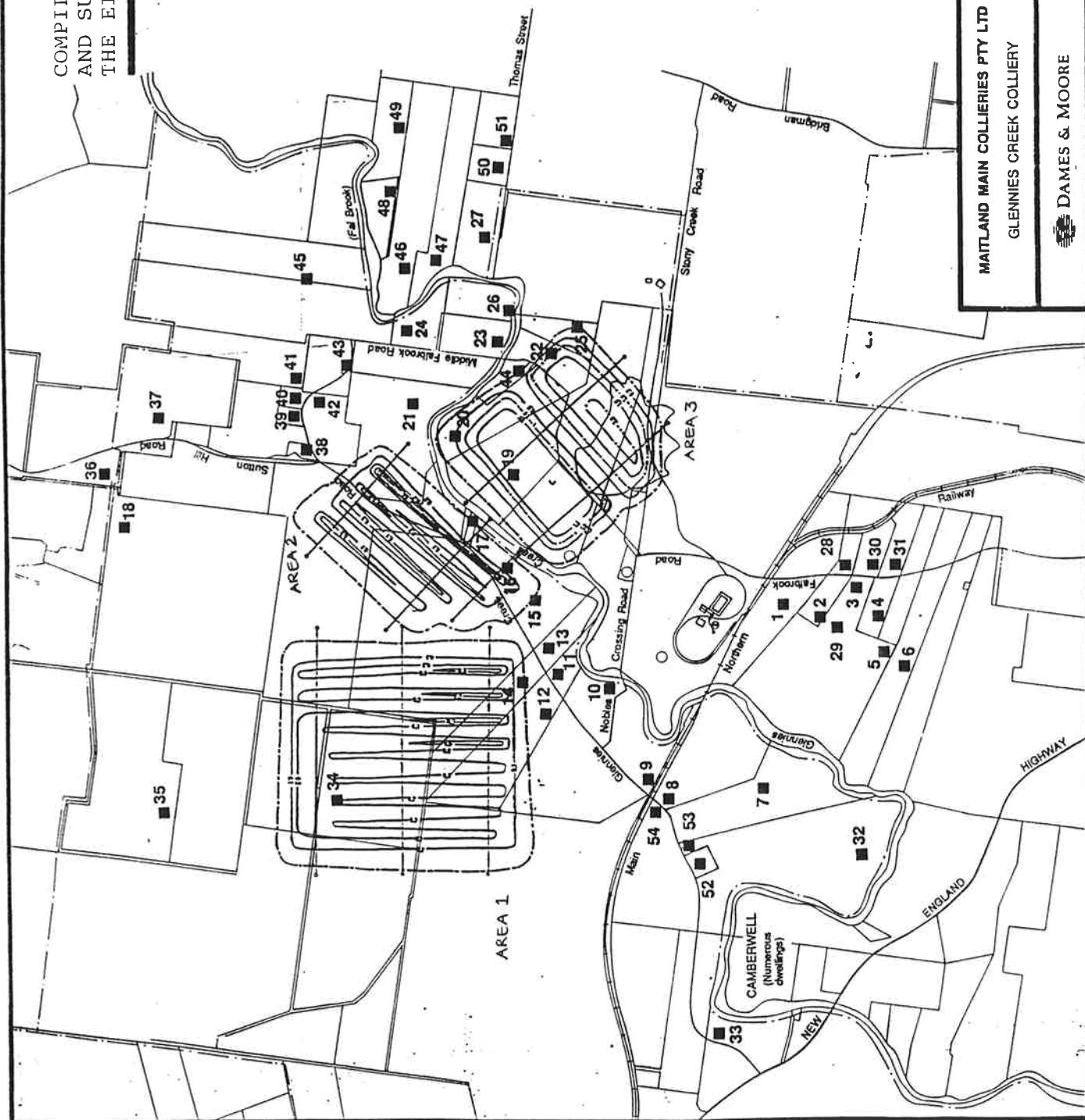


NOTE

- Company owned dwellings occupied by tenants
- 3 & 28 are unoccupied
- Residence

