EIS 699

AB018180

Environmental impact statement : proposed Clarence and Wolgan Valley Coal mines : supplementary report for Coalex Pty Ltd.

SUPPLEMENTARY REPORT

ENVIRONMENTAL IMPACT STATEMENT

PROPOSED CLARENCE and WOLGAN VALLEY COAL MINES

for

COALEX PTY LTD

September 1975

DAMES & MOORE

DAMES & MOORE
CONSULTANTS IN THE ENVIRONMENTAL AND APPLIED EARTH SCIENCES

PERTH
SINGAPORE
JAKARTA

LONDON
MADRID
TEHRAN
LAGOS
GUAM

TOKYO
SEOUL
VANCOUVER
TORONTO
CALGARY

PRINCIPAL CITIES IN THE U.S.A.

17 MYRTLE STREET, CROWS NEST, N.S.W. 2065, AUSTRALIA
TELEPHONE: 929.7744 • TELEX 21378 • CABLE ADDRESS: DAMEMORE

19 September, 1975

Coalex Pty. Limited,
815 Pacific Highway,
CHATSWOOD 2067

Attention: Mr. M. Smith

Dear Sir,

FINAL DRAFT
SUPPLEMENTARY REPORT
ENVIRONMENTAL IMPACT STATEMENT
PROPOSED CLARENCE AND WOLGAN VALLEY MINES

We have pleasure in forwarding two copies of the final draft of the supplementary report and look forward to receiving your instructions towards finalisation of this work. We are in a position to proceed to completion as soon as notified.

Yours faithfully,
DAMES AND MOORE

A.P. Campbell

A.P. Campbell
Associate

APC:ws

SUPPLEMENTARY REPORT

ENVIRONMENTAL IMPACT STATEMENT

PROPOSED CLARENCE AND

WOLGAN VALLEY MINES

FOR COALEX PTY. LTD.

Supplementary Report to Environmental Impact Statement for the above-mentioned mines prepared for Coalex Pty. Ltd. by Spencer Thomas Associates Pty. Ltd. (June 1974)

PREPARED BY

DAMES AND MOORE

SEPTEMBER 1975

TABLE OF CONTENTS

Table of Contents - Cont'd

LIST OF PLATES

1.0 INTRODUCTION

This report is being presented as a supplementary report to the Environmental Impact Statement for the Wolgan Valley and Newnes Junction (now Clarence) Coal Mines which was presented in June 1974, on behalf of Coalex Pty. Limited, by Spencer Thomas Associates Pty. Limited, Sydney.

Since the time when the initial report was written in June 1974, additional information has been made available which now makes it possible to present the design criteria for both mine complexes. As a result, the emphasis of this supplementary report is on the details of colliery development for both mines together with mitigating procedures for environmental protection and on assessment of environmental impact from the material presented in both reports.

2.0 SUMMARY

Coalex Pty. Limited intends to establish two new coal mines in the vicinity of Lithgow. The establishment of the two proposed mines will provide the protection of continuing employment for miners in the Lithgow district against the closing down of several existing mines within the next decade.

It is anticipated that the first mine to be commissioned will be the Clarence Colliery which will be located in the vicinity of Newnes Junction, east of Lithgow on the Main Western Railway. The second proposed mine will be the Wolgan Valley Colliery where it is hoped that operations will commence some time

later in an area 23 kilometres north of Newnes Junction (see Plate 2). The proposed Clarence and Wolgan Valley Collieries will both have on site coal treatment plant facilities and refuse disposal and the coal product from both mines will be railed directly to ship loading facilities for export.

An extensive programme of pollution control from treatment plant facilities and refuse disposal areas will be carried out to minimise the possibility that no harmful effects are suffered by the environment, particularly in the Blue Mountains National Park region to the east of the proposed Clarence Colliery. In particular, this programme will include the careful construction and maintenance of refuse disposal areas which will ultimately be covered with topsoil and revegetated as part of land rehabilitation on completion of the project.

It is believed that the overall environmental impact of both mines will be small. The mitigating procedures to be adopted by the Company will protect the natural environment while the relatively small areas of development in relation to the surrounding bushland will cause only minor and temporary disturbance to fauna and flora.

3.0 ALTERNATIVE COURSES OF ACTION (FOR BOTH MINES)

3.1 No Action

The proposed Clarence and Wolgan Valley Mines are the first major mining developments in the Western Coalfield district since the post-war period. The district has been declining economically and the commissioning of the two proposed mines will avert a serious socio-economic problem within Lithgow by providing security of employment for miners already in the district as well as career opportunities for their children. Over the last twenty years there has been a drift of young people away from the area and this has been a cause for concern by the civic authorities.

If the two proposed mines are not opened then it will probably be necessary in the future for mining personnel and their families to leave the district and to seek employment elsewhere.

3.2 On-Site Treatment Facilities and Refuse Disposal

This alternative has been chosen by the Company as the most practical and economical means of establishing the two collieries and with the least impact on the environment.

The coal treatment plants (washeries) at both mine sites will be positioned close to the raw coal exit portals in order to avoid excessive materials handling. Also, refuse disposal and subsequent rehabilitation will be carried out as close as possible to the treatment facilities to avoid excessive trucking of the material to distant sites. It is anticipated that

a large percentage of refuse material from the Clarence mine may be disposed of in adjacent areas that are presently used for sand mining, and negotiations on this matter are under way with the sand mining companies. (Plate 5). If this proves possible, it would tend to restore the existing topography.

Full details of the proposed facilities, environmental impact and mitigating procedures for the above mentioned operations are presented in Sections 4.0 and 5.0.

3.3 On-Site Treatment Facilities with Off-Site Refuse Disposal

On-site treatment facilities are favoured for this project as mentioned in the previous section (3.2). However, refuse disposal areas which are distant from the mine site usually present a major problem if the large number of motor trucks carrying refuse material must use public roads to gain access to disposal sites. Besides this, there do not appear to be refuse disposal areas elsewhere in the vicinity of Lithgow which have a distinct advantage over on-site disposal. It is also believed that far better control of the development of an on-site refuse disposal area is obtained since operations can proceed under the close scrutiny of mine management.

3.4 Off-Site Treatment Facilities and Refuse Disposal

The concept of off-site treatment facilities mainly implies that raw coal from the proposed collieries would be treated at the Company's existing washery facilities at the Wallerawang and Hermitage Collieries. This alternative requires that extensive

modifications and expansion of the washeries and refuse disposal areas at these sites would have to be made to accommodate raw coal from the Wolgan Valley and Clarence mines. However, this scheme would be impracticable since the land available for expansion at Wallerawang and Hermitage Collieries is limited and would not be sufficient for such large treatment plant and refuse disposal complexes.

As well as this, access to the existing washery sites from Newnes Junction would be by road or rail but neither alternative is attractive. If road transport where chosen it would be necessary for a regular stream of coal trucks to pass through the Lithgow city area on route to the washeries but this alternative would probably be unacceptable to the local populace. The problem of air pollution from fine coal dust would also tend to be excessive along this route as a result of truck movements. The main objection to rail transportation is the excessive dust that is generated from raw coal being loaded into and unloaded from rail wagons. This is not a problem with washed coal since the moisture content after washing is high enough to prevent dust rising.

The main objections to off-site refuse disposal have already been outlined in the previous section (3.3).

3.5 Selection of On-Site Treatment Plant and Refuse Disposal Areas.

3.5.1 Clarence Colliery

The mining purpose lease (MPL) area for the proposed Clarence Colliery is situated at the southern end of the Clarence mining

lease area as shown in Plate 2. A considerable portion of this MPL area has also been set aside for sand mining interests (as shown in Plate 5) and for this reason, the proposed site is considered to be the best available since development will take place in an area already set aside for industrial use.

The site is located at the headwaters of Wollangambe Creek which flows into the Blue Mountains National Park. For this reason, it is intended to carry out an extensive programme of pollution control and refuse disposal area revegetation (refer to following sections) so that in future years when the mine life is completed, the Company will leave the area in a rehabilitated state.

Other areas of possible development in the vicinity away from the Wollangambe Creek catchment have been investigated with little success. Within a short distance to the west of the proposed site is a separate catchment area that is used as Lithgow's water supply while a short distance to the south is the headwaters of the Lett River which flows into Cox's River and thence to Sydney's water supply at Lake Burragorang. Neither of these two possible areas offer advantages over the proposed site.

3.5.2 Wolgan Valley Colliery

In contrast to the Clarence Colliery there appears to be no distinct site selection alternatives for establishing the Wolgan mine in the area shown in Plate 2. Any runoff from the mine site would normally flow to the Wolgan River and eventually into Broken Bay via the Colo River. However, apart from the experimental mine and proposed entrance portal at the base

of the escarpment, all development work and refuse disposal will occur on top of the plateau and above Rocky Creek in order to avoid the Wolgan Valley. The Wolgan Valley is renowned for its beauty and the planning of most development work to lie above the escarpment and away from public view will preserve its aesthetic qualities.

At a short distance outside the western boundary of the Wolgan Valley Colliery mining lease area, there exist several disused railway tunnels which were originally constructed for the Newnes oil shale project (see Plate 2). These tunnels have since become of considerable interest to biologists because of the unique fauna (especially glow-worms) which is now present. In reply to special requests for their protection from the National Parks and Wildlife Service and the Department of Mines, the Company will ensure that the tunnels are not disturbed in any way as a result of the proposed Wolgan development.

3.6 Coal Transportation Alternatives

The proposed Clarence Colliery will be developed in an area which has ready access to the Main Western Railway near Newnes Junction (see Plate 3). For this reason the only transportation alternative considered for this colliery is transportation of washed coal to port facilities via rail.

The railhead at Newnes Junction is also a good outlet for washed coal from the Wolgan Valley Colliery (23 kilometres to the north). It is proposed to transport the coal by road from the coal preparation plant to the railhead. Road trucks, off-highway vehicles and road trains have been examined and a decision has

been made to use road trains of 90 tonne capacity. These units are quieter than off-highway vehicles and have lower bearing pressures on the pavement. The use of large road trains as against normal highway trucks will considerably reduce the number of trips per day to Newnes Junction.

In the future when production from the area increases above that presently projected, it may be economically possible to consider the installation of a rail line from Newnes Junction to the Wolgan Valley Colliery. This would greatly reduce the traffic density on the road and has obvious environmental advantages.

4.0 OPERATIONS STATEMENT

4.1 General

The two proposed underground coal mines to be developed by Coalex Pty. Ltd. are located north and east of Lithgow, N.S.W. (see Plate 2) and between Clarence to the south and Newnes to the north. The township of Newnes should not be confused with Newnes Junction which is approximately 33 kilometres to the south on the Main Western Railway. The coal deposits to be mined contain coking and steaming grades of black coal and are within the Western Coalfield District of N.S.W. The proposed mines are designed to produce a combined total of up to 3.9 million tonnes of washed coking coal per annum which is destined mainly for shipment to overseas markets and approximately 390 thousand tonnes of steaming coal.

The first mine to be developed will be the Clarence Colliery and will be located near Newnes Junction station on the Main Western Railway approximately 8.5 kilometres east of Lithgow. The second mine known as the Wolgan Valley Colliery will be located approximately 23 kilometres north of the Clarence Colliery and approximately 5 kilometres south-southwest of Newnes (Plate 2).

4.2 Proposed Mining Method

The proposed mining method for the extraction of coal at both mines will be similar and will consist of underground workings at a depth of approximately 200 metres at the Clarence Colliery and 250-300 metres at the Wolgan Valley Colliery. The coal seams are almost horizontal and mining will be mainly confined to these approximate depths. Extraction will be carried out mainly by the bord and pillar method with eventual collapse of the workings as the supporting coal pillars are removed. The extraction of

coal could cause some subsidence at the surface but the actual amount will probably not exceed 0.2m for the Wolgan Valley Colliery where the seam thickness ranges from 1.5 to 2.3 m.

4.3 Surface Facilities and Stockpile Areas

The surface facilities and stockpile areas at each colliery will be generally similar in appearance except the layout and positioning of the components will vary due to differences in the orientation of drifts and portals as a result of topographical variations at each site. For this reason, an isometric view of the proposed Wolgan Valley Colliery surface facilities has not been presented in this report but the layout will conform to the same standard as the proposed Clarence Colliery layout as presented in Plate 4. Details of the proposed surface facilities at each site are shown in Plates 3 and 7, and are explained in the following sub-sections.

4.3.1 Clarence Colliery

Surface facilities at the Clarence Colliery (Plates 3 and 4) will be located on a Mining Purpose Lease near the Newnes Junction station on the Main Western Railway (Plate 2). These facilities are required to support the underground mining operations, wash the mined coal and produce a saleable product by reducing the ash content, and to stockpile the washed coal before transportation to port facilities.

The following buildings will be required at the proposed colliery:

- Seam Access, Winder House and Conveyor
- Coal Treatment Plant (Washery) and Laboratory
- Bath House for 350 men

- First Aid Room
- Lamp Room
- Office for 25 staff
- Workshop and Store
- Water Treatment Plant
- Sewage Treatment Plant
- Ventilation Fans

In addition, the following associated and ancilliary facilities will be provided:

- Run-of-Mine Coal Storage Bin and an Emergency Surface Stockpile Area
- Conveyor System from the Run-of-Mine Coal Bins to the Washery and thence to the Product Coal Stockpile
- Reclaim Conveyor System from the Product Coal Stockpile to the Rail Loading Station
- Loop Railway Track and Overhead Waggon Loading Bins
- Electrical Transformer Substations (one main substation and one each low voltage substation for the mine and the washery)
- Bulk Stores Area
- Freshwater Supply Dam
- Washery Recirculation Water Dam
- Washery Waste Disposal Area
- Access Roads and Car Park

The layout of the surface facilities has been designed to form as compact an installation as possible. Roadways will be paved and guttered so that rainwater run-off can be collected and directed to the recirculation water dam for subsequent use in the washery. The whole area will be landscaped with gardens and trees to present a pleasing appearance and adequate labour engaged for continued maintenance.

