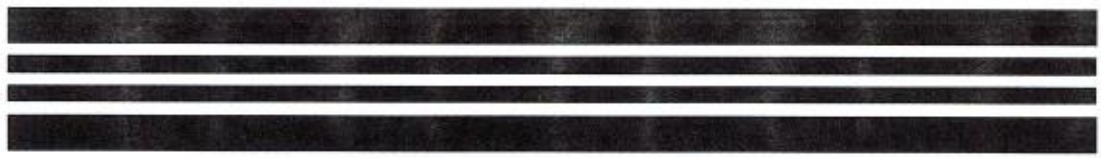

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Environmental impact statement for the Temora gold project

Environmental Impact Statement for the Temora Gold Project

Prepared by R.W. Corkery & Co. Pty. Ltd.

PARAGON GOLD PTY LTD
(A wholly owned subsidiary of Paragon Resources N.L.)

PARAGON GOLD PTY LTD

ENVIRONMENTAL IMPACT STATEMENT

FOR THE TEMORA GOLD PROJECT

Prepared by:

R.W. Corkery & Co. Pty Ltd
Geological and Environmental Consultants
P.O. Box 80
ORANGE NSW 2800

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(02) 689 3993

On behalf of:

Paragon Gold Pty Ltd
G.P.O. Box W 2039
PERTH WA 6001

Telephone: (09) 481 0913

April, 1986

EIS
602

FORM 4

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979 SECTION 77 (3)(d)
ENVIRONMENTAL IMPACT STATEMENT

This statement has been prepared on behalf of Paragon Gold Pty Ltd being the applicant making the development application referred to below.

The statement accompanies the development application made in respect of the development described as follows:-

> The mining and treatment of gold bearing ore and the development of a nearby borefield

The development application relates to the land described as follows:-

Mining and Treatment:	Portions 13, 14, 18
Borefield:	Portions 17, 21, 22, 23, 24, 40, 41, 42, 50
Parish:	Culingerai
County:	Bland

The contents of this statement, as required by Clause 34 of the Environmental Planning and Assessment Regulation, 1980, are set forth in the accompanying pages.

Name, Qualifications and Address of person who prepared Environmental Impact Statement	R.W. Corkery, B.Sc.,M.Appl.Sc., P.O. Box 80, ORANGE NSW 2800

Certificate

I, Robert William Corkery of P.O. Box 80, Orange, NSW, hereby certify that I have prepared the contents of this Statement in accordance with clauses 34 and 35 of the Environmental Planning and Assessment Regulation, 1980.

Robert W. Corkery
.....

Signature

4th April, 1986
.....

Date

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SECTION 3: DESCRIPTION OF THE EXISTING ENVIRONMENT

SECTION 5: THE PROJECTS IMPACT ON THE ENVIRONMENT

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SUMMARY

SUMMARY

THE PROJECT SITE

The project site is located on the southwest slopes of New South Wales, approximately 15 km north of Temora, a rural service town and previously a centre of gold mining in the late 19th century. The site lies on the western side of the Temora-Barmedman Road near the Gidginbung rail siding.

The site lies within a sparsely settled rural area, close to power and underground water.

The project site covers a 451 ha area sought as a Mining Lease from the Department of Mineral Resources. The Mining Lease Application (MLA 42) covers land owned by the Company and a section of Crown Land along which Schmidts Lane is presently located.

THE ORE BODY

The Company has defined an economic ore body comprising 4.6 million tonnes of siliceous rock assaying 2.8 g/t gold and 6.0 g/t silver. It is located on a small hill south of a larger hill on which Gidginbung Trig. Station is located. The ore body covers approximately 11 ha and comprises weathered ore to a depth of 15 m and oxidised ore to a depth of 85 m. A further 1.5 million tonnes of low grade material has also been defined on the site. In order to mine the ore, the Company will need to mine some 6 million tonnes of waste rock.

OUTLINE OF PROJECT

The Temora gold project will involve the development of an open cut mine to yield the ore containing gold and silver and a treatment plant to produce both metals in bullion form.

The open cut will be developed using conventional mining techniques using drilling and blasting and removal by dump truck. Ore will be delivered directly to the treatment plant where it will be either stockpiled or fed directly into the primary crusher. The low grade ore will be stockpiled separately for possible treatment and the waste rock placed by truck onto a contoured dump.

The treatment plant will comprise a conventional crushing and grinding circuit followed by a carbon-in-pulp treatment plant to extract the gold from the ground ore.

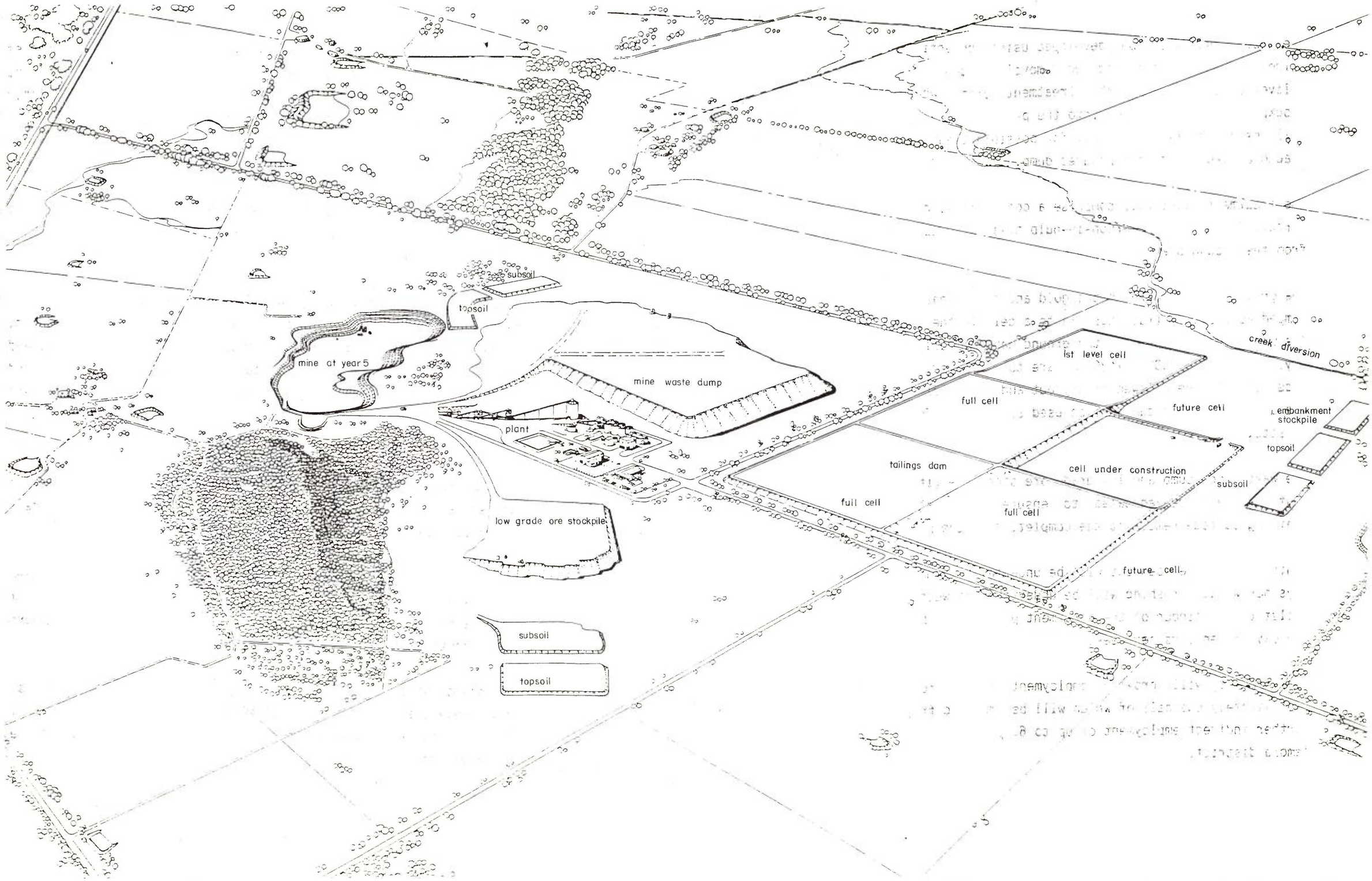
The ground rock from which the gold and silver has been removed will be pumped as a slurry (tailings) in to a cell in the adjacent tailings dam. The water is recovered and the ground material allowed to settle out and dry. The cells (300 m x 300 m) are to be constructed progressively and once full will be allowed to dry out and the surface planted to trees. The active tailings dam will be used as the sump for all water collected on site.

The waste rock dump and low grade ore stockpile (if not treated) will be contoured and re-vegetated to ensure stable batter slopes and a self draining surface remain at the completion of the project.

Mining within the open cut will be undertaken 24 hours per day, seven days per week. Crushing will be undertaken between 7.00 am and 10.00 pm whilst the remainder of the treatment plant will be operated 24 hours per day, seven days per week.

The project will provide employment for approximately 55 persons, approximately one half of which will be employed from the local area. Further indirect employment of up to 60 persons would be expected in the Temora district.

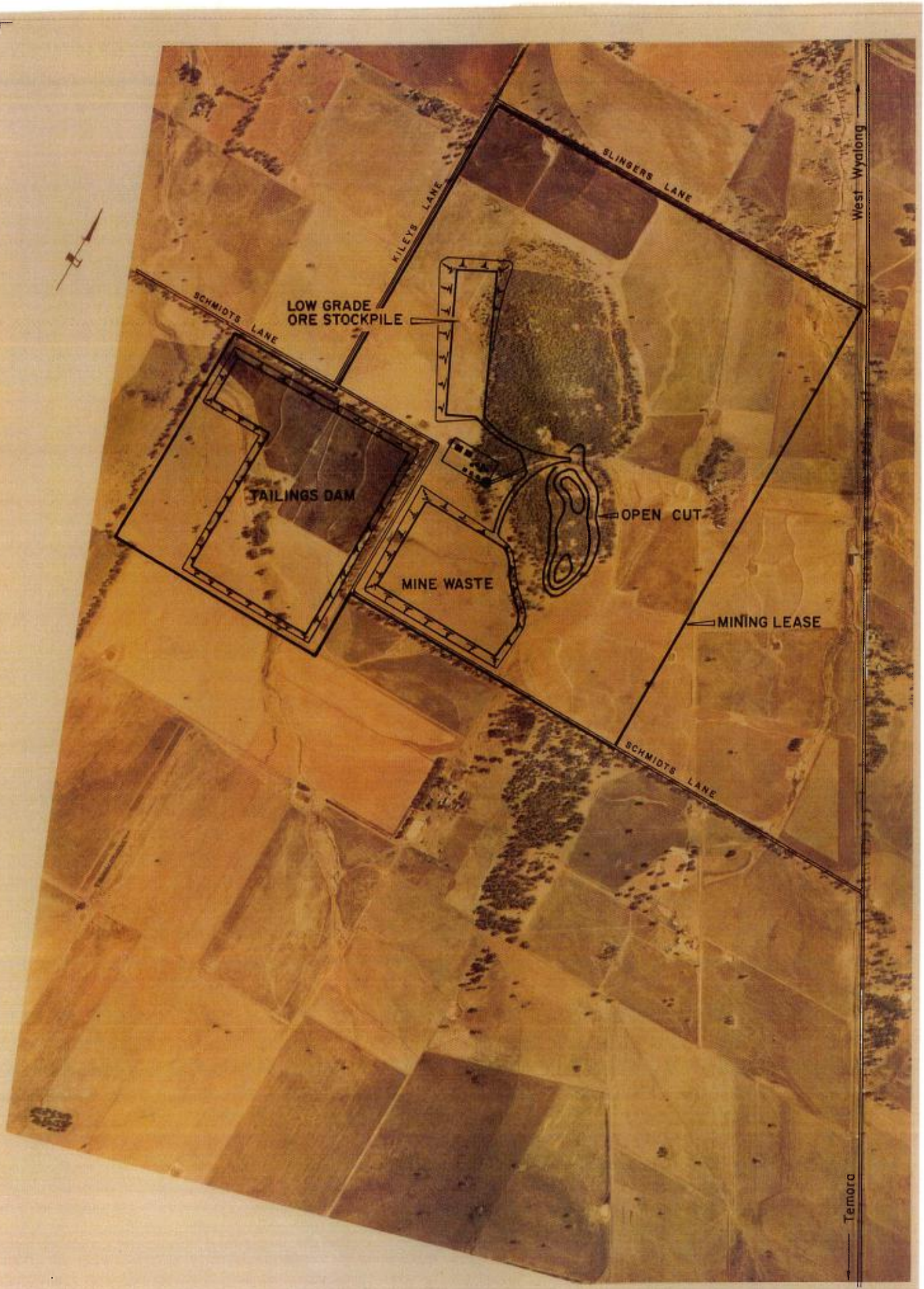
PARAGON GOLD PTY. LTD.



SOURCE: Kinhill Stearns

R.W. CORKERY & CO. PTY. LIMITED

TEMORA GOLD PROJECT



TEMORA PROJECT

0 500 1000
METRES

TEMORA PROJECT

0 500 1000

METRES

ENVIRONMENTAL CONSTRAINTS

The principal environmental constraints identified are:

(i) The proposed open cut is located in an elevated area south of the Gidginbung Trig. Station and hence will be visible from the Temora - West Wyalong Road.