LEGEND

- 0.1 — INTERMEDIATE SUBSIDIARY CONTOUR
- 1.0 — INDEX SUBSIDIARY CONTOUR
- — — LIMIT OF SUBSIDIARY



MATLAND MAIN COLLIERIES PTY LTD
GLENNIES CREEK COLLIERY

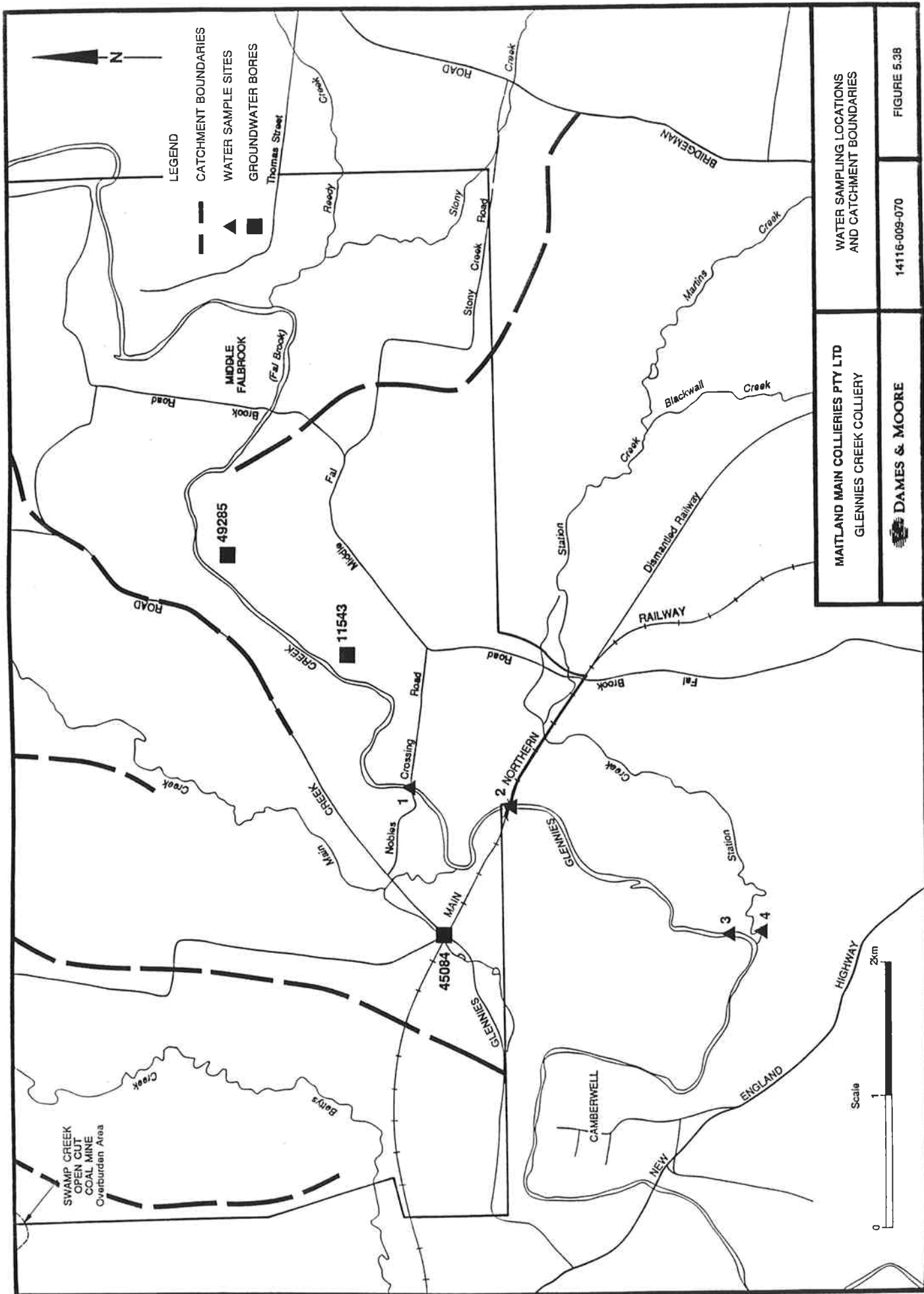
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RESIDENTIAL RECEIVER LOCATIONS