Details of the surface facilities and stockpile areas to be established for the colliery are set out below:

4.3.1.1 Seam Access and Winder House

Two surface portal structures for the haulage and conveyor drifts will be positioned as shown in Plate 3. The drifts will lead to the underground coal seams, descending at an angle of approximately 10 degrees and will be concrete-lined and steel supported structures measuring approximately 6m by 4m. The haulage drift will be equipped with a winch which will be housed in a separate building approximately 50 metres from the entrance of the drift. Vertical shafts approximately 2.4m diameter will be constructed for ventilation and man-access to the coal working faces and several shafts of this nature will be sunk progressively during the life of the mine as the underground workings expand.

4.3.1.2 Coal Treatment Plant (Washery) and Laboratory

The washery will treat the run-of-mine coal to reduce ash content and provide a saleable product. It will be constructed in the latest modular design to permit expansion of plant capacity in stages by the addition of modules to the full production rate of 750 tonnes per hour. The ultimate anticipated rate of run-of-mine production will be 3.0 million tonnes per year (mty) which will produce 2.7 mty of coking coal and a very small amount of steaming coal (about 100,000 tonnes per year). Each module will have a capacity of 250 tonnes per hour and will operate semi-independently of each other. The modules will be completely enclosed to prevent dust emissions and to reduce noise levels and provide satisfactory working conditions for employees.

The process water used within the plant will be contained in a closed recycle system and there will be no effluent discharge except for overflow during extremely heavy rainfall. The lower floor of the washery will be paved with drainage into sumps and all spillage and hosing down water will be returned to the circuit. Provision will also be made for a standby thickener which will have enough capacity to accommodate the largest item of plant that may require draining.

A small modern building housing a coal analysis laboratory and an environmental control room will be constructed adjacent to the washery.

Refuse material from the washery will be transported to a surface disposal area as shown in Plate 4. The area will be adequate to provide a life of approximately 20 years at the anticipated production levels. Full details of the refuse disposal area including the retaining dam wall are provided in Section 4.5.

4.3.1.3 Run-of-Mine Coal Conveyor, Storage Bin and Emergency Stockpile Area.

The run-of-mine coal conveyor will carry raw coal from the underground workings to the run-of-mine storage bin via the haulage drift. The conveyor belt will be 1.2 metres wide and will have a carrying capacity of 750 tonnes per hour. The surface section of the belt will be totally enclosed to prevent spillage and dust problems.

The storage bin will have a capacity of 3,000 tonnes and should an overflow occur due to a breakdown in the washery, the run-of-mine coal will bypass the bin to an adjacent emergency stockpile area. This stockpile area will be surrounded by a bund wall to collect drainage water from the area for reticulation to the washery recirculation system.

Raw coal from the run-of-mine storage bin will be fed to the washery by conveyor. The conveyor will be elevated and enclosed for protection against wind action and spillage, and will span the 30 m. distance from the storage bin to the washery. On the occasions when the emergency stockpile area is used, a front-end loader will be used to retrieve the coal and load it into a hopper below the storage bin to be fed by the conveyor to the washery. A sampling and automatic weighing station will be provided on the conveyor system with a remote readout in the washery main control room.

4.3.1.4 Product Coal Conveyor and Stockpile

The washed coal product will be fed to the product stockpile area by means of a conveyor. This conveyor will be enclosed in a similar manner to others in the system, to prevent loss from wind action or spillage.

The stockpile conveyor will be an elevated, distributing conveyor equipped with a travelling, double-sided tripper which will form two parallel stockpiles, one each side of the conveyor. The capacity of each stockpile will be 50,000 tonnes. The stockpile conveyor will be provided with external water sprays to reduce dust emissions from the main stockpile. The stockpile area will be surrounded by bund walls to permit collection of drainage water for reticulation to the washery recirculation system.

Beneath the centre line of each stockpile, the coal will be collected by reclaim conveyors which will transport the washed coal to the rail waggon loading bin on the rail

loop (see Plate 4). The sections of reclaim conveyor above ground will be enclosed to avoid spillage and dust problems.

4.3.1.4 Rail Waggon Loader and Rail Loop

The rail waggon loading bin will have a capacity suitable for loading 2,000 tonne trains and the area below the bin will be paved with concrete, forming an apron flush with the top of the rails to facilitate clean-up of any spilled coal through mishap while loading. The loading doors on the bin will be the air operated - positive shut type, giving a clean shut-off of coal when closed. An enclosed control cabin for the loader operator will be provided with an uninterrupted view of the loading operation. The rail loading facility will have an automatic weigh hopper to ensure correct loading of the waggons and prevent spillage from overloading.

A rail loop from the Main Western Railway line near Newnes Junction station will be provided to facilitate train loading (see Plate 3). The approximate length of the rail loop will be 2,000 m. and will require cut and fill to provide the correct railway line gradient. At the point beneath the loading bin, the railway line will be in a cutting below ground level and will therefore eliminate the need for elevating the bin.

4.3.1.5 Bath House, First Aid Room and Lamp Room

The bath house will be of modern design and will accommodate approximately 350 men. The design will comply in all respects with the requirements of the Coal Mining Regulation Act, the Mines Department and the Department of Health. Waste water from the showers, toilets etc. will be treated in a sewage treatment

plant, the effluent from which will be directed to the washery process water circuit.

4.3.1.6 Workshops and Store

The workshops and store will be accommodated in a modern building which will contain office accommodation for electrical and mechanical engineers and storemen. Drainage from the area of the workshops and store building will be collected and passed through drainage pits, and oil and grease separators prior to flowing to the washery recirculation system. The workshops and store building will be located near the portal of the haulage drift as shown in Plate 3 .

4.3.1.7 Bulk Stores Area

The bulk stores will be kept in an open paved storage area with a drainage system connected to the water recirculation system. The area will contain an "A" frame gantry and will be used to store timber, drums of oil, reels of cable and conveyor belting, steel etc. The area will be enclosed with a cyclone fence 1.8 m. high with access gates for trucks and personnel.

4.3.1.8 Water Supply

It is proposed initially to repair the existing dam on the site which is located adjacent to the drift entry. This dam was originally used as a water supply for engines on the old Newnes Junction Wolgan Valley Railway system. As the demand for fresh water increases beyond the capacity of this dam, a second dam

will be constructed below the first so that the overflow from the first will be retained in the second (Plate 4). Fresh water from these dams will be pumped to three existing 4.5 Megalitre concrete tanks which will act as a water reservoir for the colliery. The three concrete tanks were originally built to store shale oil from the Glen Davis project but have been abandoned for a number of years. Two of these tanks will be used as water supply for the surface operational needs and one exclusively as an underground supply.

4.3.1.9 Water Treatment Plant

A water treatment plant will be installed to treat waste water and run-off drainage which may be contaminated by oil, grease. coal fines etc. Water treated in this manner will be returned to the process water recirculation system. The plant will be capable of treating water to meet the standards as outlined in the Clean Waters Act for discharge to nearby streams, but under normal conditions, the treated water would be recirculated through the washery circuit as process water.

4.3.1.10 Sewage Treatment Plant

A modern package sewage treatment plant will be installed which will operate on the activated sludge principle with internal digestion. This plant will accommodate sewage and bathroom waste water and the effluent water quality is expected to be 20 ppm BOD and 20 ppm Suspended Solids. A polishing filter will be added as a final stage producing an effluent quality

of 10 ppm BOD and 10 ppm Suspended Solids which will meet the requirements of the Clean Waters Act. The effluent will also be chlorinated as required by the Act. Under normal operation, the effluent from this plant will be returned to the washery recirculation water system as process water.

4.3.1.11 Electricity Supply

Electrical power will be supplied in bulk to the colliery from a 66 kV main transmission line. This line will originate from the Hartley County Council sub-station at Lithgow. The route of the transmission line will follow an existing 11 kV power line northeast from Lithgow to the top of the plateau at the Newnes Junction to Wolgan Valley road. From this point, the line will extend southeast to the colliery site, terminating at a main 66/11 kV sub-station near the drift entrances. The total length of the line will be 15 kilometres and will be supported on wooden poles in a cleared corridor 40 metres wide.

At the colliery site, separate 11 kV/415 V sub-stations and switchyards will be provided for the mine and washery. All electrical equipment will be constructed to comply with regulations regarding lightning strikes, earth faulting and switching. The combined load on the electricity supply will not exceed 10 Megawatts - the design capacity of the sub-station transformers. The anticipated maximum power demand is 9 Megawatts. Electrical reticulation within the colliery site will be ducted or buried cable.

4.3.1.12 Roadways and Car Park

An access road, approximately 2 kilometres long, will be constructed (in conjunction with the Blaxland Shire Council) from the Bell's Line of Road near Newnes Junction to the colliery site. The proposed alignment of the access road is shown in Plate 3, and will be constructed to council specifications. All internal roads and car park will be paved and provided with kerbs and guttering.

4.3.2 Wolgan Valley Colliery

In general, the Wolgan Valley Colliery will be similar to the proposed Clarence Colliery (Plates 3 and 4), but the layout and positioning of the individual components will be different as shown in Plate 7.

The main differences from the Clarence Colliery layout are in the areas of water supply, transportation of washed coal to the railhead and the separation of the washery and coal handling facilities from the access portals (adits) and other surface facilities. The washery, coal stockpiles and loading facilities will be located on top of the escarpment within the road loop (Plate 7.)

Run-of-mine coal will be transported from the workings to the escarpment above by means of a drift conveyor and will be fed into a 3,000 tonne storage bin (similar to Clarence). An emergency run-of-mine stockpile area will also be provided near the storage bin, with drainage control provided.

The washery will be similar in design to the Clarence washery but will have a lower capacity of 500 tonnes per hour and will produce two main products - coking coal 60%, and middlings (steaming coal) 15%. The remaining 25% will be composed of refuse material. The anticipated rate of run-of-mine production will be 1.7 million tonnes per year (mty) which will produce 1.0 mty of coking coal, 0.26 mty of middlings (steaming coal) and 0.44 mty of refuse material.

Surface facilities at the two sites, above and below the escarpment will be as follows:

Pit Area (at base of the escarpment)

- Bath House
- Sewage Treatment Plant
- Offices
- Workshops and Store
- Bulk Stores Area
- Water Supply
- Water Treatment Plant
- Power Supply
- Ventilation Equipment
- Access Roads and Car Park

Washing Plant Area (at top of the escarpment)

- Winder House and Conveyor
- Washery
- Bath House
- Sewage Treatment Plant

- Raw Stockpile Area
- Washed Stockpile ARea
- Water Supply
- Water Treatment Plant
- Power Supply
- Drift Portal
- Road Train Loading Facilities
- Access Roads and Car Park

During the initial phases, while the washing plant area is being established, mining of coal will be carried out from the existing adits to establish the headings necessary to join up with the drift. In the meantime, the raw coal will be stockpiled adjacent to the adits for trucking to the existing Wallerawang washery. On completion of the drift and the Wolgan washery, stockpiling of raw coal in this area will cease and the stockpiles area will be cleaned up and revegetated.

As previously mentioned, the Wolgan Valley Colliery is similar to Clarence with some exceptions as follows:

4.3.2.1 Pit Areas

The bath house and offices will be larger and will accommodate 400 men.

To obtain a supply of fresh water for the colliery complex, it is intended to establish a pumping station on the Wolgan River near one of the large pool areas (Plate 7). Recorded information of river flow in the area indicates that, for most of the year, sufficient water is available to meet the colliery's need. However, there may be periods when the river flow falls below the quantity of water required to maintain full production of the colliery. It will therefore be necessary to establish adequate storage capacity which will be 4.5 Megalitres.

Water from the main storage dam will be pumped to a 0.23 Megalitre pit storage tank located above the main adit and a second line will deliver water to the washery recirculation water dam which will have a capacity of approximately 4.6 megalitres. The pipeline routes to the pit and washery dam areas are shown in Plate 7.

The main power supply for both the pit and the washery will be a 66 kV transmission line from Lithgow as mentioned in Section 4.3.1.11 Generally, the route of the transmission line will follow the road from the Clarence Colliery along the top of the escarpment to a 66/11 kV sub-station near the washery and from there to another 66/11 kV sub-station in the valley. Distribution from these sub-stations will be either 11 kV or 415 V as required. The capacity of the two main sub-stations will each be 4 Megawatts.

Ventilation to the underground operations will initially be supplied from fans located in the mine portal area. As the underground operation proceeds, raised bores will be installed to maintain the necessary ventilation for the mine, but this ventilation system will not be required until some time in the future.

4.3.2.2 Coal Washing Plant Area

The washery will be made up of two modular units instead of three as at Clarence (see Section 4.3.1.2) and therefore, will have a maximum output of 500 tonnes per hour. At this stage it is envisaged that both modules will be built simultaneously.

The bath house will be considerably smaller than for the pit area and will have accommodation for 30 - 40 men. The building will be brick and a package sewage treatment plant will be installed nearby.

The raw coal storage bin will be of similar capacity (3,000 tonnes) and construction to the one at Clarence. (see Section 4.3.1.3).

The washed coal stockpile area will be similar to that at Clarence (Section 4.3.1.4) with the exception that an additional middlings stockpile of 25,000 tonnes capacity will be required. Both the washed coking coal and middlings will be transported to the railhead at Newnes Junction en route to Sydney. Transportation of the coal to Newnes Junction will be carried out by means of road trucks. (see Section 4.4).

Water and power supply for the washery area have been mentioned in the previous section (Section 4.3.2.1).

The drift portal will have approximate dimensions of 4.5 m. by 3.3 m. and will be used for coal handling only. The conveyor carrying run-of-mine coal to the surface will have a slope of 16° to the horizontal and a belt width of 1.1 metre. A small winder will be installed for maintenance purposes and the maintenance dolly will be rail mounted. The dolly will control the winder operation and all safety equipment will be incorporated in the design.

A full account of refuse disposal from the washery is presented in Section 4.5.

4.4 Transport of Coal Product

Washed coal from the Clarence Colliery will be loaded directly onto unit trains near Newnes Junction as shown in Plates 3 and 4. A rail loop will be constructed from the Main Western Railway near Newnes Junction to service the nearby colliery and the coal product will be taken directly to ship loading facilities.

Washed coal from the Wolgan Valley Colliery will be loaded onto road trains which will utilise a road loop to be constructed around the proposed facilities as shown in Plate 7. From there the road trains will travel 23 kilometres southward to the proposed railhead at Newnes Junction. As mentioned in Section 3.6, it may be economically possible at some future time to consider the installation of a rail link between Newnes Junction and the Wolgan Valley Colliery.