(ii) The project site is located within the headwaters of Barmedman Creek, a non-perennial stream in the vicinity of the site.

(iii) The soil resources are limited on the open cut site, but are moderately well developed away from the central ridge. The A horizon has moderate fertility to assist re-vegetation programmes. Soils on the sideslopes are highly erodible.

(iv) The Temora climate is harsh in summer with high temperatures and unpredictable rainfall, whereas winters are cool to cold with more reliable rains. Winds are variable but generally blow from southwest in winter/spring and northeast and east in summer/autumn. An understanding of climate is important in planning rehabilitation, drainage controls, and aspects of the project affected by wind.

(v) The Company's baseline studies have shown that surface streams have a low buffering capacity, naturally high suspended solid levels and no abnormal trace metal concentrations. Dust levels are typical of rural areas with some high concentrations due to specific activities.

(vi) Extremely saline groundwater is recorded in the area in fractured rocks.

(vii) The project site incorporates predominantly pasture and cropland with a central area of native vegetation. Some plants of special significance were observed on the northern end of the ridge near the Gidginbung Trig. Station.

(viii) The site is located in a rural area where background noise levels are low. They are often increased by frequent wind in the area.

(ix) Nine residences are located within 3 km of the project site. Three are available for rent. The project has been discussed with all nearby landowners.

(x) Two archaeological sites are located on MLA 42 near Gidbinbung Trig. Station and "Lilydale" homestead.

(xi) Schmidts Lane passes through MLA 42. It carries little local traffic (from about seven properties).

IMPACT OF THE PROJECT

(i) The local topography will differ at the completion of the project. The open cut (fenced) and two and perhaps three elevated areas will remain.

(ii) Local runoff will be collected, used and re-circulated through the tailings dam whilst the project is operating.

(iii) Stream water quality outside MLA 42 will not be affected by the project.

(iv) Air quality will not be affected because of extensive dust control measures.

(v) The local noise climate will change. The background level will rise as a result of the 24 hr/day operation. Noise levels will be highest in the first year of operation whilst mining is near the surface. After this period the noise levels at all times of the day will be within limits specified by the State Pollution Control Commission.

(vi) Blasting may be heard at some surrounding residences, however, ground vibration levels will be within specified limits.

(vii) The project will have a significant economic impact on the town of Temora. Weekly wages of approximately $40,000 and Company spending will generate indirect employement and further growth in Temora. The demand for rental accommodation and homes for purchase will increase in Temora and the Surrounding district.

(viii) The project's location and proposed tree screening will ensure its visual impact is minor.

(ix) The temporary closure of Schmidts Lane through MLA 42 will have a negligible impact since a diversion of the same distance and condition will be constructed around the site.

CONCLUSION

The Temora gold project will result in a number of changes to the Local Environment. The Company will adopt a wide range of design and operational safeguards to ensure the changes are within accepted limits. The project will become a relatively important component in the local economy for the next ten years and once again place Temora as an important centre of gold production in New South Wales.

SECTION 1

INTRODUCTION

SECTION 1

INTRODUCTION

1.1 SCOPE

This Environmental Impact Statement has been prepared by R.W. Corkery & Co. Pty Ltd to support a Development Application by Paragon Gold Pty Ltd to Temora Shire Council.

The proponent, hereafter referred to as "the Company", proposes to mine and treat gold bearing ore at a site 15 km north of Temora, New South Wales. In order to undertake the mining and treatment of the ore, the Company has lodged a Mining Lease Application (MLA) 42 (Wagga) through the Department of Mineral Resources. Obtaining development consent is a prerequisite for the Lease to be granted. Mining within a Mining Lease is a designated development within Schedule 3 (Part m) of the Environmental Planning and Assessment Regulation, 1980.

This Statement also examines the impact that a possible borefield would have on the surrounding agricultural land. It is possible that the borefield will provide a substantial proportion of the Company's water requirements.

This Statement will serve as a basis for applications to the State Pollution Control Commission for licences and approvals required to operate the mine and treatment plant.

Figure 1.1 shows the Temora Gold Project site is located near Gidginbung approximately 15 km north of Temora and 20 km south of Barmedman. The Mining Lease sought is located on the Company's land within the Parish of Culingerai in the County of Bland.

1.2 FORMAT OF THE IMPACT STATEMENT

This Environmental Impact Statement has been written in six sections with a set of appendices. The requirements of Clause 34 of the Environmental Planning and Assessment Regulation, 1980 and the Director's letter (Appendix 4) have been incorporated into the most appropriate sections of the Statement. The format is as follows:

Section 1 - Introduces the proposal and the proponent, outlines the history of goldmining in the Temora District, and the background to the Company's proposal.

Section 2 - Outlines the Company's objectives and their proposed plans for mining, rehabilitation and treatment of the gold bearing ore.

Section 3 - Describes the existing environment around the Project Site. Potential constraints imposed by the existing environment are identified.

Section 4 - Presents the safeguards which have been incorporated in the mine plan and the design of the treatment plant to protect the environment in the vicinity of Gidginbung.

Section 5 - Analyses the impact the safeguarded project will have on the environment surrounding the site.

Section 6 - Justifies the project in terms of environmental, economic and social considerations and examines the consequences of not proceeding with the project.

Appendices - Present the results of the Company's baseline studies, the flora and fauna study, the Energy Impact Statement, and correspondence from the Department of Environment and Planning and the National Parks and Wildlife Service.

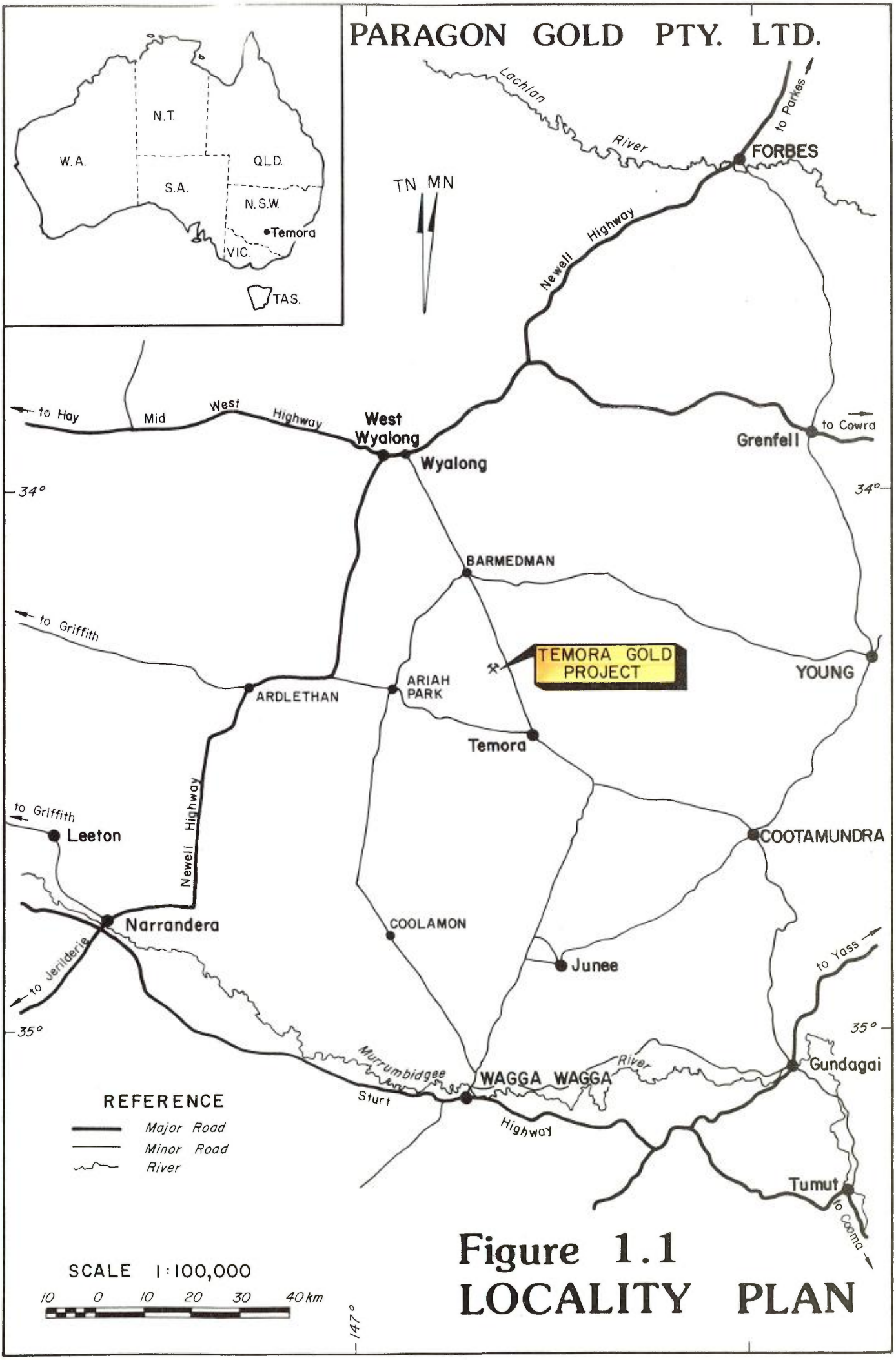


Figure 1.1
LOCALITY PLAN

1.3 BACKGROUND

The Gidginbung prospect was submitted for joint venture in early 1983. Following a review of available data and a prospect inspection, a joint venture was established in mid-1983 between Seltrust Mining and T. Jilek, then the current holder of Prospecting Lease (P.L.) 933. An Exploration Licence (E.L.) 2059 was granted to Seltrust Mining to cover probable extensions to the gold-silver mineralisation on P.L. 933.

Scout drilling commenced in September, 1983 and early success enabled drilling to continue and expand with a total of 26 km of drilling being completed by October, 1984. This drilling outlined a probable reserve of gold-silver mineralisation of nearly 6 million tonnes. An additional 4 km of drilling was undertaken in early 1986 to confirm an ore reserve. Other methods of exploration were also used including: rock and soil geochemical sampling, geologic mapping, petrographic and X-ray diffraction studies, geophysical surveys (aeromagnetics, induced polarisation and SIROTEM) and costeaning to expose vertical rock faces for detail structural study.

Metallurgical testwork on drill core and cuttings was also completed. Engineering studies including geotechnical surveys, site layout and pit design were then commenced with the intent of finalising the project for presentation in this Statement.

1.4 THE PROPONENT

Paragon Gold Pty Ltd is a wholly owned subsidiary of Paragon Resources N.L., the latter being a publicly owned mining and exploration company that was listed on Australian Stock Exchanges on the 12th September, 1985.

Paragon Resources N.L. has an issued capital of some $23.5 million spread over 3,500 shareholders, with the major holder (with approximately 35 per cent) being Oakhill Pty Ltd, an associate company of Rothwells Limited, a listed merchant bank with offices in Brisbane, Sydney and Perth.

In addition to the Temora gold project, Paragon Resources holds:

- several Exploration Licences in the Temora area,
- a 9.5 per cent interest in the Agnew Nickel Mine in Western Australia,
- other mining investments and exploration activities in Australia, and
- a 50 per cent interest in an extensive exploration programme in Vanuatu.

1.5 HISTORY OF MINING AT TEMORA

Department of Mines records show that gold appears to have been discovered in the Temora district as far back as 1869. Henry Parker took up a prospecting protection area on deep ground at Temora on the 17th November, 1879. He reported the discovery of payable reef gold on the 3rd of February, 1880 and at a similar time another party discovered payable alluvial gold in shallow ground near Temora.

The alluvial workings were located on the eastern side of Temora in a zone 8 km long and up to 2 km wide.

Temora soon became the service town for other gold mines in the district, that is, to those centred on Sebastopol and Springdale, 15 km south and 20 km east of Temora respectively.

During the period 1880 to 1926 a total of 147,057 oz. or 4.17 tonnes of gold was produced from the Temora Gold Field. Over 45 per cent of this amount was won in the years 1881 and 1882.

The closest recorded gold mines to Gidginbung were the "Pioneer (Enterprise)" and "Pride of Reefton" mines near Reefton, 10 km north of MLA 42.

1.6 MANAGEMENT OF THE INVESTIGATIONS

The bulk of the investigations and report writing has been undertaken by Robert W. Corkery, B.Sc., M. Appl. Sc., principal of R.W. Corkery & Co. Pty Ltd. Fieldwork for the project first commenced in August, 1984 when baseline environmental studies were first commenced. Additional background data and discussions with Temora Shire Council and other Government Departments was undertaken between November, 1985 and March, 1986. Discussions were held regularly with the Company and their consultants throughout the preparation of the Statement. Assistance with the Statement's preparation and supporting studies was obtained from:

Kinhill Stearns - for aspects relating to project planning and design.

Edward L. Bateman Pty Ltd - for metallurgical testwork and pre-feasibility studies.

Resource Titles (Aust.) Pty Ltd - for aspects relating to mining, prospecting and exploration titles.

Metech - for mine evaluation and computer studies.

Groundwater Resource Consultants - for a survey of groundwater resources in the vicinity of the mine site.

Golder and Associates - for geotechnical advice for mine planning.

Brayshaw and Associates - for an archaeological study of the Mining Lease Area.