14116-009-070

FIGURE 5.37

Appendix 26



MAITLAND MAIN COLLIERIES PTY LTD
GLENNIES CREEK COLLIERY

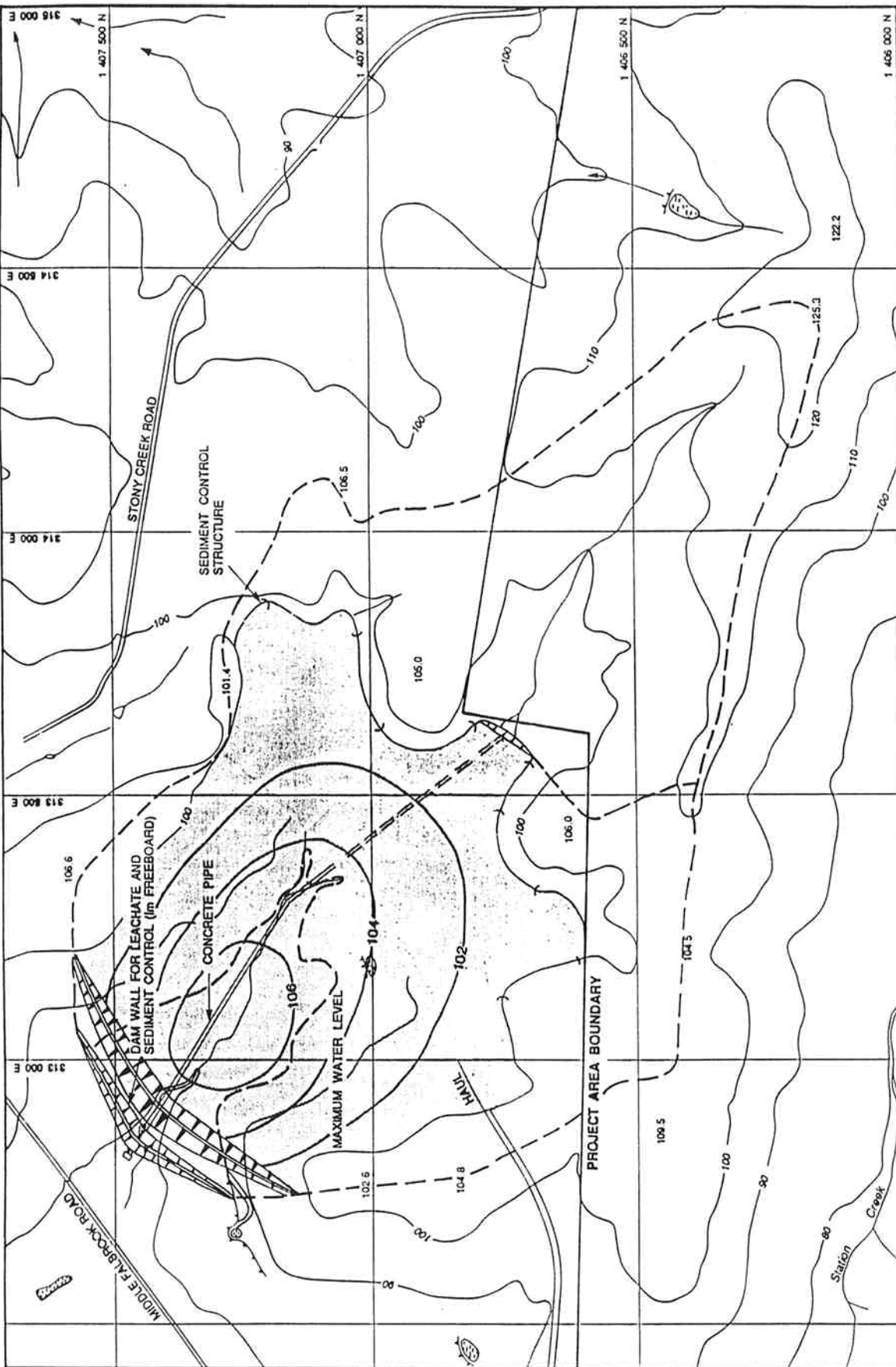
WATER SAMPLING LOCATIONS
AND CATCHMENT BOUNDARIES

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14116-009-070

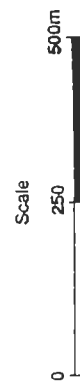
FIGURE 5.38

Appendix 27



LEGEND

— CATCHMENT BOUNDARY



MAITLAND MAIN COLLIERIES PTY LTD
GLENNIES CREEK COLLIERY

END OF LIFE WASHERY
REJECTS EMPLOYMENT

DAMES & MOORE

14116-009-070

FIGURE 6.14