4.5 Refuse Disposal

4.5.1 General

Subsurface exploration at the site of the proposed mining areas has shown that the refuse material will be composed mainly of shales and dark grey mudstones together with some fine-to-medium grained sandstones.

Mineralogical analyses of the bands of strata within the Wolgan Valley coal seam (that will form the refuse material on washing) indicate that this material is predominantly composed of clays, including kaolinite up to 50% together with some montmorillonite and illite, siderite up to 45% in some bands, and quartz. Similar analyses for the Katoomba Seam at the proposed Clarence mine indicate that material is predominantly Kaolinite 55%, together with 26% carbonaceous matter and 15% quartz.

The planned washery installations of the Clarence and Wolgan Valley Collieries will be similar in design and operation. At each colliery run-of-mine coal will initially be conveyed to a 3,000 tonne surge bin and will then be crushed and wetted before passing to the washery separation process. In the case of the Wolgan coal, wetting will be carried out as a pre-treatment stage in order to liberate the fine clays from the granular material. For both washeries, crushed material at minus 25 mm mesh size will be wet screened into two sizes, fine material at approximately minus 2 mm and a coarser fraction between 2 to 25 mm. The coarser material will be washed in dense medium cyclones and the finer material will be separated in water washing cyclones.

The cleaned coal products and refuse material will be mechanically dewatered after leaving the washery. The coal products will then be stockpiled and the refuse will be placed in disposal bins. At the Wolgan Valley washery, all refuse will be

deposited in a sump and the mixture of coarse and fine refuse will be pumped as a thickened slurry to the refuse disposal area at a consistency of approximately 0.5 kg/litre (5lb/gal). Should coarse refuse be required separately for dam wall construction at disposal areas, provision will be made to collect this fraction before the mixing with fines occurs in the sump. This coarser fraction should be quite suitable for construction purposes but, nevertheless, the minimum particle size of this material can be altered if necessary.

At the Clarence Colliery, coarse refuse material will be de-watered and trucked to the disposal area. The minimum particle size of the refuse is expected to be 0.5 mm since the minus 0.5 mm size should be recoverable as a saleable middling product.

The nature of a particular coal seam has an effect on the overall size distribution of the run-of-mine coal and for this reason, the size distribution of coarse and fine refuse material will be different for both the Wolgan Valley (Wolgan Seam) and Clarence (Katoomba Seam) washeries. The expected quantities of coarse and fine refuse material for both washeries are shown in the adjoining Tables 1 and 2.

4.5.2 Physical Properties of Refuse Material

In order to assist in the location and preliminary designs for refuse dams in the disposal areas, laboratory testing has been carried out to evaluate the physical properties of the refuse material from both proposed washeries. For the Wolgan Valley Colliery refuse, a bulk sample was taken directly from the face of the existing

TABLE 1

CLARENCE COLLIERY

PRODUCTION & REFUSE QUANTITIES

YEAR	RUN-OF-MINE COAL TONNES	SALEABLE COAL TONNES	REFUSE			
			COARSE (1) TOTAL TONNES	FINE (2)* TOTAL VOL. (M^3)	COARSE VOL. (M^3)	-½* FINE VOL. (M^3)
1	350000	325500	24500	15296	10921	4374
2	700000	651000	49000	30593	21842	8748
3	1000000	930000	70000	43705	31205	12499
4	1600000	1488000	112000	69929	49929	20000
5	2100000	1953000	147000	91781	65531	26249
6	2600000	2418000	182000	113633	81134	32499
7	3000000	2790000	210000	113633	93617	37499
8	3000000	2790000	210000	113633	93617	37499
9	3000000	2790000	210000	113633	93617	37499
10	3000000	2790000	210000	113633	93617	37499
TOTALS	20350000	18925500	1424500	889401	635030	254365

* Will be saleable product

1 Particle size 25 mm to ½ mm

2 Minus ½ mm

1,250,000 cubic metres which value is right - tonnes or m^3 correct conversion factor is about 1·3 2·24 tonnes/m^3 = 140·29 lbs/cu ft. ridiculous!

1,450,500 Tonne at 1.13 tonn/cubic metre requires 1,250 000 cubic metres

TABLE 2

WOLGAN VALLEY COLLIERY

PRODUCTION & REFUSE QUANTITIES

YEAR	RUN-OF-MINE COAL TONNES	SALEABLE COAL TONNES	REFUSE			
			COARSE (1) TOTAL TONNES	FINE (2) TOTAL VOL. (M^3)	COARSE VOL. (M^3)	FINE VOL. (M^3)
1	NIL	ALL COAL TO	WALLERAWANG	COLLIERY		
2	350000	245000	105000	65558	43662 2·4048	21896
3	1000000	700000	300000	187307	124747	62560
4	1500000	1050000	450000	280963	187121 2·4048	93842
5	1820000	1273000	546000	340900	227380	113520
6	1820000	1273000	546000	340900	227380	113520
7	1820000	1273000	546000	340900	227380	113520
8	1820000	1273000	546000	340900	227380	113520
9	1820000	1273000	546000	340900	227380	113520
10	1820000	1273000	546000	340900	227380 2·4012	113520
TOTALS	13770000	9633000	4131000	2579228	1719810	859418

1 Particle size 25 mm to ½ mm

2 Minus ½ mm

experimental mine at Wolgan. For the Clarence Colliery refuse, a bulk sample was taken from a neighbouring colliery where the seam lithology is known to be very similar.

The results of the laboratory tests are detailed in Appendix 1 and, at this stage, it should be noted that these results can only be considered as preliminary and that additional design criteria will be needed.

4.5.3 Clarence Refuse Disposal

A refuse disposal area for the Clarence Colliery will be located as shown in Plates 3 and 4 and will provide sufficient capacity for the refuse produced during the life of the mine (about 20 years). The maximum height of the refuse will be 35 metres above the present ground level.

The proposed method of construction of the refuse dam wall is considered to be the most suitable for the Clarence Colliery and a cross-section is shown in Plate 6. Initially, a properly compacted starter dam will be constructed which will be composed of well-graded, free draining rockfill. This dam will serve as a drainage toe for the final wall and will be surrounded by an adequately designed sand filter zone to prevent leaching out of fines and possible piping failure of the outer wall.

The refuse material will be granular and relatively coarse grained (25 mm to 0.5 mm) and will be dewatered at the washery before being trucked to the refuse disposal area. As shown

in Plate 6 the outer zone of 50 metres (measured horizontally from the face) will be compacted to increase the stability of the outer wall slope. The refuse will be compacted to a minimum of 100% standard compaction in 15 to 20 cm lifts by pneumatic tyred or other suitable compacting equipment. Refuse placed upstream of the above-mentioned 50 metre compacted zone will be end dumped and graded with only minimum compaction. Owing to the granular nature of the refuse, only minor subsidence will occur in this area after deposition.

The outer slope of the dam wall will be benched to limit erosion and to assist revegetation of the slope. Benching will result in an overall slope of 2:1 (horizontal to vertical).

When disposal of refuse is completed, the surface will be graded as shown in Plate 11 and covered with a 15 cm thick layer of impervious soil material to seal the area. The impervious soil will be covered with 50 cm of suitable rockfill to provide a drainage and armour layer to inhibit future erosion of the disposal area. The rockfill will be covered with 30 cm of topsoil to allow revegetation of the area.

4.5.4 Wolgan Refuse Disposal

Three refuse disposal areas, of sufficient cumulative capacity for the duration of the mine (20 years), have been defined in the vicinity of the Wolgan Valley Colliery (see Plate 8). The maximum vertical wall heights for the refuse areas will be 50 metres for Refuse Area 1, 75 m. for Refuse Area 2 and 50 m. for Refuse Area 3.

The following method of construction of the refuse dams is considered to be the most suitable for the type of refuse and existing conditions in the proposed disposal areas. A cellular downstream wall will be constructed as shown in Plate 9 . The wall will be constructed of coarse refuse compacted to a minimum of 100% standard compaction by pneumatic tyred or other suitable compacting equipment. The refuse will be formed into cellular sections contained between clay seals to eliminate the risk of spontaneous combusion within the refuse. (see Plate 9). A refuse dam wall constructed in this manner would retain refuse material behind an impermeable clay core thus preventing the material from drying out and becoming a possible fire hazard from spontaneous combustion.

The discharge pipeline from the washery will be positioned adjacent to the upstream face of the dam wall and directed away from the wall. Discharging the refuse in this manner will deposit the coarse fraction near the wall and the finer (weaker) fraction away from the wall. In addition, excess water from the washery process will be ponded upstream at some distance from the constructed wall. The coarse fraction that will discharge behind the wall will be compacted on the side nearest the wall to increase stability of the final wall. (Plate 9).

A source of clay, to be used for the cores and seals, will be found before the final designs are presented so that adequate testing of the clay can be carried out to determine its suitability as an impervious material. The compaction characteristics of the clay will also be evaluated by adequate testing. The

crest level of each refuse dam will be raised in stages as described and illustrated in Plate 9.

When disposal of refuse is completed for each of the three dams, the surface will be graded and covered with a 15 cm layer of impervious soil material to seal the disposal area. The impervious soil will then be covered with 50 cm of suitable rockfill to provide a drainage and armour layer to inhibit future erosion of the disposal area. The rockfill will be covered with 30 cm of topsoil to allow for revegetation. (Plate 11).

5.0 ENVIRONMENTAL IMPACT

The two proposed mine developments will include similar basic interactions with the environment. Interactions with the existing environment which are expected to result from implementation of the development proposals include effects on:

- Physical Environment - geology, soils, topography, hydrology, water quality, air quality, background noise levels, allocations of construction materials and resources;

- Biological Environment - vegetation (flora), wildlife (fauna), aquatic life; and

- Socio-economic Environment - land use, aesthetics, employment, regional, state and national economic conditions, rail and road transportation, community health and social services.

Since the two proposed mines are separated by some 23 kilometres and surface facilities layouts differ in detail, specific environmental impacts and significant interactions will also differ in detail. Consequently, the following discussion of Environmental Impact is split into two portions, one for each mine development.

5.1 Clarence Colliery

5.1.1 Physical Environment

Geology - the proposed mine will be an underground operation extracting coal from the Illawarra Coal Measures. The extraction of the coal from the lease area will result in some subsidence (about 0.2m) of the overlying formations of sandstone, claystone and shale of the Triassic Narrabeen Group, but the impact of subsidence in the remote area is expected to be negligible. Since none of these formations are rare or unusual, but are found in thousands of square kilometres in this region of New South Wales, the impact of disturbance to the geologic environment of the site and vicinity will be negligible.

Soils - the soils which overly the sandstone and shale are generally thin and infertile. The construction of surface works for the mine such as roadways, structures, drift portal structures, water storage tailings disposal dams and stockpile systems will involve earthworks for site preparation, establishment of grade levels and drainage ways. These activities will unavoidably cause disturbance to the existing soils on the site and may lead to accelerated erosion and subsequent siltation of the drainage water to Wollangambe Creek until the exposed soils are stabilised. However, adequate safeguards in drainage control, capture and recycle surface water runoff, and rapid stabilisation of exposed soils with vegetal cover, will greatly mitigate any adverse impacts.

Topography - to a limited extent a modification of existing topography over the site will result from earthworks, placement of washery refuse material in the surface disposal area, and from

subsidence following extraction of the coal. The most noticeable changes to topography will occur in the washery refuse disposal area and in the general mine site area (Plate 3). The topographic changes due to mine site grade levelling will be rather minor, but the washery refuse dipsosal areas may undergo contour elevation changes of up to 35 metres (Plate 4) during the life of the project. The rock excavation for the rail loop will also become a permanent landscape feature.

Land subsidence over mined out areas will not be noticeable to any observer due to the limited movement (about 0.3m) and the uniformity of any movement over wide areas. This subsidence or other topographic change will not adversely affect any existing man-made structures in the area or the amenity of the adjacent Blue Mountains National Park.

Hydrology - surface water runoff from the general mine site area and washery reject disposal area will be affected in that extensive control works to capture and store this water for subsequent re-use will be constructed. Since the site lies at the head of the Wollangambe Creek catchment area and involves only a very small portion of the total catchment area, the impact on the flow regime of the creek will be negligible. Other creeks and water supply catchments in the area will not be affected.

Water Quality - as with any industrial activity imposed on an undeveloped area, and particularly those which use process water for product treatment, there is in most cases the potential for water pollution. The Clarence Colliery will use water, both underground in the mining operation and in the surface facilities site at the washery plant, and also for

sanitation and employee amenity. However, the waste waters from these activities will be treated and returned to a storage dam for subsequent re-use, thus avoiding pollution of downstream surface waters. The design of the treatment works and recycling systems as described previously will be such that any overflow from the storage reservoir to Wollangambe Creek during periods of extremely heavy rainfall will be within discharge quality parameters set by government regulations and the requirements of the Clean Waters Act of 1970. No domestic or municipal water supply will be significantly affected by the proposed action.

Air Quality - as with any human activity there is the propensity for adverse effects to air quality in the locality. In the case of the proposed Clarence Colliery, dust generation from coal handling and preparation will be greatly minimised by the incorporation of engineered safeguards into the design of all surface facilities. Specifically, these safeguards include the enclosure of conveyor systems and washery modules, use of coal storage bins and automatic water sprays over stockpiles, wind screen walls and tree barrier plantings around stockpiles, and rapid compaction, covering and revegetation of reject disposal banks. The distances between the site and any residences on public thoroughfares should further preclude any off-site nuisance caused by windborne dust.

Background Noise - it is unavoidable that human activity and the operation of industrial plant and equipment will generate noise which will add to existing background levels. Since the site is in a remote and undeveloped area, any increase in background noise would be more easily noticed than in an already developed industrial area. Safeguards against excessive noise emissions

from the colliery will be taken even though the population in the site area is sparse. Specific measures include enclosure of conveyors and the washery plant, and maintenance of noise supression devices on vehicles and other equipment. The surrounding forest vegetation and natural attenuation of noise with distance from the source will further minimise significant adverse effects to background noise levels in surrounding areas off-site. The additional movements of railway trains and vehicles to and from the colliery will also involve an incremental rise in existing noise levels along these thoroughfares.