Mr David Schlunke - for a survey of the flora and fauna of the Lease Application Area.

Eden Dynamics Pty Ltd - for assistance in the assessment of the acoustical impact of the project.

The following authorities were consulted by R.W. Corkery & Co. Pty Ltd, the Company, and their subconsultants during the preparation of the Environmental Impact Statement. Those marked (*) provided comments on a draft copy of the Statement. The remaining authorities attended a "Planning Focus" Seminar at Temora on the 13th/14th of March, during which a range of constructive suggestions and additional data was provided.

Department of Environment and Planning (Sydney)
Temora Shire Council (Temora)*
Soil Conservation Service (Temora and Wagga*)
Department of Mineral Resources (Sydney* and Wagga)
Department of Industrial Relations (Wagga)
Department of Agriculture (Temora, Sydney)
National Parks and Wildlife Service (Griffith)*
State Pollution Control Commission (Albury*, Sydney)
Northern Riverina County Council (Temora)
Telecom (Temora)
State Rail Authority(Temora)
Water Resources Commission (Sydney)*
Department of Public Works (Cootamundra)
Department of Education (Temora)
Grain Handling Authority (Temora).

SECTION 2

DESCRIPTION OF THE PROJECT

SECTION 2

DESCRIPTION OF THE PROJECT

2.1 OUTLINE OF PROPOSAL

Figure 2.1 places the Temora Gold Project in its local setting. It is located on the western side of the Temora-Barmedman road and the Lake Cargellico-Cootamundra railway line. The site lies within a sparsely settled rural area close to power and underground water.

The Temora Gold Project will involve the development of an open cut mine to yield ore containing gold and silver and a treatment plant to produce both metals in bullion form. Figure 2.2 presents the proposed project site layout.

The mine will be developed on the southern end of a prominent ridge near Gidginbung where the Company's exploration has defined economic ore from the surface to approximately 85 m below the surface. The open cut will be developed using conventional mining techniques using drilling and blasting.

The Company at present proposes to remove approximately 12 million tonnes of rock from the open cut during a ten year period. Approximately forty per cent of the rock will be ore, ten percent a low grade material, and the remaining fifty per cent waste rock. Ore will be transported directly to the treatment plant for the extraction of the gold and silver. The low grade material will be stockpiled separately for possible treatment and the waste rock placed by truck onto a contoured dump.

The treatment plant will comprise a conventional size-reduction plant to crush and grind the ore, followed by a carbon-in-pulp (C.I.P.) treatment plant to extract the gold from the ground ore.

2.2 MINING LEASE APPLICATION

Figure 2.3 shows the boundary of the Mining Lease Application lodged with the Department of Mineral Resources for the Temora Gold Project. The Lease Application designated Mining Lease Application (MLA) 42 (Wagga) covers an area of 451 ha. MLA 42 was lodged on the 19th December, 1985 and marked out on 4th March,1986. The application was advertised in local and state-wide newspapers and all the relevant landowners and Government Authorities notified. The Company is seeking the Mining Lease for a period of 21 years to provide adequate time for the development, mining, treatment and rehabilitation of the site.

The Mining Lease sought was defined to coincide with the Company's land ownership and to provide adequate area for the Company's entire operation with a buffer between the development and surrounding properties. The only land not owned by the Company within MLA 42 is Crown Land covering a portion of Schmidt Lane. This lane is vested in Temora Shire Council.

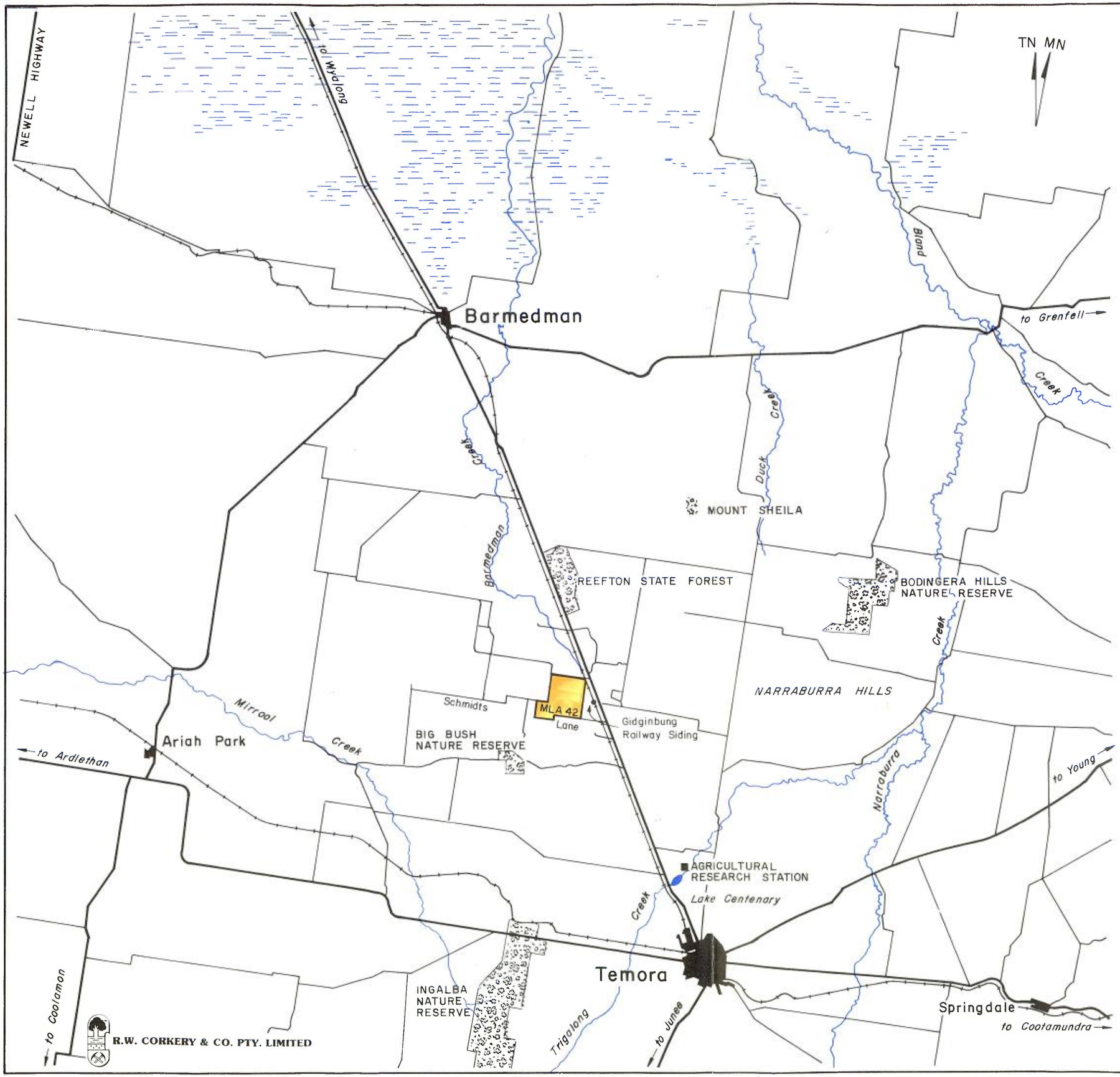
Figure 2.3 also shows Prospecting Lease (P.L.) 933 and the location of Exploration Licence (E.L.) 2059 surrounding the Gidginbung area.

2.3 THE ORE BODY

The ore body defined by the exploration programme covers approximately 11 ha to a maximum depth of 85 m. The ore body comprises a weathered or totally oxidised zone from the surface to approximately 15 m, beneath which the rock is partially oxidised to 80 m.

The gold/silver mineralisation is richer in the weathered or partially oxidised zone than the underlying fresh or unoxidised material. In total, approximately 4.6 million tonnes of ore assaying 2.8 g/t gold and 6.0 g/t silver has been defined. A further 1.5 million tonnes of low grade ore has also been defined with the proposed open cut.

PARAGON GOLD PTY. LTD.



REFERENCE

- Major Road
- Minor Road
- Stream
- Built-up Area
- Mining Lease Application
- Railway

SCALE 1:200,000

2 0 2 4 6 8 10 km

Figure 2.1
LOCAL SETTING

PARAGON GOLD PTY. LTD.

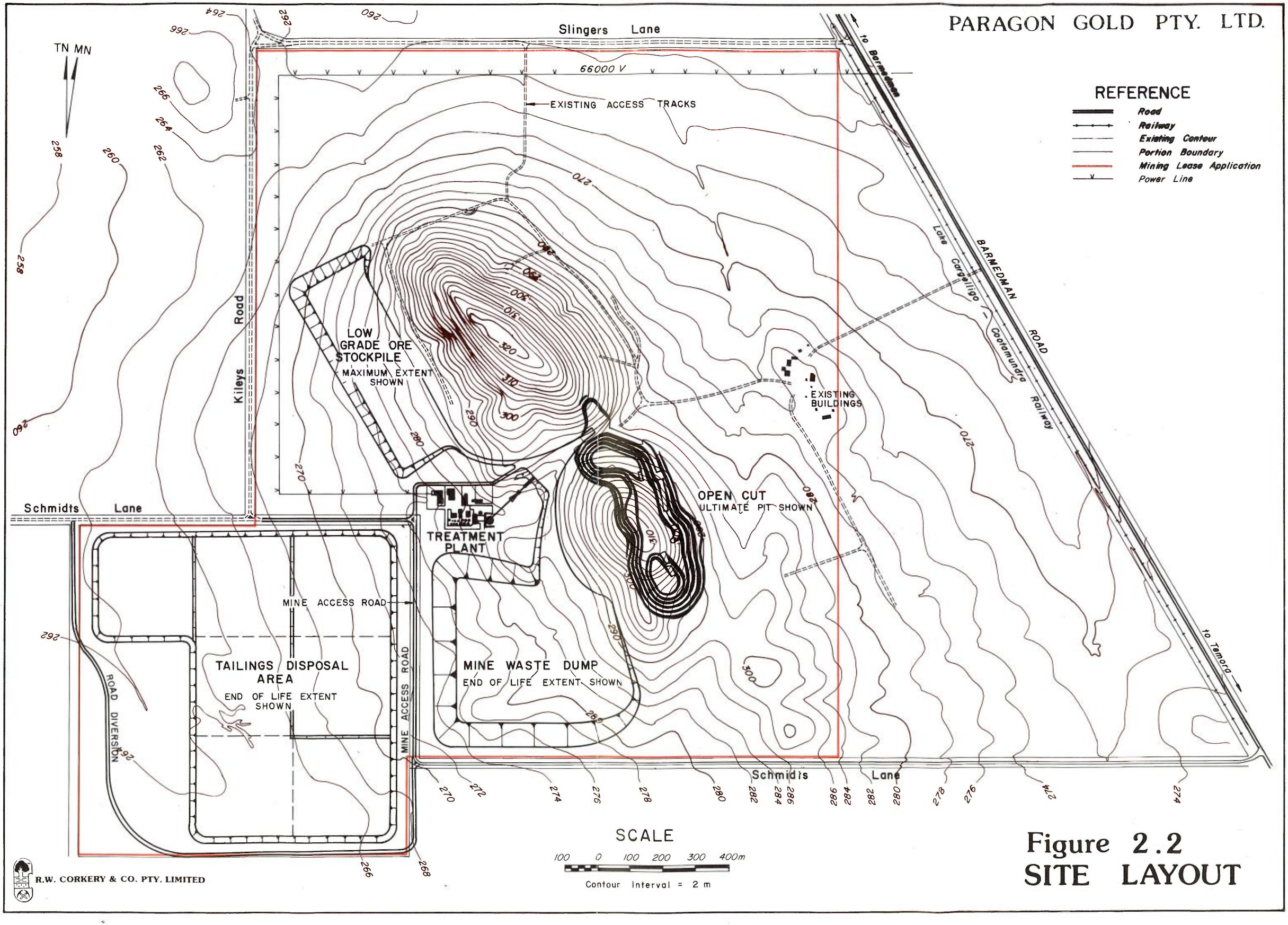


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Figure 2.2
SITE LAYOUT

PLATE 1: View to the northwest from the intersection of Schmidts Lane and Barmedman Road towards the project site.

PLATE 2: View to the southwest from the intersection of Slingers Lane and Barmedman Road towards the project site.

PARAGON GOLD PTY. LTD.