Allocation of Construction Materials and Other Resources - Development of the Clarence Colliery will involve allocation of coal resources from known reserves in the Sydney Basin. The utilisation of the coal for the benefit of mankind may be seen as a positive impact, while other implications such as effects on Australia's mineral income earnings and overall balance of payments are often cited as beneficial as well. Attention should nevertheless be drawn to the fact that the mining of the coal will represent a net reduction to non-renewable coal resources.

Considerable quantities of construction materials such as concrete, steel, copper, stone and gravel will be required in development of the colliery. These materials must either be obtained in competition with other development projects from existing sources or new sources have to be developed. It is anticipated that existing sources for these materials will be adequate to meet the needs of this project for the most part. In terms of potential increases in demand for these materials on a regional basis, the overall percentage increase would be

insignificant and not cause undue competition between proposed construction projects.

In terms of consumable resources, the Clarence Colliery is expected to require up to 25,000 Megawatt hours of power per annum and about 300,000 tonnes of water per annum. These resources are available for operation of the proposed colliery, the water being captured and stored on site, and the electric power being supplied from Lithgow.

5.1.2 Biological Environment

Flora - Since the Clarence Colliery will be an underground mine, disturbance to existing vegetation should be limited to relatively small areas required for surface facilities. The mine site area, washery reject disposal area, rail loop and access roadways will be cleared of existing vegetation. The total area involved however would amount to only four hectares. From the information gathered on flora in the area which was obtained for the original impact statement (to which this is a supplementary report), there does not appear to be any rare or unique plant species which will be affected by the proposed development. As soon as practicable following facilities construction, the site will be landscaped with native grasses, shrubs and trees to present a pleasing appearance. Adequate staff will be employed to maintain this landscaping.

The washery refuse disposal area will be covered with topsoil on completion and planted with trees, shrubs and grasses progressively as final contours are reached. Overall, the

impact on flora in terms of regional forest resources is judged to be slight. No adverse impact to the Newnes State Forest 10 kilometres to the north of the surface facilities, will result from implementation of the proposal and land rehabilitation programmes will greatly mitigate long-term effects.

Fauna - as with effects anticipated for flora discussed above, direct effects on wildlife within the region of the development site will probably be minor due to the relatively small area of habitat to be cleared. Some animals will be lost within those areas directly affected, but no significant impact in terms of regional populations of fauna species is expected. Following land rehabilitation and revegetation programmes, some re-colonisation can be expected as human acitivites subside. As for flora, the original information gathered on fauna does not indicate any rare or unusual species or any valuable wildlife habitat in the area of the proposed development.

Aquatic Life - the site for the Clarence Colliery is located on the headwaters of the Wollangambe Creek and no significant water bodies exist on the site that would be directly affected by the proposed action. However, further downstream away from the site, there are significant pools and flowing water that would support aquatic life such as fish and amphibians, and possibly the Platypus. Uncontrolled runoff from the site area would flow eastward to these areas and through areas of the Blue Mountains National Park, so extensive safeguards to avoid pollution of water courses off-site have been included in the design of the colliery. (See description of the proposed action and environmental impact discussion for

water quality). Provided these safeguards are properly installed and maintained no significant adverse effect on existing aquatic life should result.

5.1.3 Social Environment

Employment - the development of the proposed Clarence Colliery would provide employment for a construction labour force of up to 250 men and a mine operational force of up to 500 men. The source of this labour force is expected to be drawn primarily from an existing pool of miners in the Lithgow area with some contributions from other nearby population centres in the Blue Mountains such as Katoomba. The proposed colliery development will be of benefit in reducing unemployment levels in the Lithgow-Blue Mountains region.

Regional, State and National Economic Conditions - the development of the Clarence Colliery will benefit the economy in terms of providing employment for hundreds of workers, expanding the industrial base of the region, and injecting millions of dollars into the economy through purchase of plant and machinery. In a broader view, there will also be benefits in terms of increased mineral export earnings and a favourable effect on Australia's balance of payments. Taxes, royalties and other payments to local and state governments can also be viewed as a benefit.

Community Health and Social Services - since a large influx of population to the area is not anticipated due to the existing pool of miners and supporting staff, the impact on community health and social services should be minimal.

Land Uses - The site for the Clarence Colliery is located in an area zoned for mining or industrial use. Quarrying operations are currently, or have in the past, been conducted near the site. Thus, a major change in land use for the site itself will not result from colliery development. However, nearby land uses or potential land uses could indirectly be affected by colliery development.

The Blue Mountains National Park, the boundary of which is adjacent to the colliery site to the east, could conceivably be indirectly affected by the proposed action. Although no recreational developments are located in the portion of the park near the colliery site and visitation of these areas is extremely infrequent due to the lack of roadways or walking tracks, future development plans or plans to extend park boundaries westward to further protect these wilderness areas would be thwarted for the time being.

Other nearby land uses, including single family residences to the southeast along the Bell's Line of Road may also be indirectly affected if the increase in industrial and transportation activity were to be viewed as a detriment to land values or desirability of any area for family dwellings. However, due to the distances involved and intervening forest vegetation, this effect is expected to be minimal.

Aesthetics - to minimise any adverse impacts to aesthetic values, an extensive site landscaping and tree planting programme will be conducted and maintained which will beautify the grounds. The selection of building materials and exterior colour schemes which will blend in with the surroundings and present a pleasing appearance will also be important in this regard.

Railway and Road Transportation - the transportation of the labour force to and from the colliery will increase traffic on the Bell's Line of Road (Sydney to Lithgow road), particularly at shift-change time. This could involve up to 1,000 additional vehicle movements per day concentrated in these discrete time periods, if each employee used his personal vehicle. It is anticipated however, that a bus service to and from residential centres such as Lithgow and/or Katoomba will be provided which will greatly ease this impact. It is also conceivable that, depending on negotiations with the Public Transport Commission, railway passengers to the Newnes Junction Railway Station could be re-instated, thus further mitigating impact on road traffic.

The transport of coal to Sydney for export will involve additional train movements on the Great Western Railway Line, but the capacity of the line is adequate to handle the increased traffic. By utilising the railways to transport the product coal, overall efficiency would be maximised while at the same time minimising environmental impacts.

5.2 Wolgan Valley Colliery

5.2.1 Physical Environment

Geology - as with the Clarence Colliery discussed previously, the proposed Wolgan Valley mine will be an underground coal mine in essentially the same geologic environment. Therefore the impacts discussed previously for the Clarence Colliery will also apply to the Wolgan Valley Colliery (see Section 5.1.1).

Soils - as with the discussion for geology above, soils in the Wolgan Valley Mine area are similar to those at the Clarence Mine site and in general, the discussion for the Clarence Mine is also applicable to the Wolgan Valley Mine (see Section 5.1.1). Exceptions to this concern the path of drainage water which could carry silt away from the site and which in the case of the Wolgan Valley Mine would go down Rocky Creek to the Wolgan River. Safeguards designed for the surface facilities sites to control drainage and recycle surface runoff, and rapidly stabilise exposed soils will avoid any adverse impacts.

Topography - as with the Clarence Mine discussed previously, some modification to existing land surface topography will result from implementation of the proposed development. In the sites for the surface facilities, some grading and earthworks will be required to achieve the desired plant grade levels and to provide drainage control and water storage structures. While changes in topography due to these activities will be relatively minor, the disposal of washery reject materials at surface disposal sites will alter existing topographic contours up to 50 to 75 metres on limited areas of up to 4 hectares when completed.

Other changes in topography as a result of the proposed action will stem mainly from subsidence effects after extraction of the coal is complete. The anticipated amount of subsidence is small (about 20cm) and will be uniform over large areas so any change would not be noticeable to the unaided eye of an observer. There are no man-made structures existing in any area of possible subsidence and the vegetation and other

amenities of the region will not be affected.

Hydrology - surface water runoff from the industrial site area and washery refuse disposal areas will be affected since extensive control works to capture and store this fresh water for subsequent re-use will be employed. As the site is located on the plateau and at the headwaters of Rocky Creek, changes in flow regimes should be minor, especially when the relatively small proportion of the catchment area involved is considered.

Other fresh water supply and make-up water necessary for washery functioning will be drawn from the Wolgan River, which will at times noticeably affect the flow volume in the river. However the allocation of this volume of water to the Wolgan Valley Mine would not be in competition with any existing users or allocations downstream.

Water Quality - no significant adverse impact on water quality in Rocky Creek or in the Wolgan River is anticipated from implementation of the proposed action. There will however be a very temporary potential for increased siltation of water courses off-site during construction phases and before stabilisation of exposed soils can be accomplished. The extent of this siltation will depend upon the duration and intensities of rainfall experienced during the construction periods.

The water control recycling and treatment plant design for the Wolgan Valley Colliery has been described previously (Section 4.3). These plans envisage a zero discharge system under all normal conditions with maximum re-use of all waters, and

especially washery process water. Only in periods of extremely heavy rainfall would this system be expected to discharge to water courses off-site in which case the effluent would be within water quality parameters set by government regulation and the requirements of the Clean Waters Act of 1970. No domestic or municipal water supply will be significantly affected by the proposal.

Air Quality - extensive safeguards incorporated into the project design to avoid adverse effects to air quality, almost identical to those planned for the Clarence Colliery, will be effective in avoiding air pollution problems. The great distances between the surface facilities and off-site residences or places of human habitation around the Wolgan Valley mine will preclude any off-site nuisance caused by fugitive windborne dust.

Background Noise - the impact of the slight increase in background noise levels in the mine area will be negligible. The discussion of anticipated impacts in terms of existing background noise levels for the Clarence Colliery (see Section 5.1.1) also applies to the anticipated impact from implementation of the Wolgan Valley mine proposal, except that the site area is even more remote and sparsely populated. No major roads or railways pass within 23 kilometres of the site and the nearest residence is 3 kilometres from the washery and mine site area, and 1.4 kilometres from the existing Wolgan Valley portal near Newnes. There will be an increase in background noise levels along the unsealed Wallerawang to Newnes road due to the possible increase of up to 1,000 vehicle movements per day. The total actual number of vehicle movements is expected to be less than this however, due to the provision of bus services

for mine employees, and there will be a decrease in vehicle traffic after drifts, portals and the washery plant are developed near Dean's Siding on the plateau.

Allocation of Construction Materials and Other Resources - as discussed for the Clarence Colliery proposal, the development of the Wolgan Valley Mine will involve allocation of coal resources from known reserves in the Sydney Basin. While there may be benefits associated with the mining of this coal for the benefit of mankind, the mining of the coal will nevertheless represent a net reduction to non-renewable coal resources.

Construction materials in significant quantities including concrete, steel, copper, stone and gravel will be required to develop the proposed project. The Wolgan Valley Mine project in itself would not significantly affect regional resources or supplies of these products, but considered in conjunction with the proposed Clarence Colliery and its demand on construction materials, there could be a noticeable effect on a temporary basis to local supplies and competition among construction projects in the region.

The demand for consumable resources at the Wolgan Valley mine is expected to be similar to that for the Clarence mine and involve negligible impacts on existing supplies.

5.2.2 Biological Environment

Flora - the comments relating to the anticipated impact on vegetation with the Clarence Colliery proposal (Section 5.1.2)

apply in general to Wolgan Valley Mine. No significant impact on existing forest resources is anticipated and land rehabilitation and revegetation programmes will be applied to mitigate the localised impacts at surface development sites.

Fauna - No significant impact on fauna in the area of the Wolgan Valley Colliery is expected. The discussion of anticipated impacts expected at the Clarence Colliery (Section 5.1.2) also applies to the proposed Wolgan Valley mine. The access road carrying coal will present a barrier to the movement of wildlife east and west across the plateau. However, the existing old coach road and the abandoned railway already present a minor barrier, especially to arboreal species such as opossums which prefer an unbroken canopy through which to move.

Aquatic Life - as with the Clarence Colliery, no significant water bodies exist on the Wolgan Valley mine site that would be directly affected by the proposed action. However, the water intake structure in the Wolgan River has the potential for adverse effects to aquatic life by entrapment on intake screens. Since extensive safeguards will be taken to avoid discharge of polluted water from the colliery to nearby water courses, no significant effect on existing aquatic life in downstream areas should result from the operation of the Wolgan Valley mine. The alteration of the flow regime of the Wolgan River, especially during prolonged dry spells is expected to somewhat reduce the total available area of habitat in downstream areas. However, the mine will depend heavily on storage water for its continued operation during such times and withdrawals from the river can be reduced to protect downstream areas.

5.2.3 Social Environment

Employment -
Regional, State and National Economic Conditions -
Community Health and Social Services - the discussion of anticipated impacts with respect to these aspects of the socio-economic environment presented previously for the Clarence Colliery (Section 5.1.3) also apply to anticipated impacts for the proposed Wolgan Valley mine. There would be a beneficial impact on employment levels in the region and on regional, state and national economic conditions with development of the proposed mine.

Land Uses - the Wolgan Valley mine is located on lands previously dedicated to mining purposes so no major change in land uses would result from the proposal. The Company is at present operating an experimental mine at the site of the Wolgan Valley portal near Newnes so the expansion of activities there would not represent a basic change in current land utilisation. Other land uses nearby such as farms and pastoral holdings in the Wolgan Valley, the Newnes State Forest south of the mine, or the Blue Mountains National Park to the east and southeast should not be significantly affected.

Aesthetics - the impact on aesthetic values of the area will be slight. Most of the mine operations will not be visible to the public, especially those of the mine site area located on the plateau. The scenic values of the Wolgan Valley will therefore be protected for the most part.

However, the Wolgan Valley portal near Newnes will be visible to visitors to the Wolgan Valley, but is not located near any point of historical significance nor visible from popular tourist vantage points so the overall impact should be minimal.

Railway and Road Transportation - the movement of the labour force to and from the Wolgan Valley mine will increase traffic on local roads, particularly around shift-change time. In the first portion of the life of the mine this increased traffic will be noticeably mostly on the unsealed Wallerawang-Newnes Road. This road receives very little traffic at present and the increased traffic will be very noticeable to residents near it. Later on in the life of the mine when the drifts and portals to the underground coal deposits are developed on the plateau, the total traffic on the Wallerawang-Newnes Road will decrease.

The coal will be transported to the Newnes Junction railhead by road trucks over the upgraded old coach road and will be transported to Sydney over the Great Western Railway, thus making efficient use of existing transportation systems where possible, and avoiding the excessive environmental impacts of long distance road haulage. The increased rail traffic along the Great Western Railway will however result in an unavoidable increase in noise, dust and other effects along the route. The transport of coal, by road, from the mine area to Newnes Junction will not affect traffic patterns on public thoroughfares.

6.0 SOURCES OF INFORMATION

6.1 Primary Investigators

The primary investigators who were involved in the project are listed below together with a brief summary of their qualifications and experience.

Peter Campbell - is an Associate of Dames and Moore and before joining the firm in 1972, he held the position of lecturer in Earth Sciences at Macquarie University with a major interest in micrometeorology. He has had considerable experience in environmental matters and has acted in a management capacity on many environmental projects both in the U.S. and Australia.

James McNamara - is a water quality and pollution control specialist with Dames and Moore and holds degrees in chemical engineering and geology. He obtained ten years experience as an engineer in heavy industry, especially in water quality management, before branching into environmental sciences and has since participated in a number of studies.

John Herington - is a soils and rock engineering specialist with Dames and Moore and holds a Masters degree in soil mechanics from the University of Sydney. He has had considerable experience in site engineering and engineering analysis for foundation design as well as projects related specifically to slope stability.

James Weston - is a Masters graduate in park management and land use. He has participated in a number of environmental studies concerned with the socio-economic impact of proposed developments

in partly built-up areas and has been responsible for several reports on possible land use management in rapidly developing sub-urban regions.

6.2 Personal Contacts

Coalex Pty. Ltd.

Mines Department of N.S.W.

National Parks and Wildlife Service

Soil Conservation Service of N.S.W.

6.3 References

Australian Bureau of Census and Statistics. (1974). Handbook of Local Statistics - New South Wales

Australian Bureau of Census and Statistics. (1973). Census of Population and Housing, 1971. Characteristics of Population and Dwellings, Local Government Areas, New South Wales. Bulletin 7, Part 1.

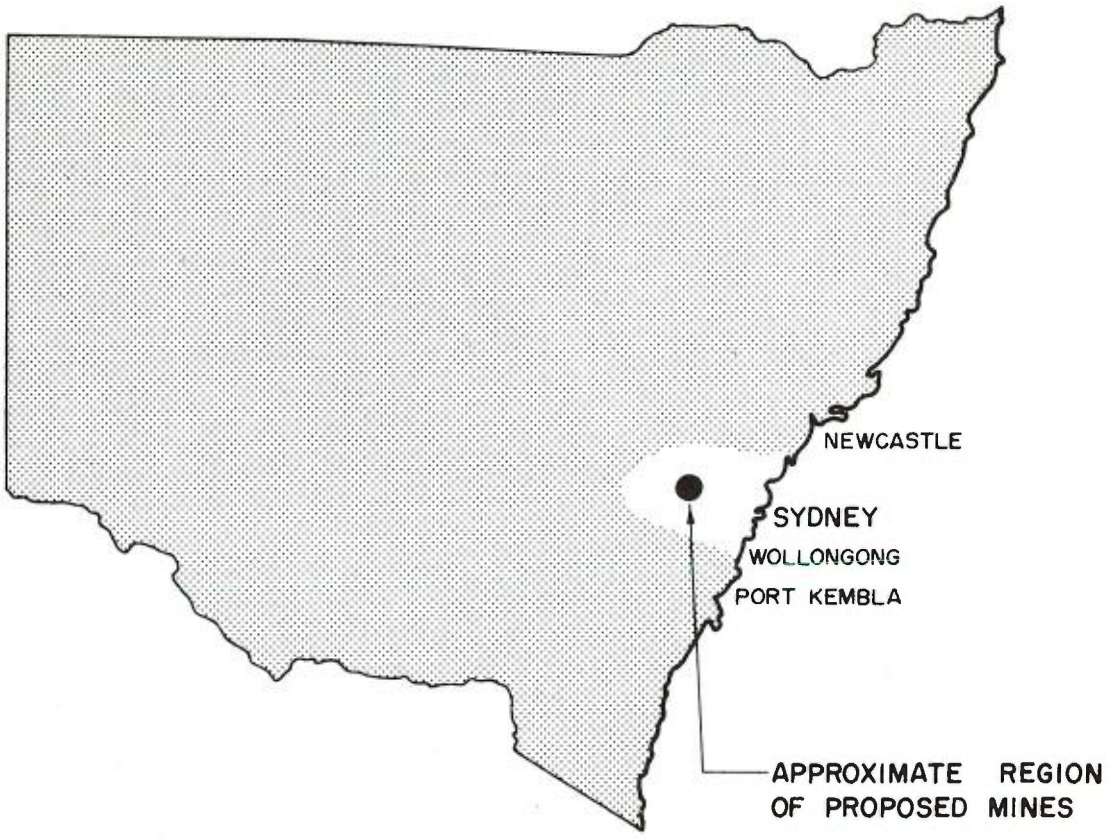
Ellis, J.P., P. Rowley and R. Wheway. (1973). An investigation of Water Pollution at Coal Washeries. Water Research Foundation of Australia.

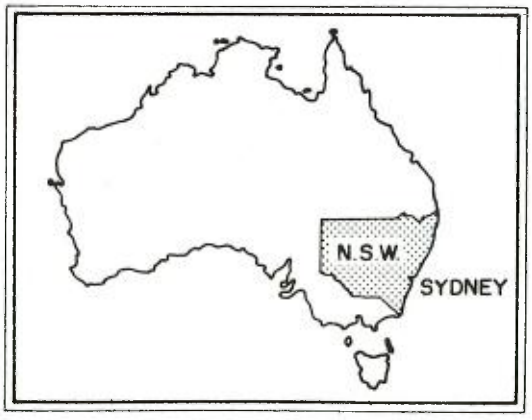
Environmental Impact Statement - Proposed Wolgan Valley and Newnes Junction Coal Mines by Spencer Thomas and Associates Pty. Ltd. (June 1974).

Nasher, Beryl, (1967). Geology of the Sydney Basin. The Jacaranda Press.

Northcote, K.H. (1966). Atlas of Australian Soils. Explanatory data for Sheet 3, Sydney-Canberra-Bourke-Armidale area. C.S.I.R.O.

Setchell, G.H. (1968). Sydney 2000: Requirements for Conservation of Natural Areas, Scenic Preservation and Recreation. National Trust of Australia (N.S.W.)