TN MN

POR. 16 · POR. 59 · POR. 13 · POR. 14 · POR. 21 · POR. 18 · POR. 19 · POR. 12

Slingers Lane

Kileys Road

MLA 42

PL 933

PARISH OF CULINGERAI

PARISH OF GIDGINGIDGINBUNG

to Barmedman

BARMEDMAN ROAD

Lake Cargelligo

Cootamundra Railway

to Temora

Schmidts Lane

REFERENCE

- Road
- Railway
- Existing Contour
- Portion Boundary
- Mining Lease Application
- Parish Boundary
- Prospecting Licence

SCALE 1:10,000

100 0 100 200 300 400m

Contour Interval = 2 m

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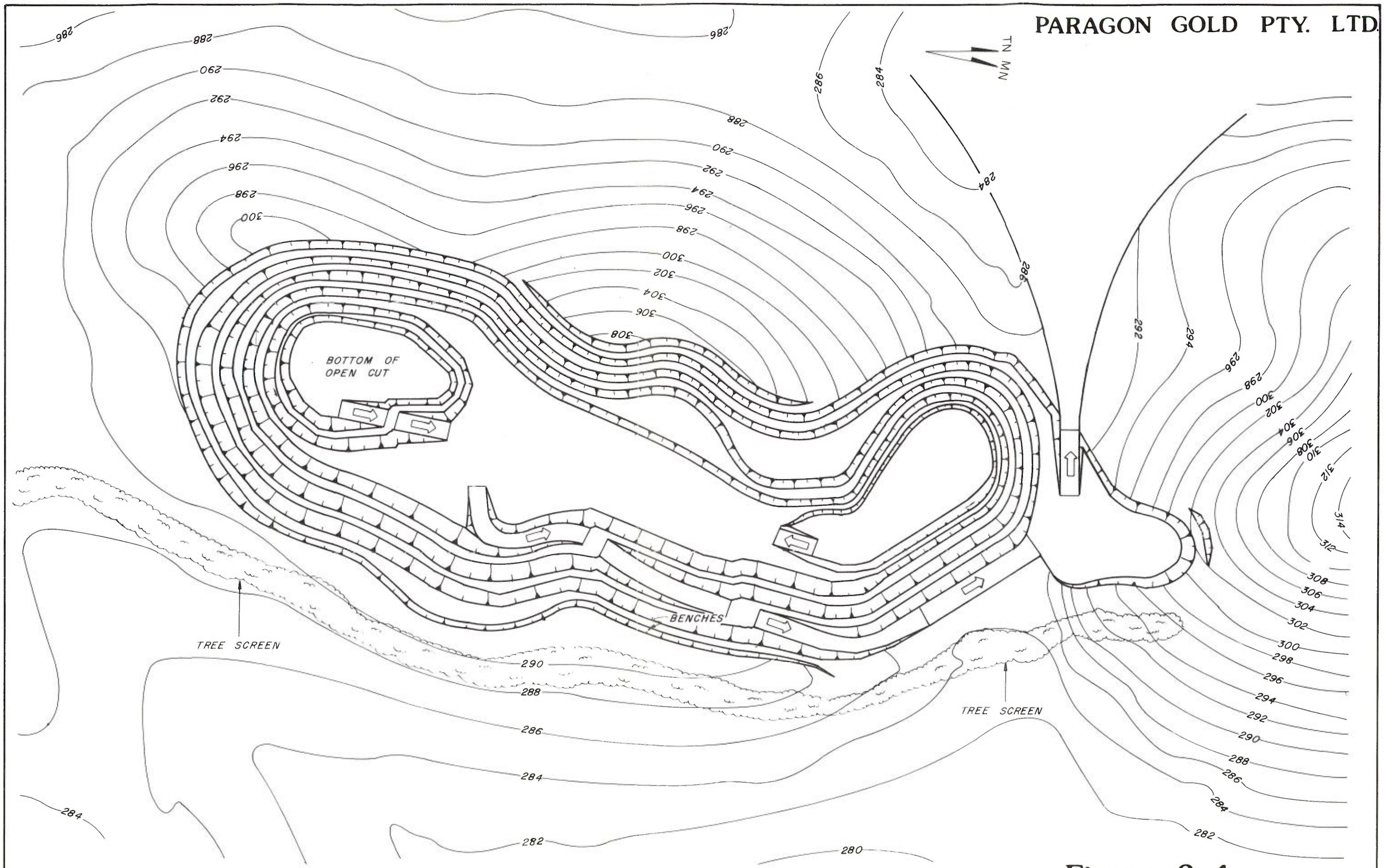
Figure 2.3
MINING LEASE APPLICATION

PARAGON GOLD PTY. LTD.



SCALE 1:2,500

20 0 20 40 60 80 100m

CONTOUR INTERVAL = 2·0m

REFERENCE

Existing Contour

Proposed Access Road

Proposed Bench

R.W. CORKERY & CO. PTY. LIMITED

Figure 2.4
OPEN CUT LAYOUT

In order to mine the ore and low grade material, the Company will need to mine a similar quantity (some 6 million tonnes) of waste rock. This rock is located on the margin of the ore body where it will be necessary to remove the waste rock to obtain access to the deeper ore.

2.4 MINING METHOD

2.4.1 Outline of Method

The Company will use conventional open cut methods to remove the ore from the mine. The open cut will be developed in a series of benches with a haul road network from the base of the open cut to its opening to the north. Figure 2.4 displays the final open cut layout and the location of the benches and proposed road network.

Mining will involve the drilling of a pattern of drill holes, loading with explosives, blasting, and loading of broken rock into dump trucks for transportation to the primary crusher, low grade ore stockpile or waste rock dump. Drilling will be undertaken well in advance of the blasting programme to enable assays of the drill cuttings to determine the gold and silver grades. The results of the assays will determine whether the blasted rock is transported to the treatment plant, low grade ore stockpile, or waste rock dump.

2.4.2 Sequence of Mining

The mining operation will commence with the removal of all trees from the mine area. These will be pushed beyond the boundary of the proposed open cut. After all timber and fire wood is obtained, the remainder will be burned on site. The thin veneer of skeletal soil which exists on the hill will be pushed to the eastern and southern side of the hill where it will be formed into a mound to provide a base for the tree screen shown in Figure 2.2. Particular emphasis will be placed to ensure the trees adequately screen the access road into the open cut and the western wall of the open cut.

Mining will commence close to the top of the southern hill in an area where gold and silver grades are higher than average. The elevated sections of the hill will be removed in the initial stages of the mining operation.

The Company will essentially be removing the top of the southern hill prior to creating a conventional open cut hole. It is estimated that the hill will be removed in a period of 2 years after which the bottom of the pit will descend at a rate of approximately 10 m per year. Figure 2.5 displays the mining sequence for years 2, 5, 7, and the final layout.

2.4.3 Open Cut Design Criteria

The open cut design criteria have been established following a preliminary assessment of ore grades, geotechnical aspects and likely equipment to be used in the operation. The following criteria are proposed, subject to final geotechnical recommendations:

Bench height (operating)		5.0 m
Final bench height		20.0 m
Berm		5.0 m
Final bench face angle	- west	75^{o}
	- east	75^{o}
Overall pit slope	- west	60^{o}
	- east	45^{o}
Haulage road	- gradient	1 in 10
	- width	16.0 m
Specific Gravity	- ore	2.5
	- waste	2.5

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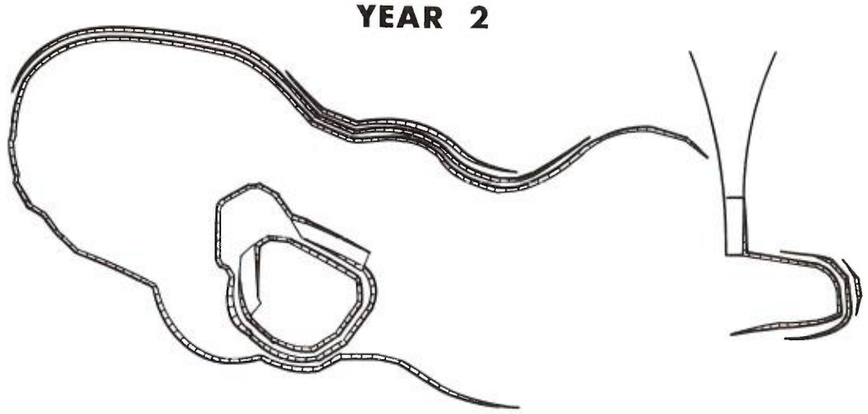
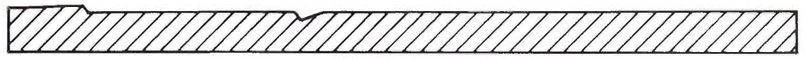
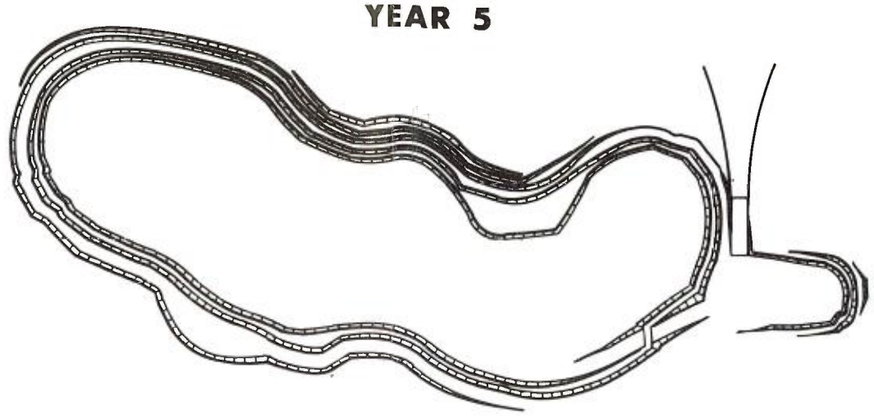
YEAR 2

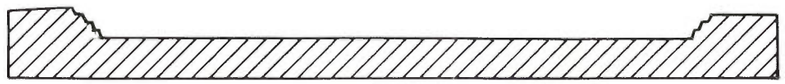




TYPICAL SECTION

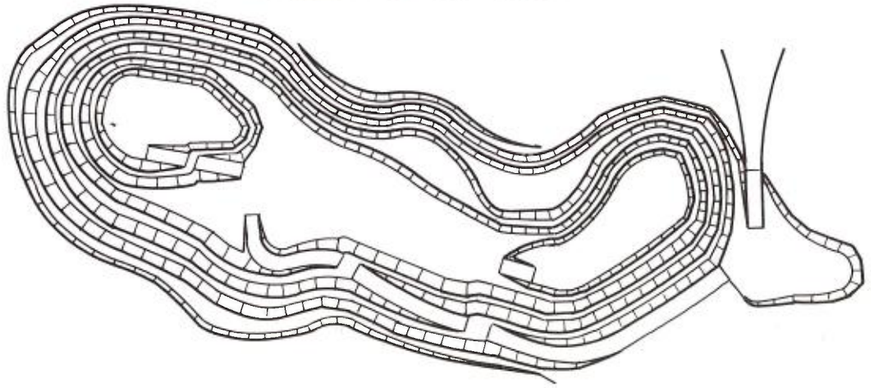
YEAR 5

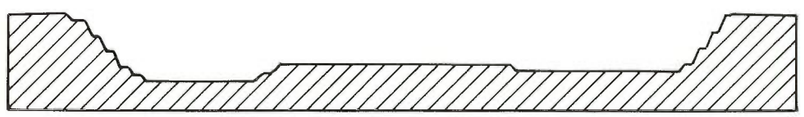




TYPICAL SECTION

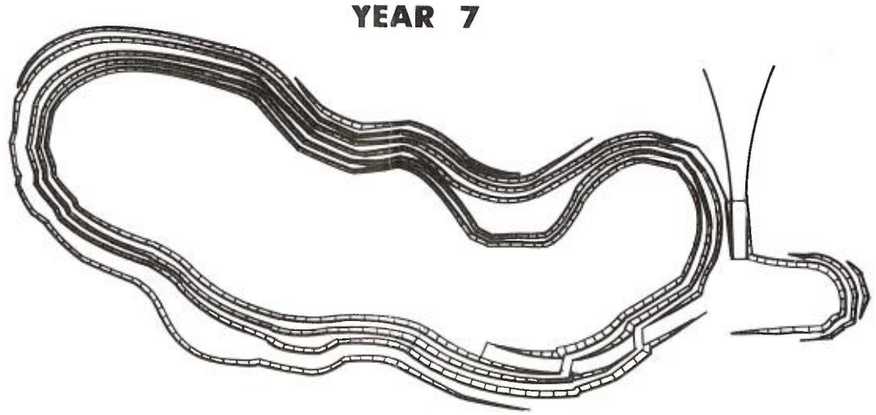
FINAL OPEN CUT

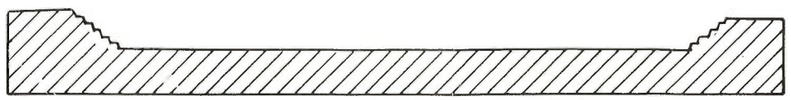




TYPICAL SECTION

YEAR 7





TYPICAL SECTION

SCALE 1:5,000

50 0 50 100 150 200 250 m

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Figure 2.5
MINING SEQUENCE

2.4.4 Equipment

The Company expects the successful contractor will utilize equipment of a similar size to the following:

2 D9 Bulldozers
2 CAT 14 Graders
2 Front-end Loaders (988 and 992)
3 Airtrack Drills and Compressors
2 Water Trucks
2 Service Trucks
1 5 tonne Mobile Crane
3 Lighting Plants
4 50 tonne Trucks
3 Sundry Vehicles
Workshop Equipment

Not all equipment will be operating at once as some are expected to be backup equipment and some items such as graders are only required periodically.

2.5 WASTE ROCK DUMP

2.5.1 Selection of the Site

It is proposed to place the waste rock from the open cut in an area immediately west of the open cut (See Figure 2.2). This site has been chosen for the following reasons:

(i) Sufficient area is available in one area to provide a single site;

(ii) It is located on the western side of the ridge in an area not visible from the Barmedman Road;

(iii) The natural slope of the land will allow storage of large quantities of rock which will tend to lap on to the ridge rather than form a distinct landform.