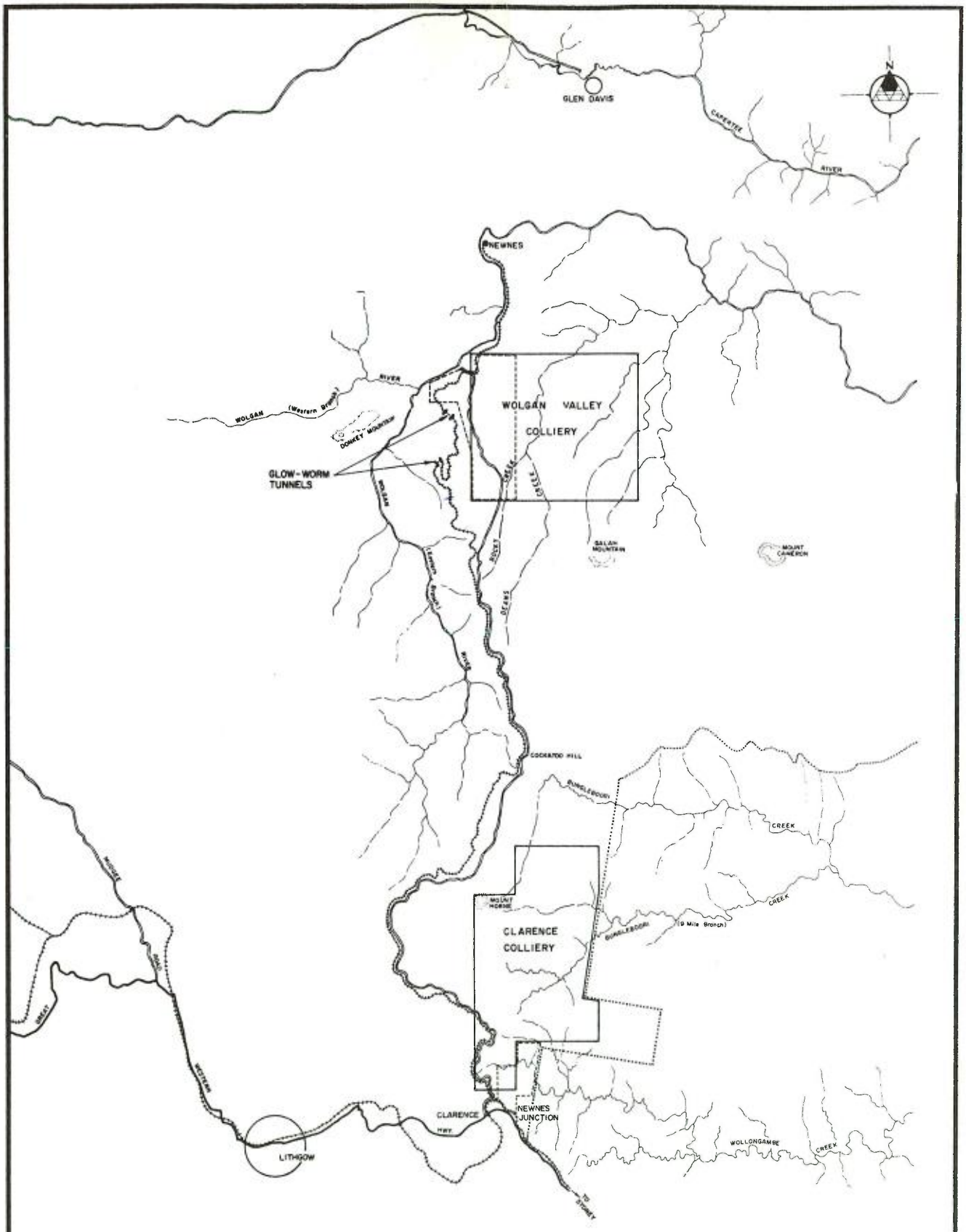




LOCATION MAP

DAMES & MOORE

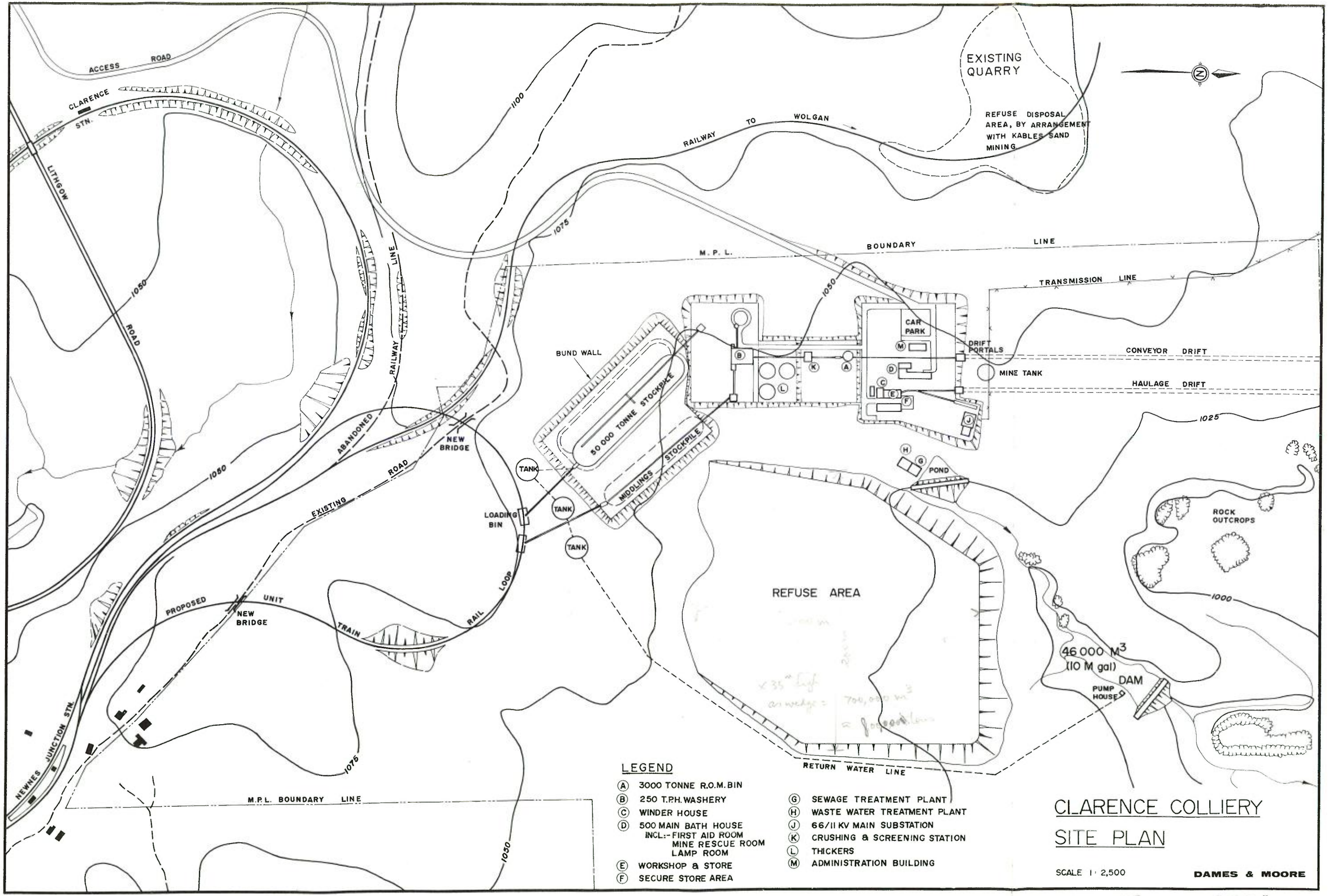
PLATE 1



SITE VICINITY

DAMES & MOORE

PLATE 2

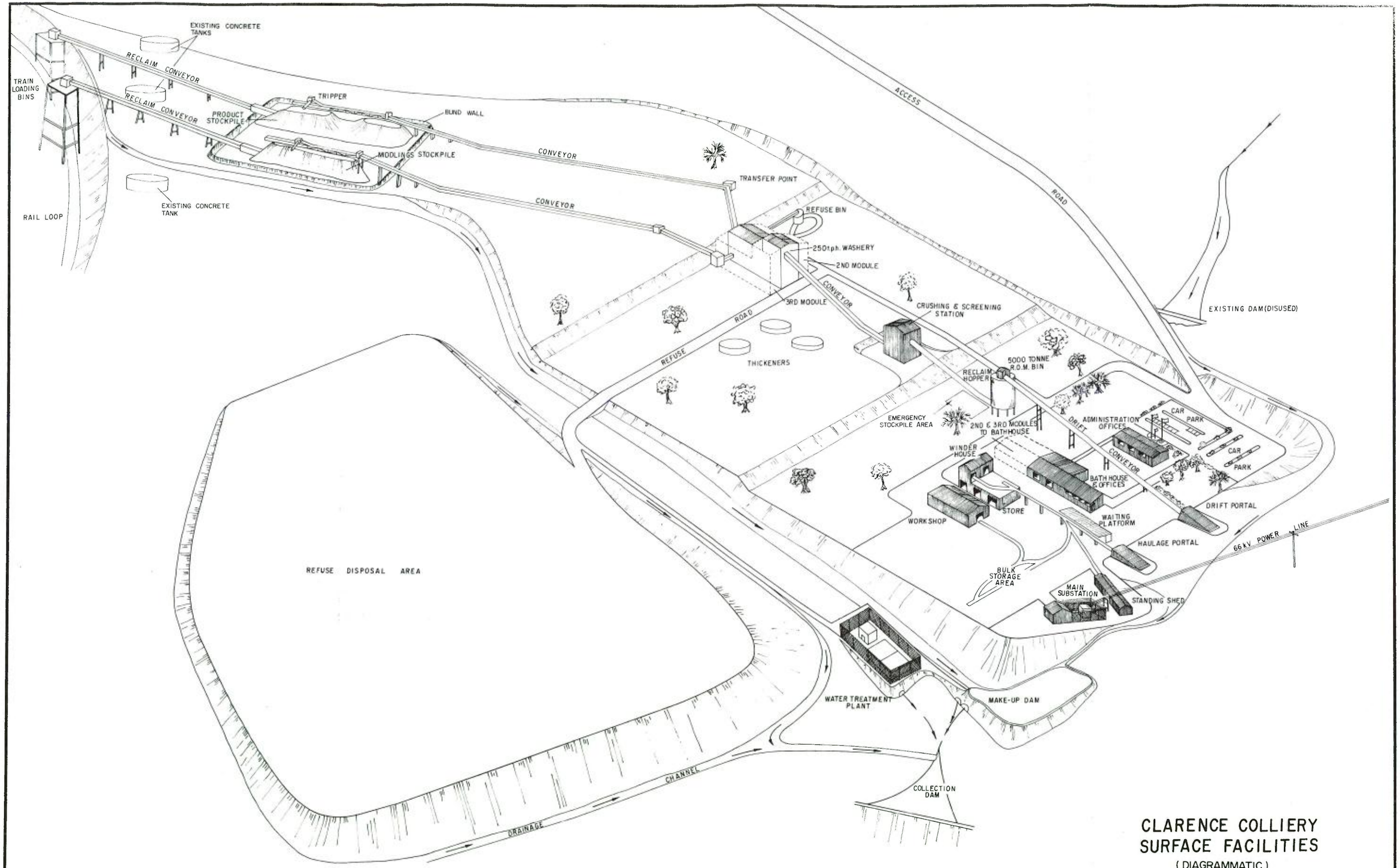


CLARENCE COLLIERY
SITE PLAN

SCALE 1:2,500

DAMES & MOORE

PLATE 3



CLARENCE COLLIERY
SURFACE FACILITIES
(DIAGRAMMATIC)

DAMES & MOORE

PLATE 4

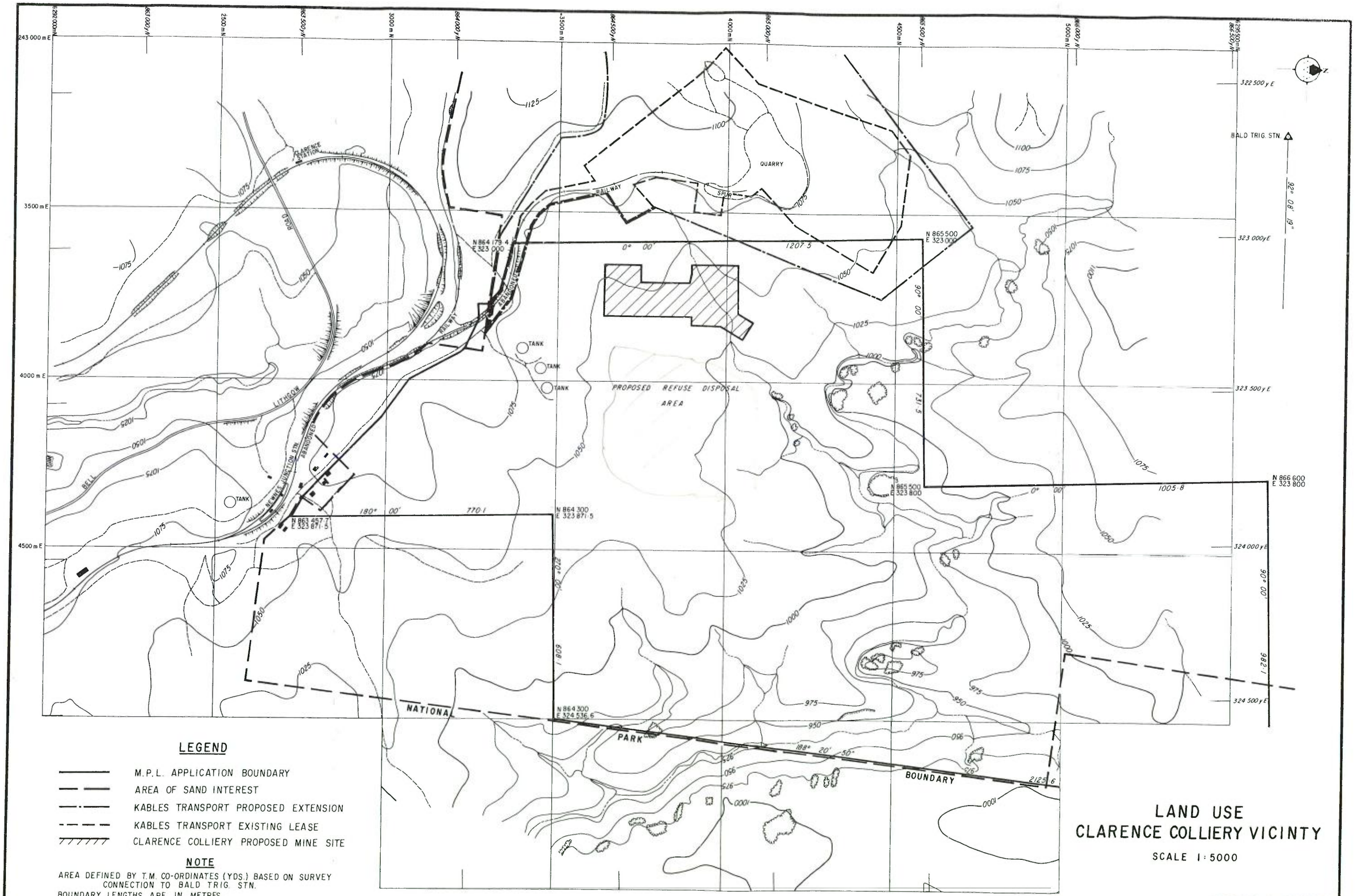
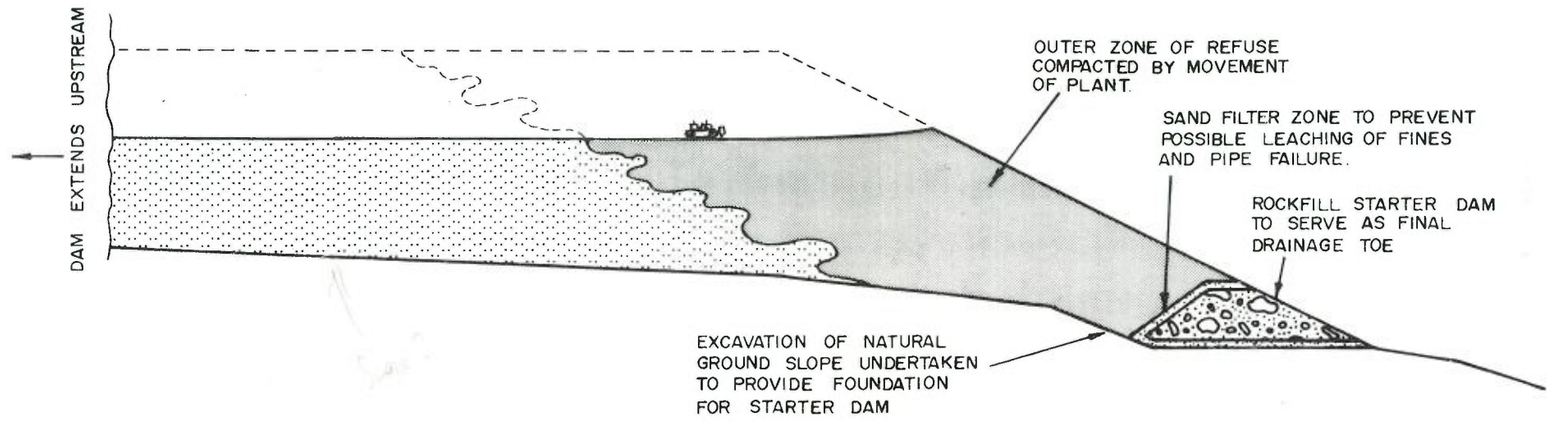
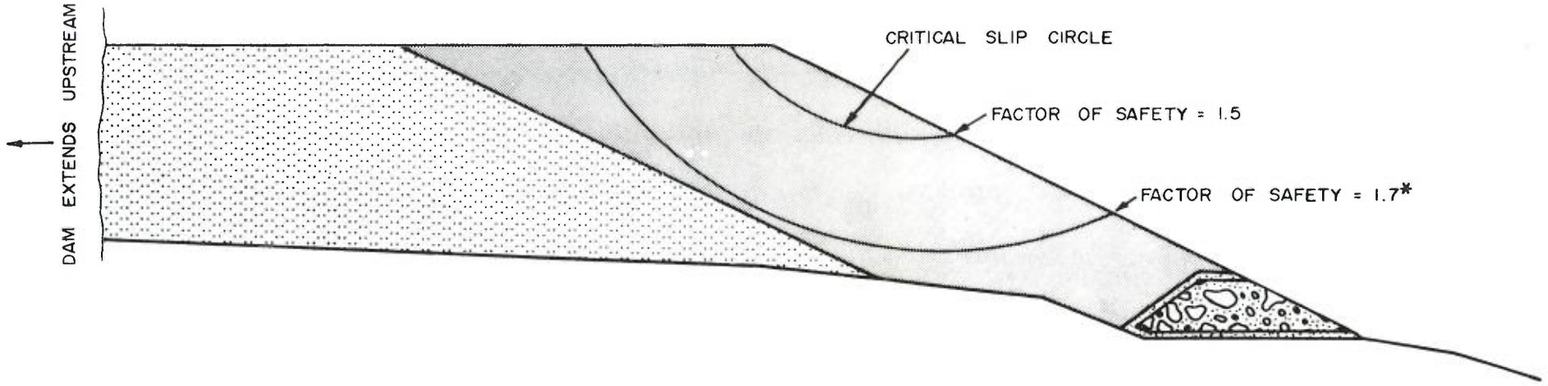

LEGEND
M.P.L. APPLICATION BOUNDARY
AREA OF SAND INTEREST
KABLES TRANSPORT PROPOSED EXTENSION
KABLES TRANSPORT EXISTING LEASE
CLARENCE COLLIERY PROPOSED MINE SITE
NOTE
AREA DEFINED BY T.M. CO-ORDINATES (YDS.) BASED ON SURVEY CONNECTION TO BALD TRIG. STN.
BOUNDARY LENGTHS ARE IN METRES.
QUARRY
PROPOSED REFUSE DISPOSAL AREA
CLARENCE STATION
BALD TRIG. STN.
N 864 179.4
E 323 000
N 865 500
E 323 000
N 866 600
E 323 800
N 865 500
E 323 800
N 864 300
E 323 871.5
N 863 457.7
E 323 871.5
N 864 300
E 324 536.6
NATIONAL PARK BOUNDARY
RAILWAY
ROAD
TANK
LITHGOW
BELL
243 000 m E
3500 m E
4000 m E
4500 m E
322 500 y E
323 000 y E
323 500 y E
324 000 y E
324 500 y E
LAND USE
CLARENCE COLLIERY VICINTY
SCALE 1:5000
DAMES & MOORE

PLATE 5





SLOPE STABILITY - FACTOR OF SAFETY DIAGRAM

LEGEND

- FINER FRACTION OF REFUSE
- WELL COMPACTED COARSE REFUSE
- ROCKFILL
- * ASSUMES THAT COMPETENT BEDROCK IS CLOSE TO THE NATURAL GROUND SURFACE.

SEE ATTACHED NOTES

Need guarantee that it is an engineered structure

CLARENCE COLLIERY PROPOSED REFUSE DISPOSAL SCHEME

DAMES & MOORE

PLATE 6

CLARENCE COLLIERY PROPOSED REFUSE DISPOSAL SCHEME

NOTES:

1. THE OUTER SLOPE OF THE REFUSE DISPOSAL DAMS WILL BE BENCHED TO LIMIT EROSION AND ASSIST IN REVEGETATION. BENCHING WILL RESULT IN OVERALL SLOPE NOT EXCEEDING 2:1 (HORIZONTAL : VERTICAL). DURING STAGED CONSTRUCTION A LIFT HEIGHT OF 5 METRES WILL BE USED.

2. THE SEEPAGE FROM THE REFUSE PILE WILL BE COLLECTED IN THE ACROSS-STREAM COLLECTION DAM FROM WHENCE IT WILL BE PUMPED TO THE TREATMENT PLANT FOR REUSE IN THE WASHERY.

3. SURFACE DRAINAGE AND STORM RUN OFF FROM THE CATCHMENT SURROUNDING THE REFUSE DISPOSAL AREA WILL BE DIVERTED BY DRAINAGE CHANNELS AND COLLECTED TO DISCHARGE DOWNSTREAM OF THE DOWNSTREAM SEEPAGE DAM.

4. PRIOR TO FINAL DESIGN AND CONSTRUCTION THE AREA BENEATH THE PROPOSED REFUSE DAM WALL WILL BE ADEQUATELY INVESTIGATED BY A COMPETENT GEOTECHNICAL ENGINEER TO EVALUATE THE PRESENCE OF ANY WEAK AND/OR PERMEABLE SUBSOILS. THESE, IF FOUND SHOULD BE REMOVED AND A FOUNDATION OF ADEQUATE STRENGTH PLACED.

5. THE DOWNSTREAM SEEPAGE DAM MAY BE A CONVENTIONAL EARTH-FILL CENTRE CORE DAM WITH THE UPSTREAM ZONE CONSTRUCTED OF COMPACTED COARSE REFUSE. HOWEVER, THE DOWNSTREAM ZONE WILL NOT BE CONSTRUCTED FROM REFUSE OWING TO THE POSSIBILITY OF ACID SEEPAGE WATER.

6. DURING THE CONSTRUCTION OF THE REFUSE DAM WALL PERIODIC INSPECTION AND TESTING OF THE COMPACTED REFUSE WILL BE UNDERTAKEN TO ENSURE THAT CONSTRUCTION TECHNIQUES ARE ADEQUATE.

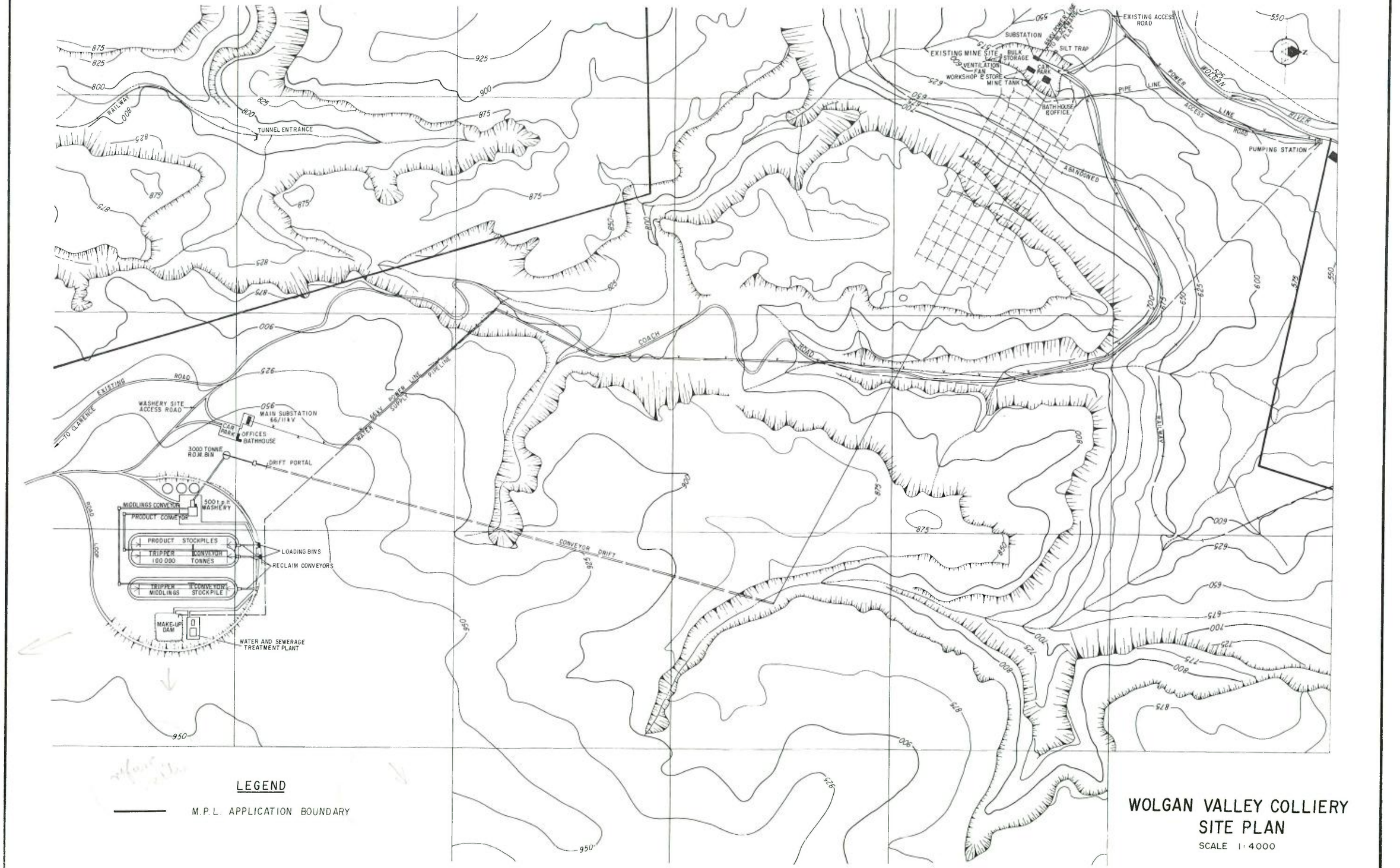
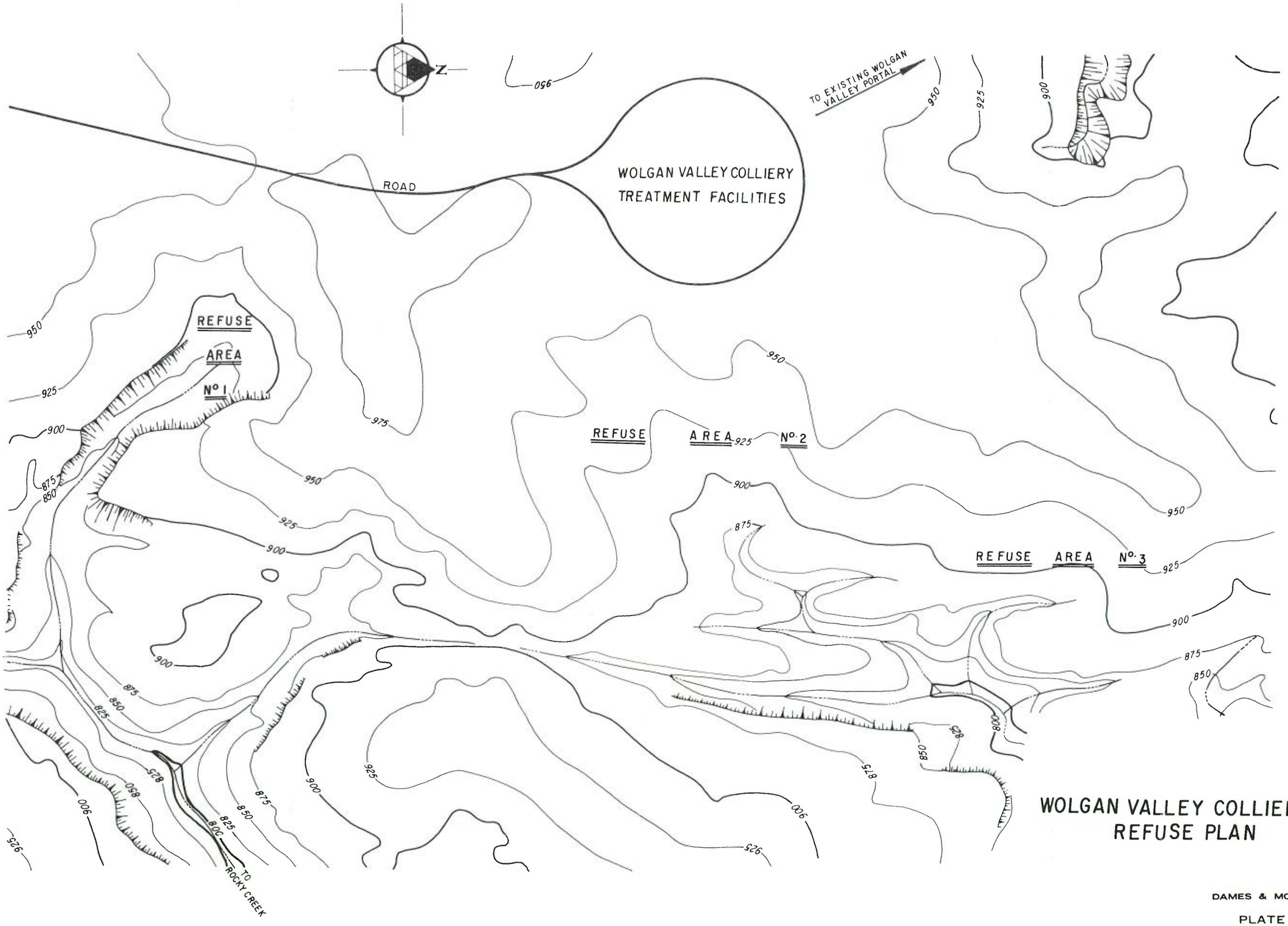

EXISTING ACCESS ROAD
SUBSTATION
EXISTING MINE SITE
BULK STORAGE
SILT TRAP
VENTILATION FAN
CAR PARK
WORKSHOP & STORE
MINE TANK
BATH HOUSE & OFFICE
PIPE LINE
POWER
ACCESS ROAD
LINE
WOLGAN RIVER
PUMPING STATION
ABANDONED
RAILWAY
TUNNEL ENTRANCE
COACH ROAD
EXISTING ROAD
TO CLARENCE
WASHERY SITE ACCESS ROAD
MAIN SUBSTATION 66/11kV
CAR PARK
OFFICES
BATHHOUSE
3000 TONNE R.O.M. BIN
DRIFT PORTAL
WATER
66kV POWER SUPPLY LINE
PIPE LINE
MIDDLINGS CONVEYOR
PRODUCT CONVEYOR
500 t.p.h. WASHERY
PRODUCT STOCKPILES
TRIPPER CONVEYOR 100 000 TONNES
TRIPPER CONVEYOR MIDDLINGS STOCKPILE
LOADING BINS
RECLAIM CONVEYORS
MAKE-UP DAM
WATER AND SEWERAGE TREATMENT PLANT
CONVEYOR DRIFT
ROAD LOOP
N
LEGEND
M.P.L. APPLICATION BOUNDARY
WOLGAN VALLEY COLLIERY
SITE PLAN
SCALE 1:4000
DAMES & MOORE

PLATE 7



WOLGAN VALLEY COLLIERY
REFUSE PLAN

DAMES & MOORE

PLATE 8

LEGEND

WELL COMPACTED CLAY

WELL COMPACTED COARSE REFUSE

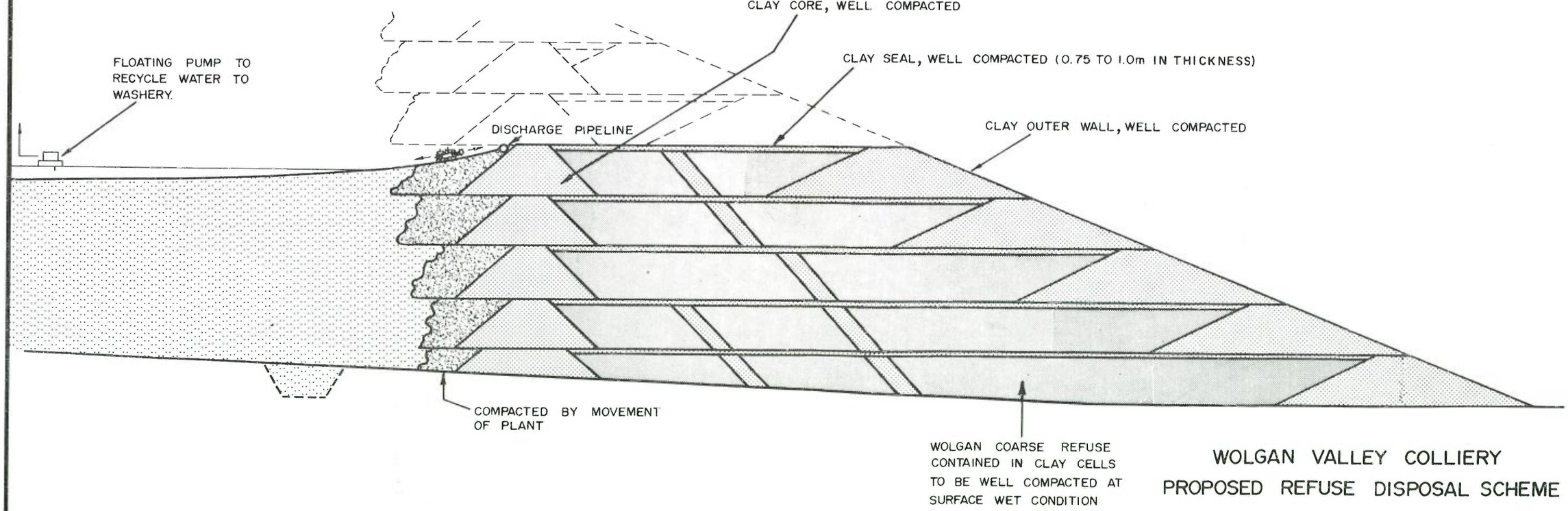
COARSER FRACTION OF REFUSE

FINER FRACTION OF REFUSE

SEE ATTACHED NOTES

NOTE

THE GROUND SLOPE BENEATH THE DAM WALL WILL VARY FROM LOCATION TO LOCATION. HERE IT IS SHOWN RELATIVELY FLAT TO ALLOW A CLEARER SCHEMATIC PRESENTATION OF THE STAGED CONSTRUCTION.



WOLGAN VALLEY COLLIERY
PROPOSED REFUSE DISPOSAL SCHEME

DAMES & MOORE

PLATE 9

WOLGAN VALLEY COLLIERY PROPOSED REFUSE DISPOSAL SCHEME

NOTES:

1. INNER CLAY CORE REQUIRED TO PREVENT SEEPAGE OF WATER THROUGH DAM WALL AND DRYING OUT OF STORED REFUSE LEADING TO POSSIBLE FIRE HAZARD.