2.5.2 Site Preparation

The few trees present on the eastern side of the area will be removed, and set aside for fire wood. Any unusable wood will be burnt on site. The initial area proposed for waste rock disposal during the first two years will be stripped of its topsoil and this material placed at the eastern side of the dump area adjacent to the final dump area.

2.5.3 Dump Construction

The waste rock comprising angular rock varying in size from 1 m to less than 1 mm will be placed in a radial manner on to the prepared area and progressively built up to a height varying from 8 to 22 m (See Figure 2.6). The north-eastern side of the dump will lap on to the ridge.

As each cleared area is filled with rock, topsoil and subsoil from the next area will be removed and placed onto the completed area to commence rehabilitation. The Company will retain a defined roadway across the surface of the dump to the active dumping area. The side slopes of the dump will be finalised at approximately 1:3 (Vert:Hor).

2.6 LOW GRADE ORE STOCKPILE

2.6.1 Site Selection

The low grade ore stockpile has been placed on the western side of the ridge adjacent to the northern hill (See Figure 2.2). Its location has been chosen for the following reasons:

(i) The stockpile is visibly shielded from the Barmedman Road and all areas east of MLA 42;

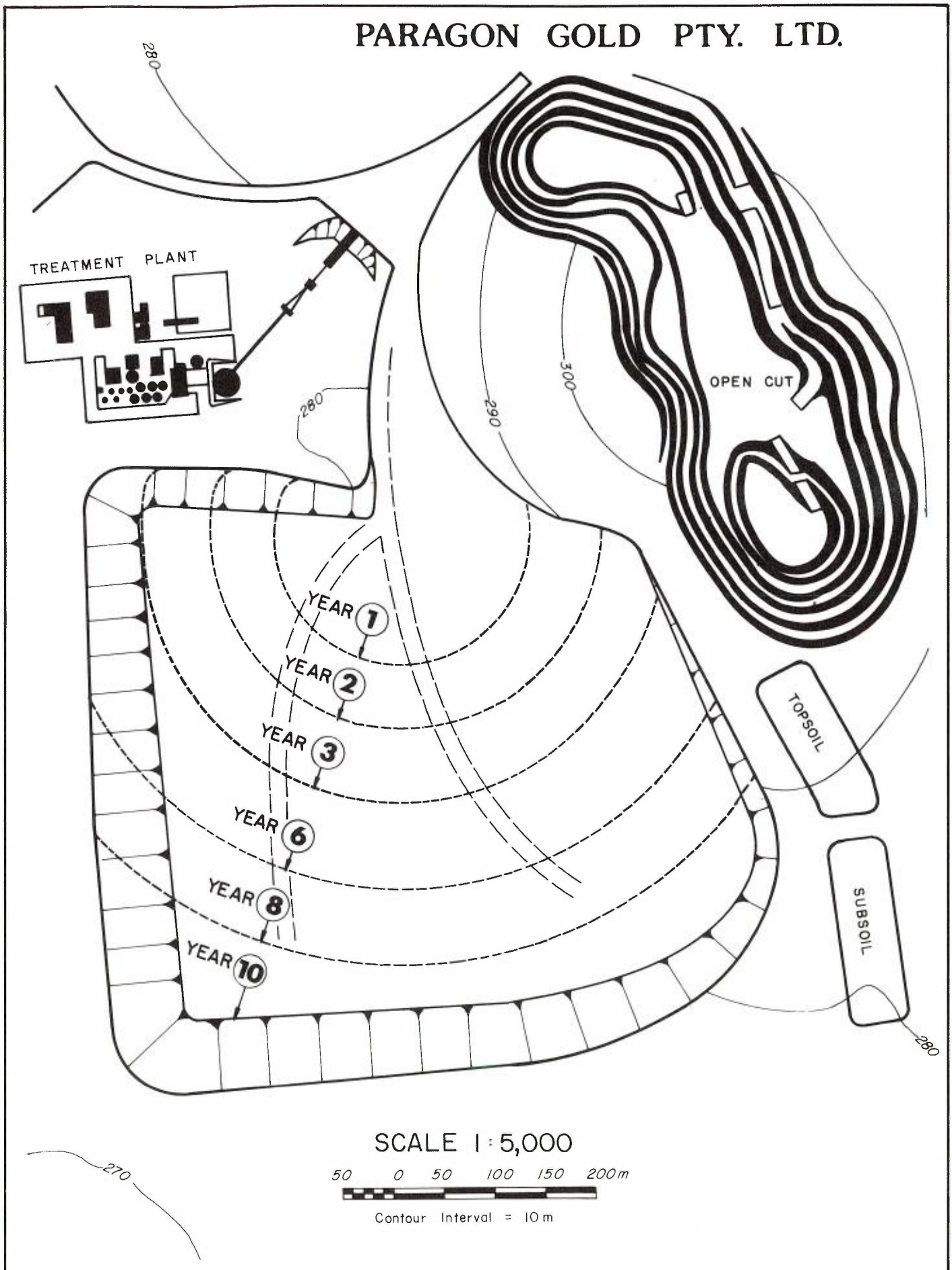

Figure 2.6
WASTE ROCK DUMP

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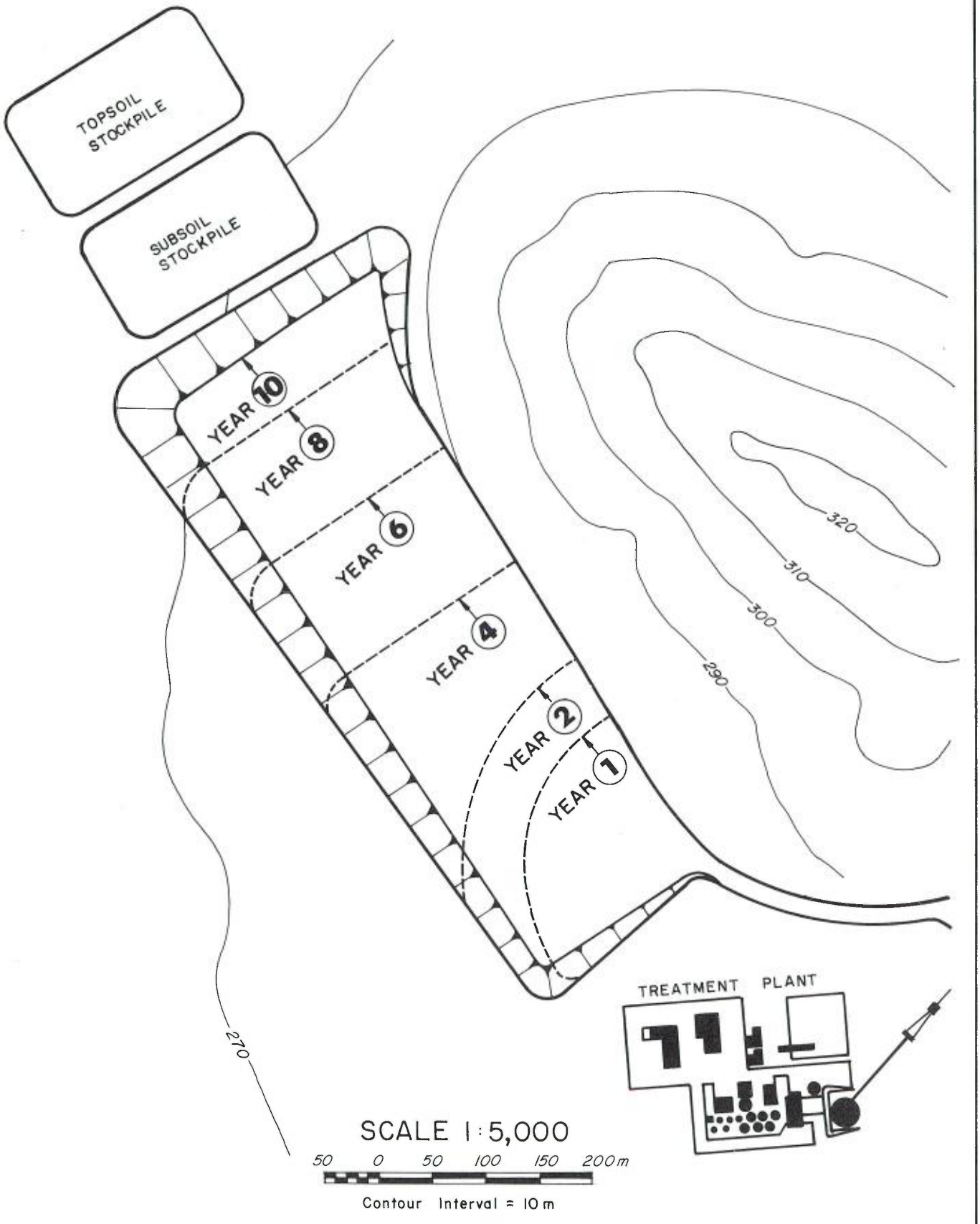

Figure 2.7
LOW GRADE ORE STOCKPILE

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(ii) The stockpile will be close to the crusher to enable economic transportation of the ore if it is to be treated;

(iii) The eastern side of the stockpile has been placed as far away as possible from the northern hill to minimise the impact on the Trig. Station, vegetation and an aboriginal site.

2.6.2 Site Preparation

The limited topsoil and subsoil on the site of the first two year's storage will be removed and placed beyond the northern extremity of the final dump (See Figure 2.7).

2.6.3 Stockpile Construction

The method of stockpile construction will depend principally on whether the low grade ore is progressively fed into the plant or left until the completion of the mine when it would be the only feed for the treatment plant.

If the material is progressively fed into the treatment plant, it is unlikely that the stockpile would be constructed beyond the two year limit shown on Figure 2.7. In the event that the treatment is left to the completion of the project, the stockpile will be constructed in a northerly direction with the soil being removed ahead of dumping and placed in the stockpile area north of the stockpile.

2.7 TREATMENT PLANT

2.7.1 Selection of Site

The treatment plant site shown on Figure 2.2 has been chosen for the following reasons:

(i) The site is on the western side of the main ridge on MLA 42 and is hence screened from the Barmedman Road and all points east;

(ii) The site is close to the proposed open cut exit which minimises the transport distance to the plant;

(iii) The crusher component of the plant is located as close as possible to the saddle in an area which provides a natural barrier to noise;

(iv) The site provides a satisfactory natural fall for equipment to be used on site.

2.7.2 Plant Layout

Figure 2.8 shows a preliminary layout of the treatment plant. With the exception of the administration building and gate house, all buildings will be enclosed within a security fence.

2.7.3 Outline of Process

Figure 2.9 illustrates a simplified flowsheet for the treatment of the ore after it is delivered from the open cut. Essentially, the ore is crushed and ground sufficiently fine to allow the dissolution of the gold present and its collection on carbon particles.

Subject to final design, the treatment plant will comprise the following typical components:

(i) A three stage crushing plant incorporating a primary jaw crusher, secondary and tertiary crushers. The hopper for the jaw crusher will be located at a level of approximately 293 m A.H.D. Provision has been made in the crushing circuit to separate a road base material.

PLATE 3: View to the east from the intersection of Kileys and Schmidts Lanes towards the proposed site of the treatment plant.

PLATE 4: View to the northeast from Schmidts Lane across the proposed site of the waste rock dump.

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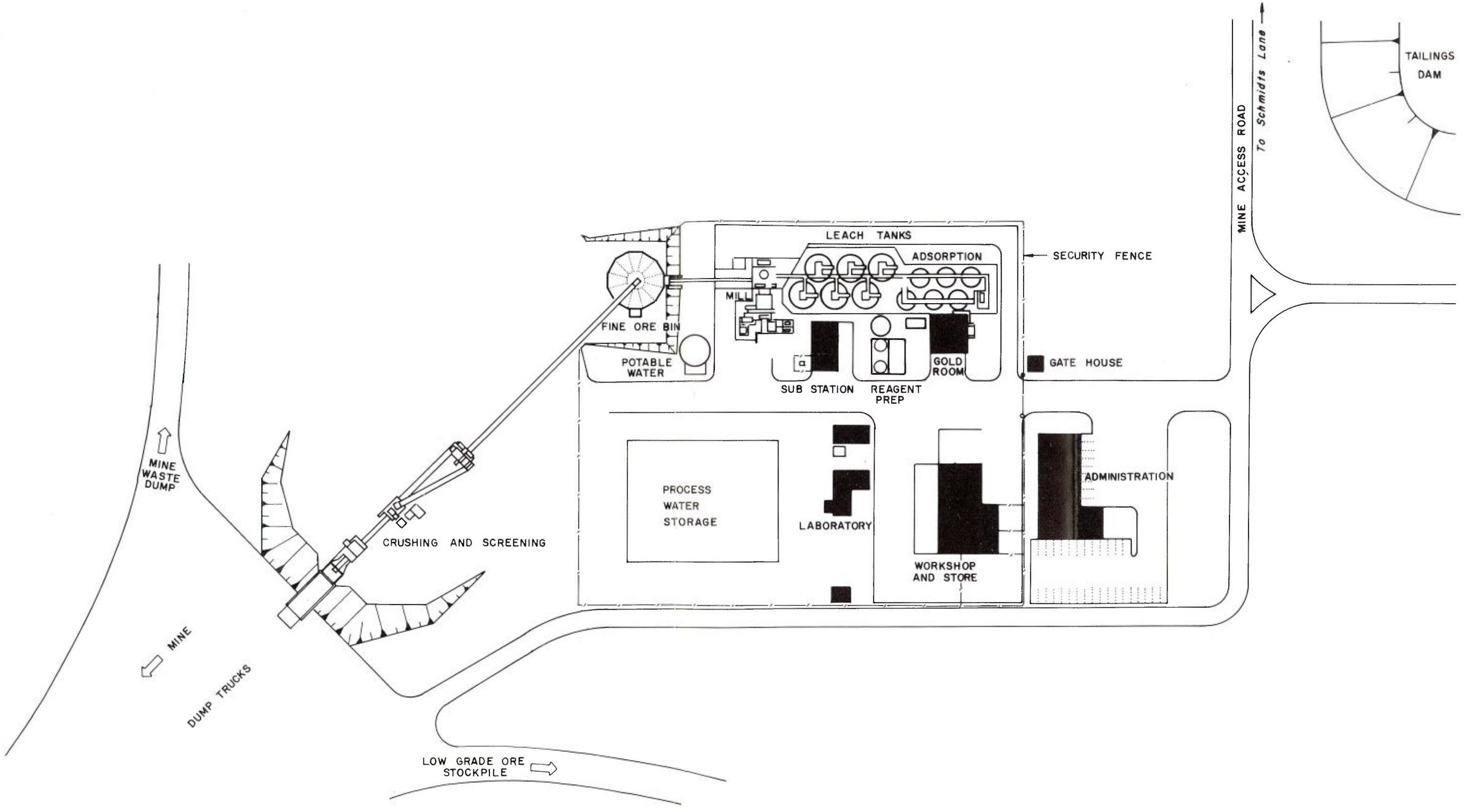

SCALE 1 : 1,000

10 0 10 20 30 40 50 m

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Figure 2.8
TREATMENT PLANT LAYOUT

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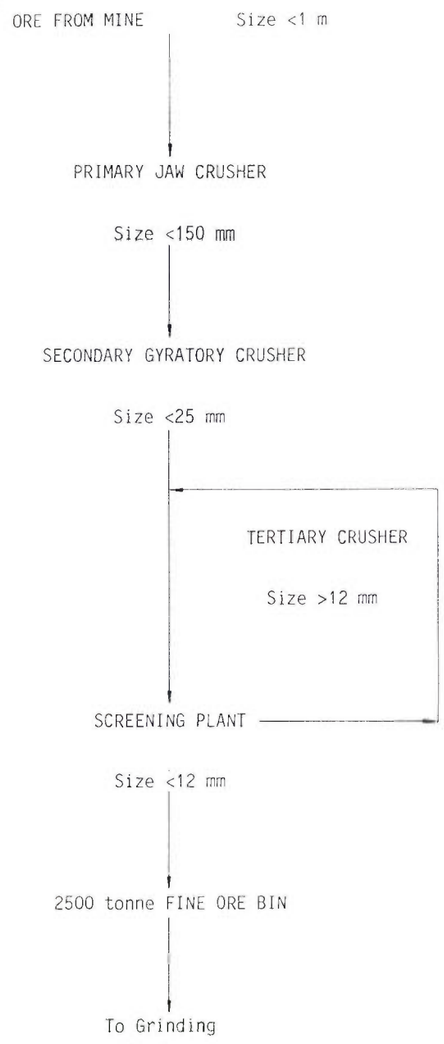
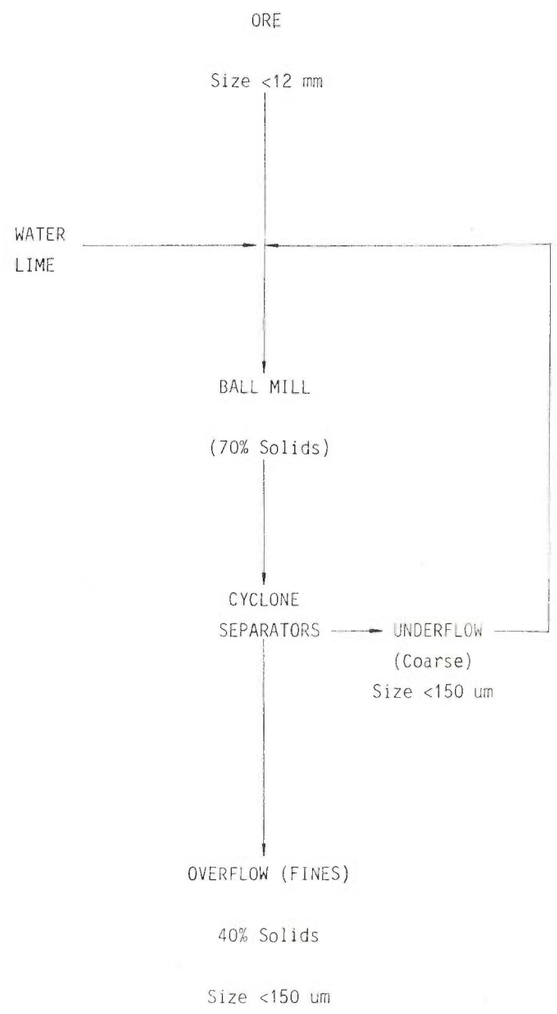
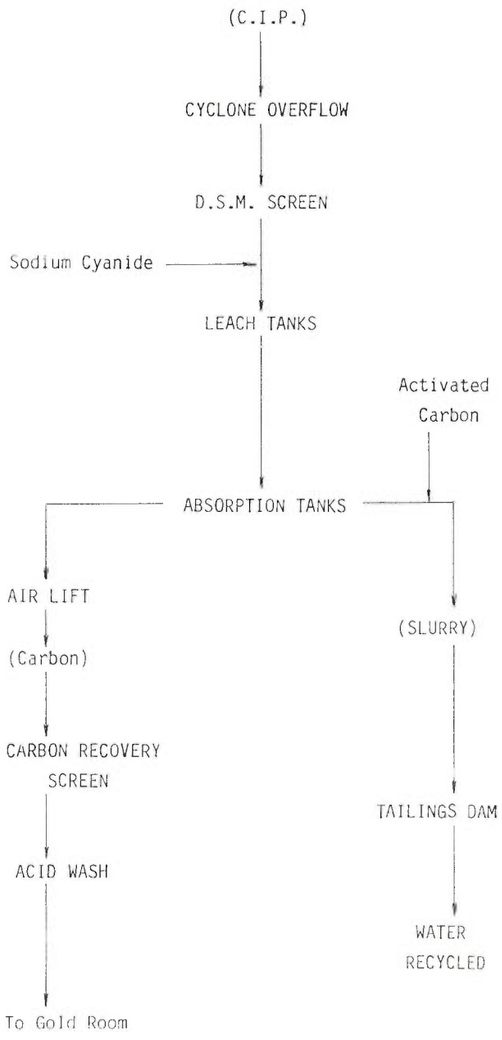
CRUSHING



GRINDING



CARBON IN PULP PLANT



GOLD ROOM

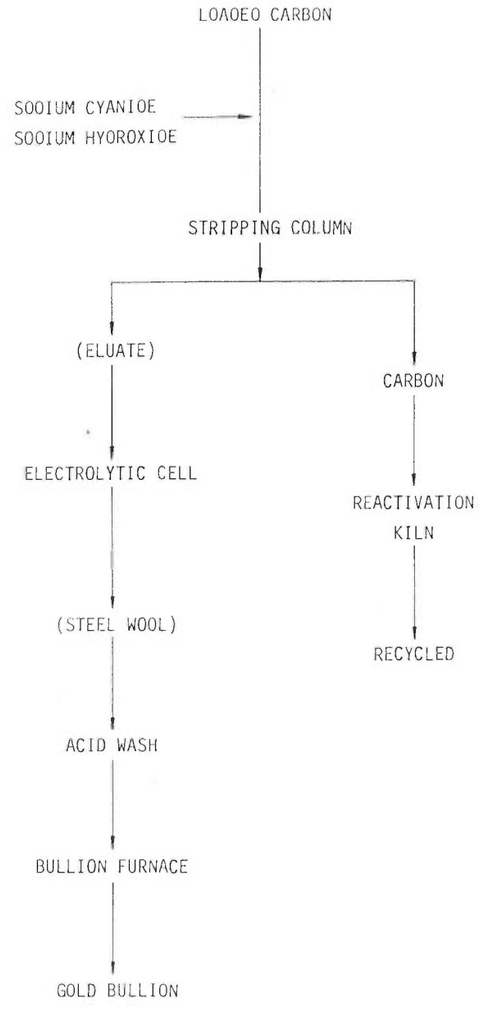


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Figure 2.9
TREATMENT PLANT FLOWSHEET

(ii) A fine ore bin with a capacity of 2,500 tonnes of ore which is equivalent to 5 shifts production in the grinding plant. The top of the ore bin will be approximately 300 m A.H.D.

(iii) A grinding plant comprising a single stage rubber lined ball mill with cyclone classifiers. The product from the ball mill is a slurry of 42 to 45 per cent solids.

(iv) A set of mechanically agitated leach tanks. The tanks allow a total retention time of 24 hours.

(v) An absorption circuit consisting of mechanically agitated tanks, each providing one hour's retention time. Carbon is circulated counter current to the flow of the slurry by recessed impeller centrifugal pumps. Carbon "loaded" with gold is recovered and washed on a vibrating screen.

(vi) A gold room incorporating an acid wash column, an elution system, a carbon regeneration kiln (gas fired) and associated carbon storage bins and screens.

2.8 TAILINGS DISPOSAL

2.8.1 Nature Of The Tailings

The tailings will comprise a quartz sand of which 80 per cent passes 150 um. This is a relative coarse grain size for tailings generated from a gold bearing ore. The predicted sulphide level in the tailings is approximately 3 per cent in the form of iron sulphide.

The aqueous barren solution component of the tailings stream will have a composition similar to that set out in Table 2.1.

TABLE 2.1
APPROXIMATE COMPOSITION OF TAILINGS WATER

		Concentration in mg/l			Concentration in mg/l
Sodium	(Na)	800	Cyanide	(CN)	100
Gold	(Au)	<0.03	Copper	(Cu)	2.0
Nickel	(Ni)	1.0	Zinc	(Zn)	0.8
Cobalt	(Co)	0.09	Iron	(Fe)	2.0
Calcium	(Ca)	4.0	Magnesium	(Mg)	1.0
Silica	(SiO_2)	1.0	Alumina	(Al_2O_3)	4.0
Chloride	(Cl)	250			

Source: Kinhill Stearns

2.8.2 Tailings Dam Construction

All tailings generated on site will be placed into specially designed and constructed dams. Figure 2.10 displays a network of seven 300 m x 300 m cells that will provide storage for all tailings generated during the treatment of both the run-of-mine ore and low grade ore if it is treated.

The proposed sequence of construction of each cell is as follows:

(i) The topsoil and subsoil from the area of the first two cells will be removed and stockpiled for use in revegetation of the final two cells (See Figure 2.10).

(ii) Approximately 0.5 m of the underlying clay will be removed with scrapers and placed around the perimeter of the cell area to form a starter. The slope of the external dam walls will be 1 in 3 (Vert:Hor) and the internal wall slope will be 1 in 2.5.

(iii) Any gravel beneath the tailings dam walls will be removed.