2. CELLULAR CONSTRUCTION OF DOWNSTREAM FACE TO MAINTAIN A SEAL FOR THE COARSE REFUSE AND ALONG WITH ADEQUATE COMPACTION TO PREVENT THE POSSIBLE SPONTANEOUS COMBUSTION OF THE REFUSE.

3. THE OUTER SLOPE OF THE REFUSE DISPOSAL DAMS WILL BE BENCHED TO LIMIT EROSION AND ASSIST IN REVEGETATION. BENCHING WILL RESULT IN OVERALL SLOPE NOT EXCEEDING 2.5:1 (HORIZONTAL:VERTICAL). DURING STAGED CONSTRUCTION A LIFT HEIGHT OF 5 METRES WILL BE USED.

4. A FLOATING PUMP SYSTEM WILL BE INSTALLED TO RECYCLE PONDED WATER, HELD IN THE REFUSE DAM, BACK TO THE WASHERY AND TO HANDLE STORM DELUGE ON THE SURFACE OF THE REFUSE DAM STORAGE AREAS TO PREVENT OVERTOPPING. WATER WILL BE DISCHARGED BACK TO THE WASHERY AND IF NECESSARY TO THE DOWNSTREAM SEEPAGE DAM.

5. A DOWNSTREAM SEEPAGE DAM WILL BE CONSTRUCTED TO COLLECT SEEPAGE WATER AND EXCESS STORM DELUGE OR DISCHARGE FROM THE FLOATING PUMP SYSTEM. THE WATER WILL BE TREATED IN A WATER TREATMENT PLANT TO RESTORE THE WATER TO A SATISFACTORY STANDARD FOR RELEASE INTO THE STREAMS.

6. SURFACE DRAINAGE AND STORM RUN OFF FROM THE CATCHMENT SURROUNDING THE REFUSE DISPOSAL AREA WILL BE DIVERTED BY DRAINAGE CHANNELS AND COLLECTED TO DISCHARGE DOWNSTREAM OF THE DOWNSTREAM SEEPAGE DAM.

7. THE COMBINED COARSE AND FINE REFUSE FRACTIONS FROM THE WASHERY WILL BE DISCHARGED FROM A PIPELINE PLACED ADJACENT TO THE COMPACTED COARSE REFUSE DAM WALL TO ENABLE DEPOSITION OF THE COARSER FRACTION NEAR TO THE WALL. THIS COARSER FRACTION WILL BE COMPACTED BY THE MOVEMENT OF PLANT.

8. IT MAY INITIALLY BE NECESSARY TO CONSTRUCT AN UPSTREAM EXCAVATION TO POND SLURRY FINES AND FORM A POND FOR WATER AND FLOATING PUMP INSTALLATION.

9. PRIOR TO FINAL DESIGN AND CONSTRUCTION THE AREA BENEATH THE PROPOSED REFUSE DAM WALL WILL BE ADEQUATELY INVESTIGATED BY A COMPETENT GEOTECHNICAL ENGINEER TO EVALUATE THE PRESENCE OF ANY WEAK AND/OR PERMEABLE SUBSOILS. THESE, IF FOUND SHOULD BE REMOVED AND A FOUNDATION OF ADEQUATE STRENGTH PLACED.

10. DEPENDING ON THE FOUNDATION CONDITIONS REVEALED, IT MAY BE POSSIBLE TO USE A DECANT PIPELINE BENEATH THE WALL TO HANDLE RECYCLING OF PONDED WATER TO THE WASHERY AND STORM DELUGE.

11. ADEQUATE FREEBOARD OF AT LEAST 0.5METRE WILL BE MAINTAINED AT ALL TIMES AT THE CREST OF THE DAM TO DEAL WITH EMERGENCY STORM CONDITIONS OR PUMP BREAKDOWNS.

DAMES & MOORE

WOLGAN VALLEY COLLIERY PROPOSED REFUSE DISPOSAL SCHEME

NOTES - CONT'D:

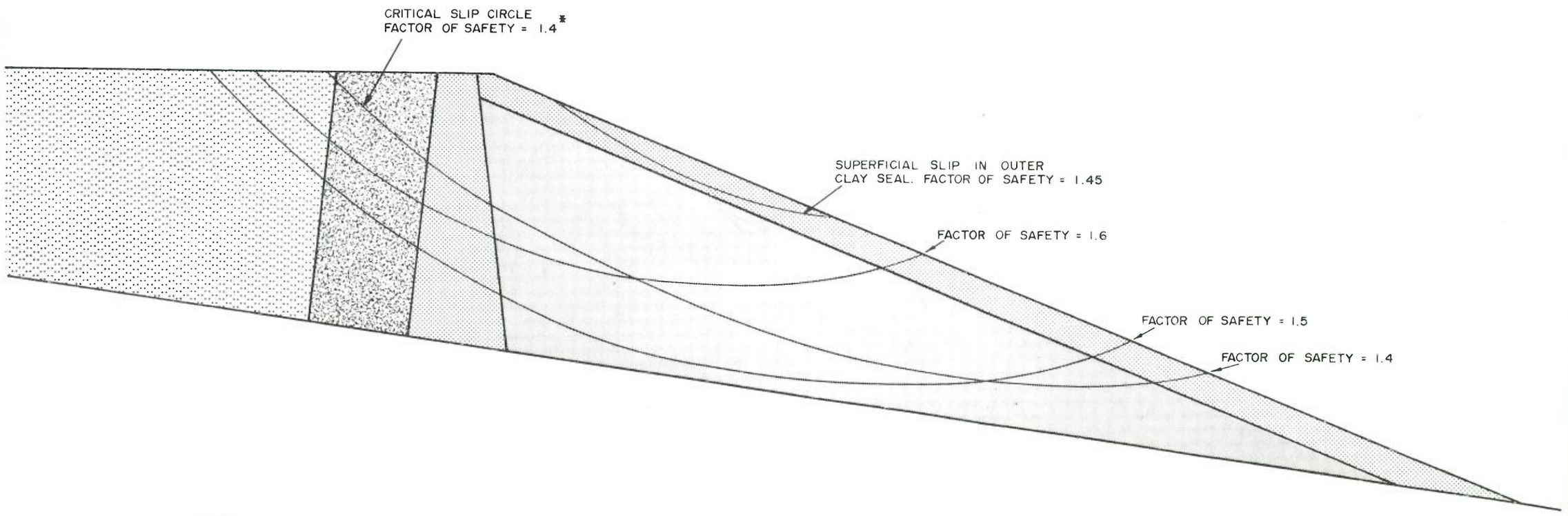
12. NO DOWNSTREAM CONCRETE PIPEWORK OR SUPPORT STRUCTURES WILL BE USED BECAUSE OF POSSIBLE SULPHATE ATTACK FROM THE SEEPAGE WATER.

13. THE DOWNSTREAM SEEPAGE DAM MAY BE A CONVENTIONAL EARTH-FILL CENTRE CORE DAM WITH THE UPSTREAM ZONE CONSTRUCTED OF COMPACTED COARSE REFUSE. HOWEVER, THE DOWNSTREAM ZONE WILL NOT BE CONSTRUCTED FROM REFUSE OWING TO THE POSSIBILITY OF ACID SEEPAGE WATER.

14. DURING THE CONSTRUCTION OF THE REFUSE DAM WALL PERIODIC INSPECTION AND TESTING OF THE COMPACTED REFUSE WILL BE UNDERTAKEN TO ENSURE THAT CONSTRUCTION TECHNIQUES ARE ADEQUATE.

LEGEND

- WELL COMPACTED CLAY
- WELL COMPACTED COARSE REFUSE
- COARSER FRACTION OF REFUSE
- FINER FRACTION OF REFUSE
- * ASSUMES THAT COMPETENT BEDROCK IS CLOSE TO THE NATURAL GROUND SURFACE.



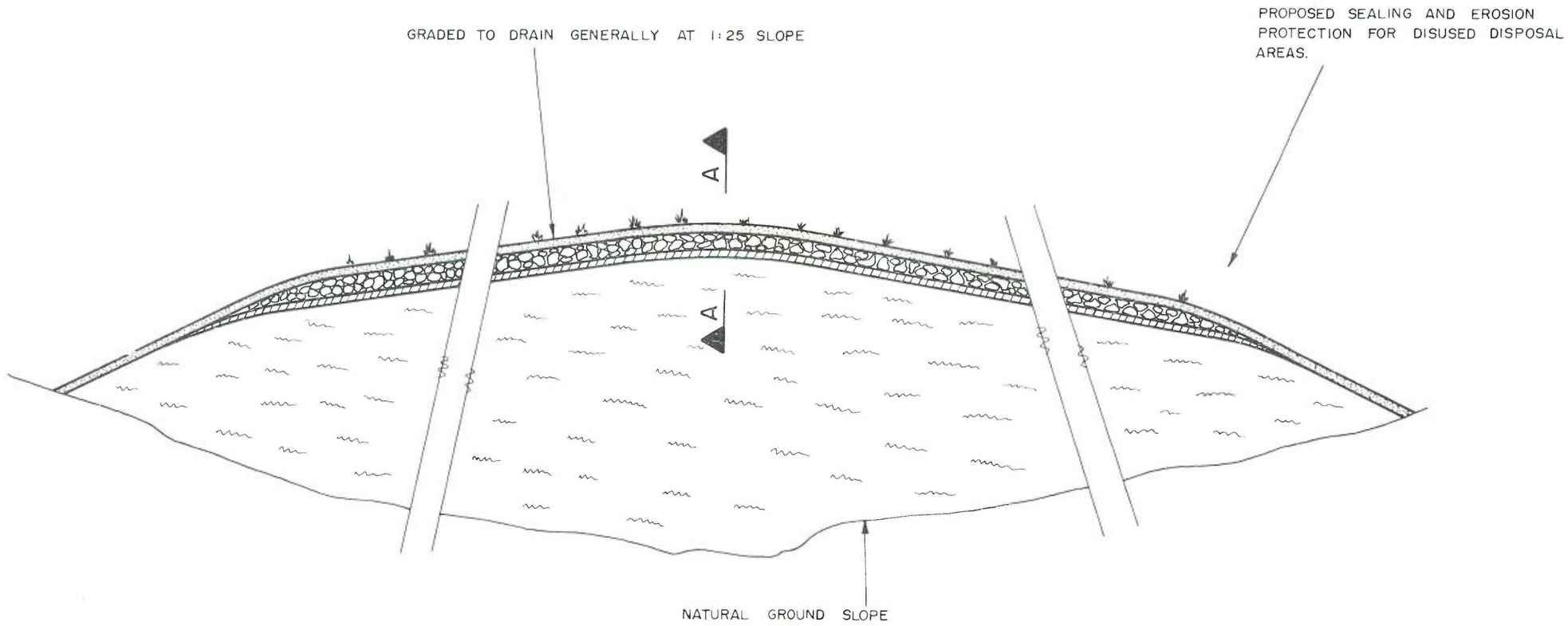
NOTE

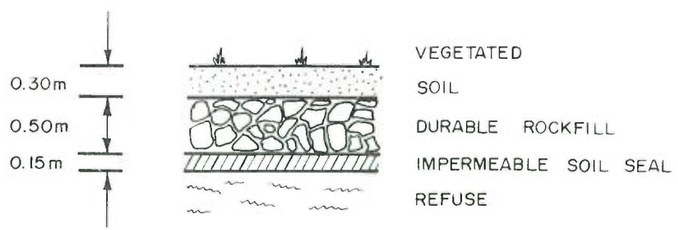
STABILITY CALCULATIONS HAVE BEEN CARRIED OUT FOR THE MAXIMUM GROUND SLOPE AT THE REFUSE DAM WALL LOCATION (REFUSE AREA 2)

WOLGAN VALLEY COLLIERY REFUSE DISPOSAL DAM
SLOPE STABILITY - FACTOR OF SAFETY

DAMES & MOORE

PLATE 10





SECTION A-A

DIAGRAMMATIC SECTION THROUGH REFUSE DISPOSAL AREA. (General)

DAMES & MOORE

PLATE II

COALEX PTY LTD

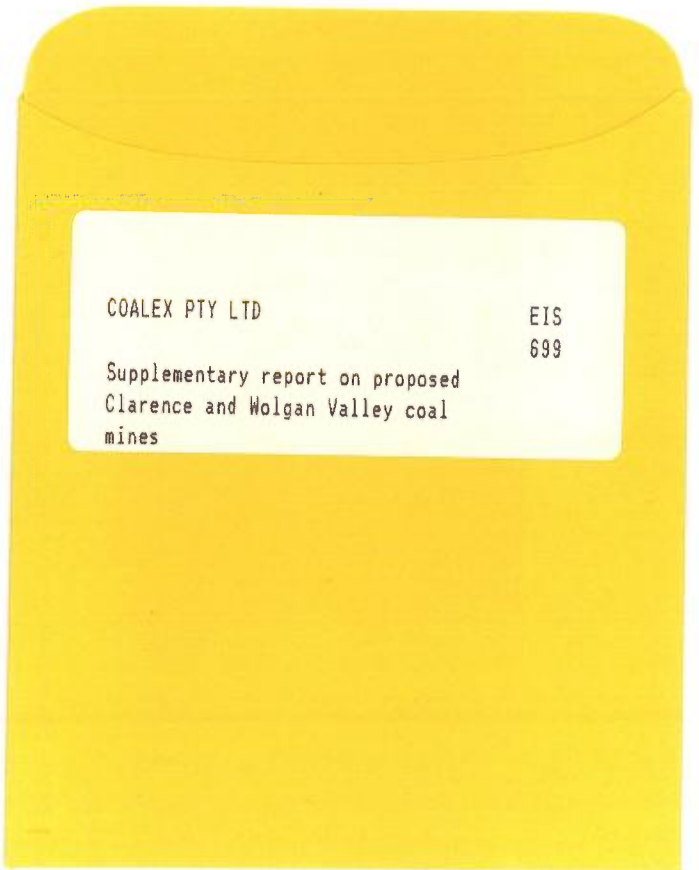
EIS
699

Supplementary report on proposed Clarence and Wolgan Valley coal mines

Borrower's name	Date	Ex

RAECO

EIS 699


COALEX PTY LTD
EIS
699
Supplementary report on proposed
Clarence and Wolgan Valley coal
mines