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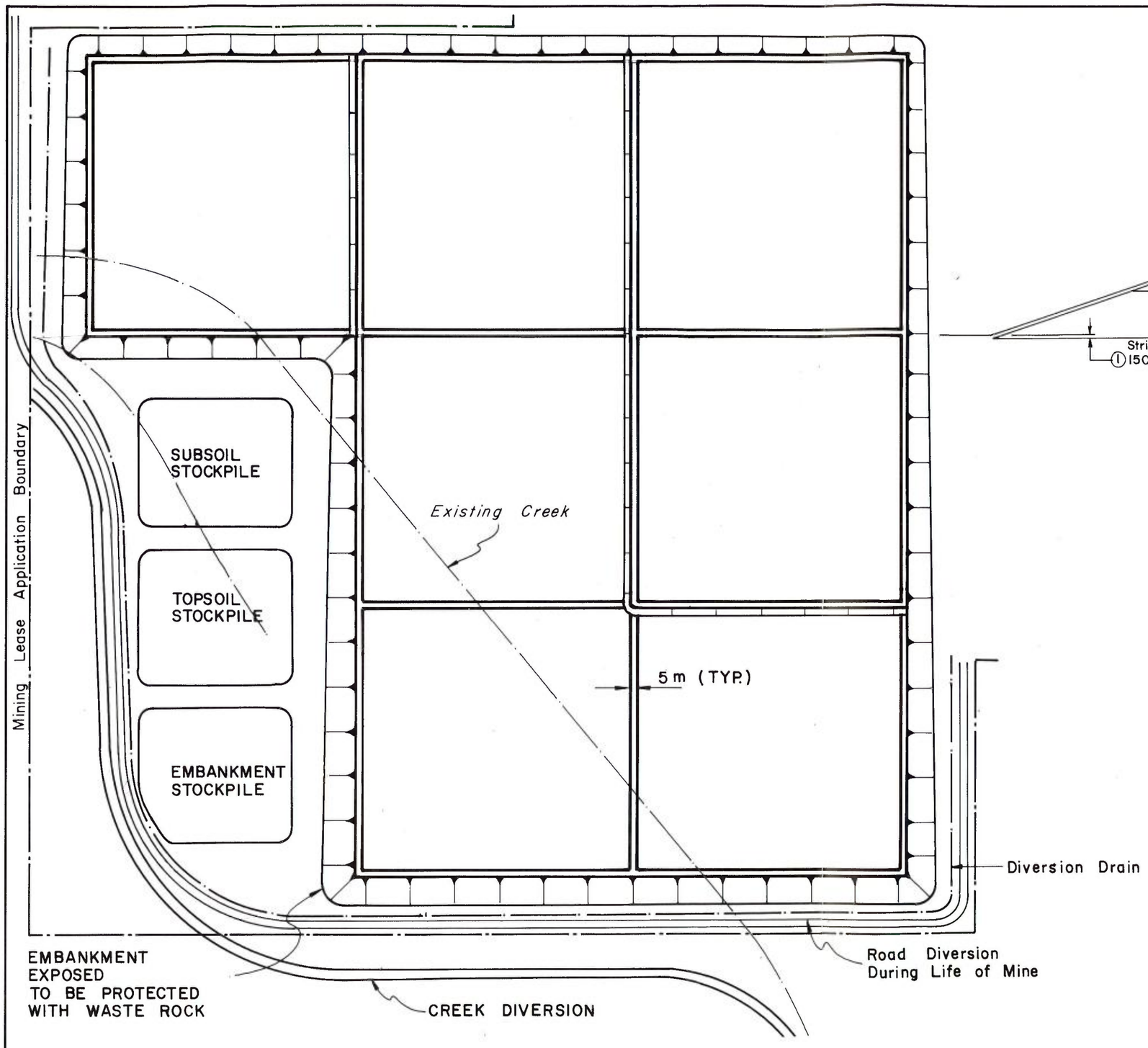

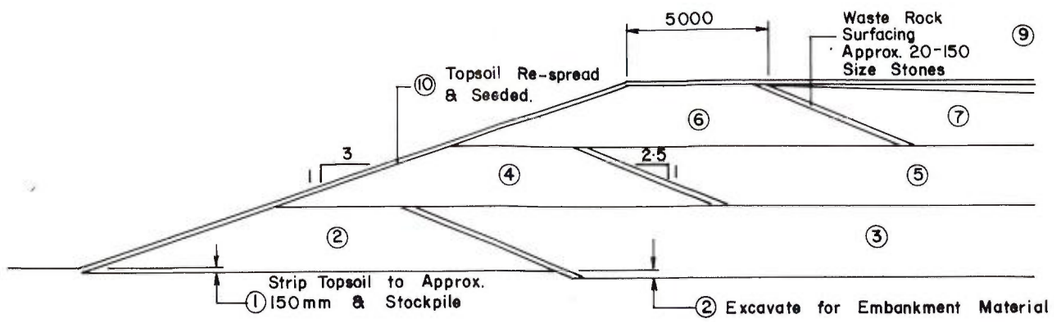

SECTION OF DAM WALL
SCALE 1:250

SCALE 1:5,000

50 0 100 200 300

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Figure 2.10
TAILINGS DAM

PLATE 5: View to the southeast across the proposed site of the tailings dam. The trees in the centre mark the location of Barmedman Creek.

PLATE 6: View to the west from the intersection of Kileys and Schmidts Lanes towards the location of the possible borefield.

(iv) The mean height of the starter dam will be 2.5 m. The starter dam will completely enclose the site on all sides so that site runoff cannot enter the cell and pose a risk of dam overtopping.

(v) The outer wall will be protected from erosion by the placement of approximately 200 mm of coarse mine waste on its surface.

(vi) A pipe network to distribute the tailings across each cell will be installed on the surface around the perimeter of each cell. Spigots or outlet points will be attached to this pipe network at 30 m intervals. Tailings slurry will be discharged from these spigots into the cell. Active spigots will be rotated, so that tailings slurry will enter the cell with a velocity of around 1.5 m/sec.

(vii) Coarse sands in the tailings will settle closest to the cell walls, assuring a stable substrate for the construction of the next lift of the walls. These walls will be constructed in accordance with the normal upstream construction method. Lifts subsequent to the initial starter dam will be constructed of clay excavated from the area of the cell next to be developed. This will assure that cell walls are of low permeability, and will minimise the ultimate height of each cell.

(viii) The procedure outlined above will be undertaken alternately between the two active cells. Each cell will be left to commence drying out whilst the other is used.

(ix) When the final height of each cell has been achieved, that is, three lifts. Tailings will be discharged intermittently near the centre of the cell to bring the overall level of the contained solids up to a more nearly horizontal plane. Once tailings reach the maximum height over the entire surface the tailings will then be discharged into the next cell. The filled cell will be allowed to dry in preparation for soil cover and revegetation.

(x) When each cell is full and dried out sufficiently the top surface of each cell will be levelled and covered with soil from a subsequent cell area. The soil will be self seeding to a large extent, but to assist in minimising wind erosion and to assure rapid revegetation, the soil surface will be harrowed and seeded with an appropriate type of grass. A selection of trees recommended by the Forestry Commission will be planted on the top of each completed cell to establish a tree lot on the tailings dam. The Company will undertake an experimental programme with the supervision of the Forestry Commission to ensure the chosen trees are the most suitable for a long term tree lot on the site. The outer cell walls will remain covered with waste rock from the mine, as the best means of protecting these slopes from erosion.

2.9 CONSTRUCTION AND MINING RATES AND WORKING HOURS

2.9.1 Introduction

The Company proposes to commence the construction of the treatment plant as soon as the Mining Lease is granted. Open cut mining will then commence during the construction period to provide an ore stockpile for the start-up of the treatment plant and to provide waste rock for civil works associated with construction such as the crusher ramp.

2.9.2 Construction Rate

The Company envisages that once underway, the treatment plant will be constructed in approximately six to eight months.

2.9.3 Mining Rates

Mining will produce approximately 3,500 to 4,000 tonnes of material per day.

TABLE 2.2

WORKING HOURS - TEMORA GOLD PROJECT

ACTIVITY		PROPOSED WORKING HOURS
CONSTRUCTION		
- Earthmoving		7.00 am - 10.00 pm
- Foundations		7.00 am - 10.00 pm
- Fabrication		7.00 am - 10.00 pm
- Electricals		7.00 am - 10.00 pm
OPEN CUT MINE		
- Drilling	- Open cut	24 hours per day
- Blasting		1.00 pm - 5.00 pm
- Transportation	- Ore	7.00 am - 10.00 pm
	- Overburden	24 hours per day
TREATMENT PLANT		
- Crushers		7.00 am - 10.00 pm
- Ball Mill		24 hours per day
- Leaching Circuit		24 hours per day
- Tailings Disposal		24 hours per day

2.9.4 Working Hours

Table 2.2 lists the proposed activities on the project site and the proposed hours of operation of each activity. It is proposed to operate the project seven days per week. It should be noted that the 7.00 am start-up time is for Monday to Saturday as it will be 8.00 am on Sundays.

2.9.5 Life of Mine

The Company predicts that the mine will have a life of approximately 10 years, although the treatment plant may remain operative beyond that time to enable it to treat the low grade ore. This will naturally be subject to prevailing economic conditions.

2.10 SERVICES

2.10.1 Power

The Northern Riverina County Council has advised the Company that they can provide an electrical supply for an approximate load of 2,000 kw. This would be achieved by extending a 66,000 volt spur line to the site from an existing line running between Temora and West Wyalong. The proposed route of the spur line is shown on Figure 2.11. The spur line crosses agricultural land belonging to N.R. & H.M. Taylor and H. Noack.

A sub-station will be provided with a 66,000/11,000 volt transformer. The substation would in turn be provided with a single 11,000 volt outgoing circuit to the treatment plant. A similar line would be constructed between the project site and the borefield once it is defined.

The Company estimates it will utilise approximately 30 kilowatt hours of power for each tonne of ore treated. This amounts to an annual usage of approximately 15,000 megawatt hours.

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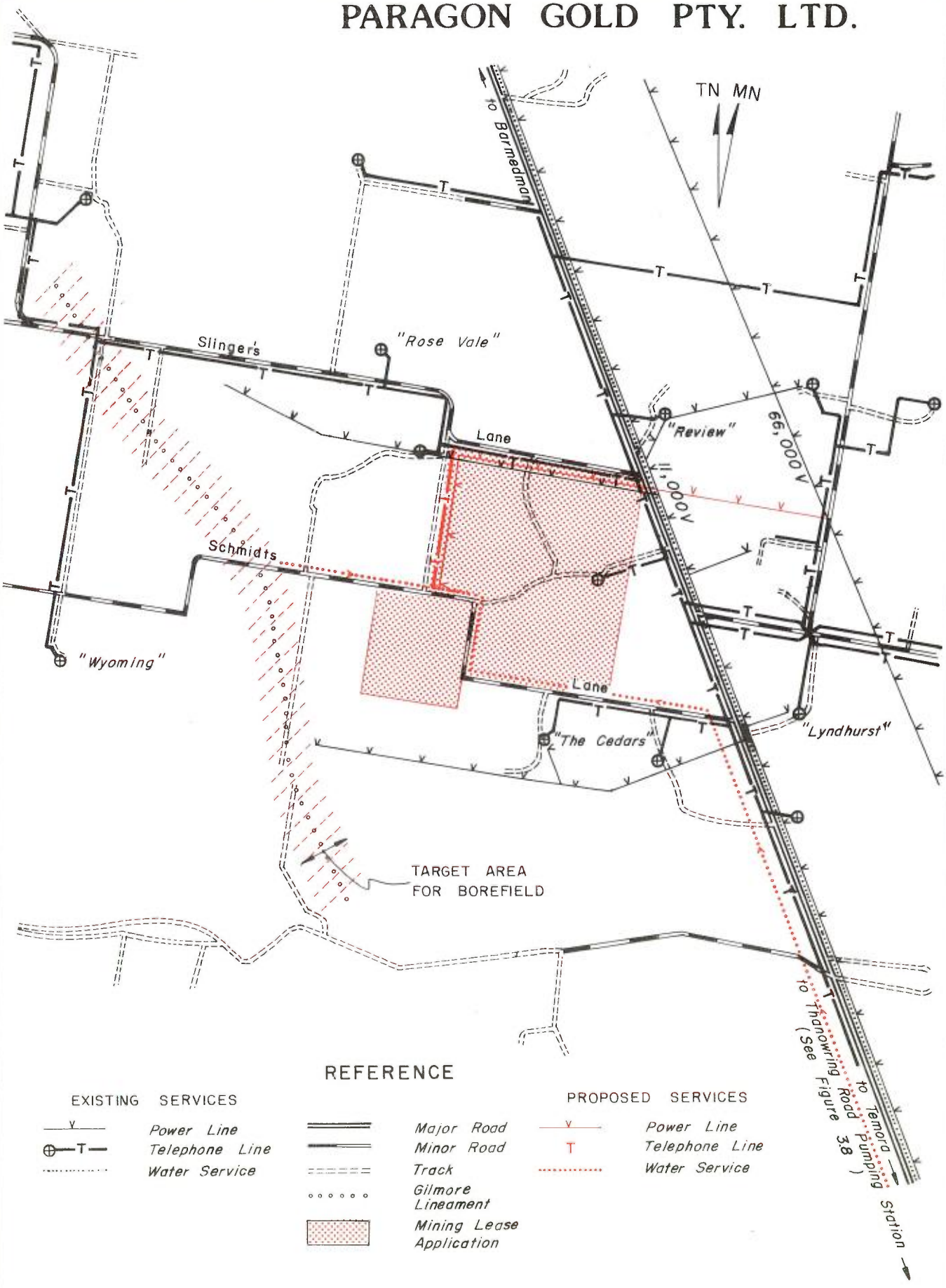

SCALE 1:50,000

0·5 0 0·5 1·0 1·5 2 km

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Figure 2.11
SERVICES

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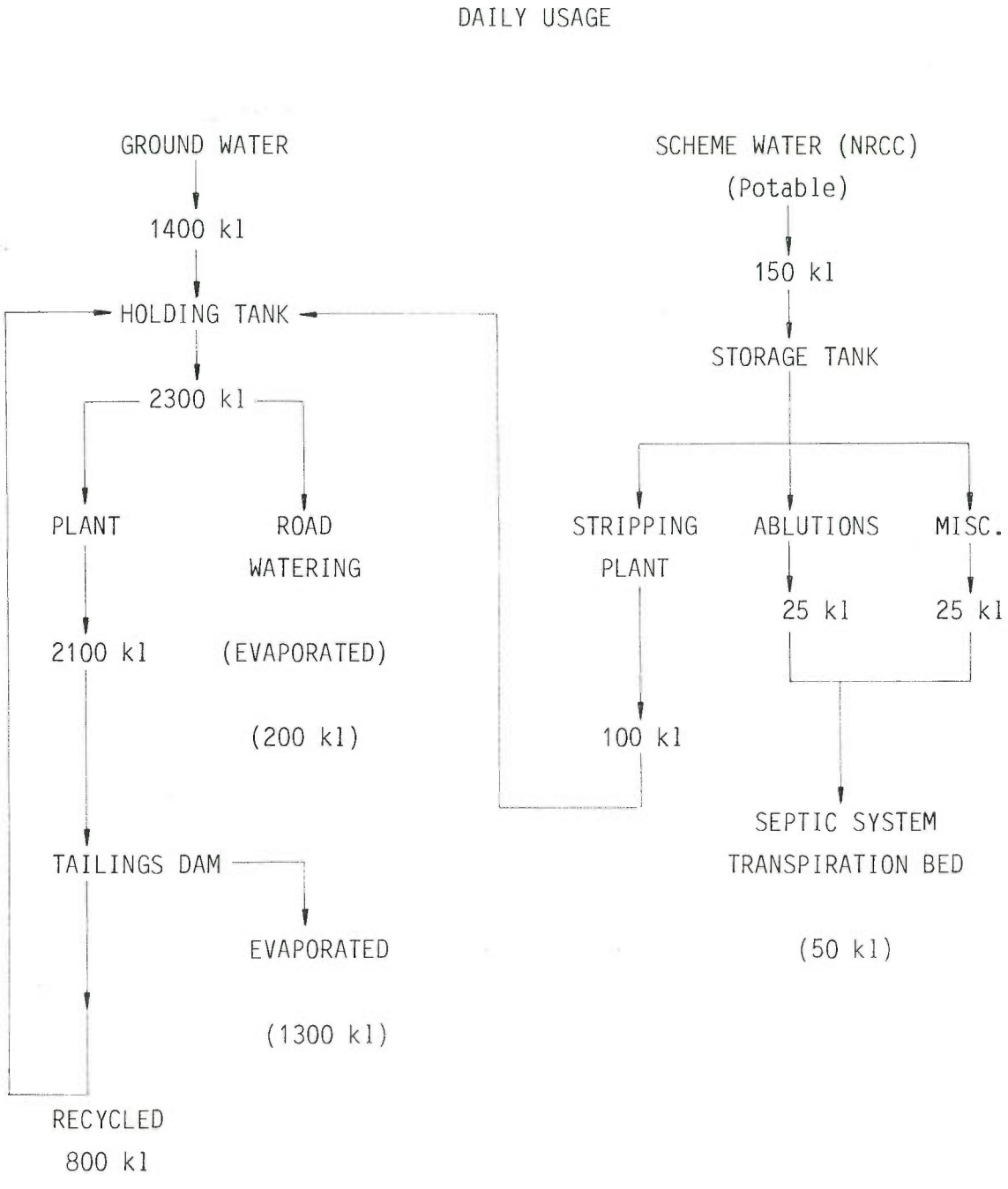

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Figure 2.12
WATER FLOW SHEET

2.10.2 WATER

Table 2.3 lists the estimated water requirements for the project.

TABLE 2.3
ESTIMATED WATER REQUIREMENTS FOR THE TEMORA GOLD PROJECT

Proposed Use	Required Quality	Required Volume kl/day
Treatment Plant	Non Potable	1400
Stripping Plant	Potable	100
Ablutions	Potable	25
Road Watering	Non Potable	200
Miscellaneous	Potable	25

The Company proposes to obtain its water supplies from two sources:

1. Freshwater Pipeline

   The Company proposes to engage the Northern Riverina County Council to construct a 150 mm diameter pipeline from the Thanowring Road pumping station to the treatment plant site. The pipeline will follow Barmedman Road across agricultural land on six properties, and Schmidts Lane on the Company's land, to the site. This pipeline will be large enough to supply the entire water needs of the whole treatment plant if sufficient water is available through the Northern Riverina County Council.

   The freshwater will be stored on site in a 100,000 litre tank.

2. Groundwater

   The Company's recent groundwater exploration programme has defined a target area 2.5 km west of the mine site where sufficient water could be obtained to meet the non-potable water requirements. The saline nature of the water does not affect the efficiency of the treatment process. Drilling within the target area will be undertaken by July, 1986.

Figure 2.11 shows the target area for the borefield and the predicted location of the pipeline between the bores and the main pipeline to the treatment plant. All locations shown are preliminary since the exact bore locations and long term agreements with landowners have not been finalised. All bores and pipelines will be incorporated into a Mining Purposes Lease since the borefield is defined and agreements with landowners finalised. All bores will be licenced by the Water Resources Commission.

Provided adequate groundwater resources are confirmed in the target area, a borefield will be developed and the water pumped to the treatment plant. The Company will instal a lined pond or tank which will provide adequate storage for the process water.

Figure 2.12 displays the sources and uses of water for the project. The Company will endeavour to maximise the amount of water re-circulated through the tailings dams. For planning purposes, the Company has assessed that approximately 40 per cent of water in the tailings will be recovered for re-use during summer and up to 60 per cent during winter.

2.10.3 Telephone

The Company will require between six and eight telephone lines for their communications to and from the site. Telecom have advised the Company that sufficient lines exist on the local exchange to satisfy their requirements.

Telecom will install the lines along Slingers and Kileys Lanes to the site (see Figure 2.11).

On-site communications will be undertaken using two-way radios and internal telephones.

2.10.4 Sewerage

The sewage and other effluent from the sanitary facilities and change houses on the project site will be collected in an underground pipework and directed to an appropriate size septic tank(s) with associated transpiration beds. Septic tank effluent cannot be placed into the tailings dam circuit since the presence of organic compounds would have an adverse effect on the carbon-in-pulp gold process.

2.11 SAFETY

The following safety issues have been addressed in the Company's planning:

Slope Stability

Golders and Associates will finalise the exact batter slopes for the open cut to ensure stability of batters and roadways for the life of the mine. The preliminary assessment suggests that steeper slopes will be possible on the western side of the open cut than on the eastern side. Cable bolting will be undertaken where necessary.

Cyanide

The Company will adopt strict safety standards to ensure that the health of all employees is not endangered through the use of cyanide. The Company will satisfy all reequirements of the Department of Industrial Relations in relation to the use of cyanide in mining.

These requirements cover such aspects as:

(i) Protective measures to avoid ingenstion or inhalation of cyanide e.g. ventilation, protective clothing;

(ii) Proper instructions for use of cyanide;

(iii) Good personal hygiene;

(iv) The local hospital be advised that cyanide is being used at the mine;

(v) Any spillages/leaks be immediately cleaned up;

(vi) Provision of first-aid kits and development of emergency procedures;

(vii) Storage and security of cyanide.

Public Safety

Signs will be erected on the boundaries of the Mining Lease advising the public that they should keep out as the site is dangerous.

Open Cut

At the completion of mining, the open cut will be fenced with a 2 m high cyclone wire fence to prevent unauthorised access.

Employee Safety

The Company will ensure its workforce is adequately trained to avoid accidents. Such training will be undertaken primarily with the assistance of the Department of Industrial Relations.

The Project Site will be regularly inspected by inspectors from the Department of Industrial Relations, who will ensure the above issues are all adequately taken care of.

2.12 TRANSPORTATION

2.12.1 Access Road

The Company proposes to use Schmidts Lane as the principal access road to the site. The Company has approached Council for approval to temporarily close the section of Schmidts Lane within MLA 42 and then provide a diversion around the tailings dam to link up with the western section of Schmidts Lane.

Access to the mine and treatment plant will be along the temporarily closed section of Schmidts Lane. At the conclusion of the project, the Company would close the diversion and open the existing route of Schmidts Lane.

The Company would upgrade the railway crossing on Schmidts Lane by laying a timber decking (railway sleepers) within and on both sides of the railway track.

2.12.2 Proposed Traffic

Construction Period

There will be a wide range of vehicles travelling to and from the site during the construction period. In the early stages, there will be numerous semi-trailers, low loaders and trucks delivering plant components to the site. Supply vehicles for fuel, concrete and parts will be regularly travelling to the site.

The Company estimates that a maximum of twelve large trucks/semi-trailers could be expected on any one day during construction. Employee's and contractor's vehicles could approach a maximum of 60 at the height of construction, however, for most of the time, less than 30 cars are expected daily.

The bulk of the larger vehicles will arrive during daylight hours subject to further restrictions by the Department of Main Roads for extra width vehicles. Most cars will arrive at the site by 7.00 am and leave during the late afternoon.

Operational Period

The traffic pattern during the operational life of the mine will become quite regular as employees travel to and from work at regular times. Service vehicles will invariably travel to the site on a regular basis also.

The estimated daily traffic flow to and from the mine will be:

6.30 - 7.30 am Monday to Saturday	- 20 cars
7.30 - 8.30 am Sunday	- 15 cars
2.30 - 3.30 pm seven days a week	- 20 cars
10.30 - 11.30 pm seven days a week	- 15 cars

Up to 5 service/miscellaneous vehicles per day could be expected to travel to the site. Hence, a total of about 60 vehicles per day would travel to and from the site.

2.13 EMPLOYMENT AND HOUSING

2.13.1 Construction Period

The Company expects the workforce during the construction period to increase at a regular rate for the initial three to four months to approximately 100 persons. The workforce should stabilise at 100 persons for approximately two months before it reduces as the completion of the project approaches.

The Company envisages that up to 60 persons, predominantly single men, will require accommodation during the construction period. Some contractors and labourers employed will reside locally. The Company's investigations have shown that sufficient accommodation will be available in local hotels and caravan parks. It may be possible for contractors to erect mobile accommodation adjacent to the Temora Railway Station if the need arises.

2.13.2 Operational Period

The Company estimates that approximately fifty-five persons will be engaged directly by the Company and the earthmoving contractor they engage to develop and operate the mine. A preliminary list of occupations of employees is presented in Table 2.4. The Company estimates that approximately one half of those listed in Table 2.4 will need to be imported to a district since the Company will require those persons to have had direct experience with gold projects. The remaining half of persons listed would be engaged locally.

The Company's local enquiries have indicated that there is sufficient rental housing and properties for sale in Temora and the surrounding area to provide a good standard of living for their employees. Furthermore, sufficient land is available for home construction in Temora if necessary. The Temora Shire Council in their local Environmental Plan has made provision for further housing lots if required (See Section 3.11.2).

2.14 REHABILITATION

2.14.1 Introduction

The Company proposes to incorporate rehabilitation procedures in all aspects of the mine development. The emphasis throughout the Company's planning is to ensure that rehabilitation is progressive and provides a long term low maintenance site.

TABLE 2.4

PROPOSED WORKFORCE SCHEDULE

Employees

General Manager	1	Admin. Superintendent	1
Plant Superintendent	1	Mine Superintendent	1
Maintenance Foreman	1	Mine Geologist	1
Secretary	1	Accounts Clerk	1
Gold Room Foreman	1	Geologist	1
Storeman	1	Metallurgist	1
Plant Foreman	1	Mining Engineer	1
Mine Surveyor	1	Shift Foreman	4
Stores Assistant	1	Utility Operator	2
Plant Shift Operator	4	Survey Assistant	1
Trades Assistant	2	Crusher Operator	2
Sampler	2	Fitter/Boilermaker	2
Electrician	1		

Contractors

Mine Supervisor	1	Shift Foreman	2
Driller	2	Offsider	2
Truck Driver	4	Loader Driver	2
Fitter/Boilermaker	2	Trades Assistants	2
Auto Electrician	1		

Total Employees	36
Total Contractors	18
	54

A soil conservation and management programme is an essential part of the overall rehabilitation of the project site. All topsoil and up to 150 mm of subsoil will be separately removed and stockpiled from each area to be disturbed. Where appropriate, the soil stockpiles would be grassed to ensure stability and nutrient levels until it is used in the Company's revegetation programme. The Company proposes to work closely with the local office of the Soil Conservation Service throughout the project.

It is the Company's intention to prepare a detailed rehabilitation plan for each component on the project site. Features of the plan will include details of:

(i) topsoil/subsoil stripping and stockpiling;

(ii) specifications for respreading topsoil and subsoil;

(iii) specific seed and fertiliser requirements;

(iv) sowing techniques, and

(v) runoff and erosion control.

The above plan should also satisfy an expected condition to be imposed on the Mining Lease by the Department of Mineral Resources.

The Company's long term objective is to leave the site with as much of the land returned to grazing as possible, yet minimise areas requiring long term maintenance. Details of rehabilitation procedures are set out in the subsequent sections.

Figure 2.13 shows the proposed final contours over MLA 42 and Figure 2.14 presents a perspective sketch of the final landform.

2.14.2 Open Cut

The Company has no other option other than to leave the void generated by the mining as an open hole. It is proposed to securely fence the abandoned hole with a 2 m high cyclone fence.

Since the upper 5 m of the western face of the open cut will remain visible from the Barmedman Road, the Company proposes to specially treat the area by growing native creepers down the face.

It is possible that the open hole could periodically hold water after rain periods, however, little groundwater flow (if any) is expected into the base of the open cut. Any water accumulated in the abandoned open cut should not be deleterious.

2.14.3 Tailings Dam

The tailings dam will be progressively revegetated after each cell is filled and dries out. Fortunately, the relatively coarse nature of the tailings will allow relatively rapid drying and in turn allow vehicles on the top of the cell to contour the final shape, spread soil and sow seed. The Company will sow a range of pasture grasses initially to stabilise the surface of each cell but will then undertake a tree planting programme to establish a tree lot on the tailings dam. The existing fence around the site will be retained throughout the operative life of the tailings dams to ensure that stock do not gain access to regenerating areas.

In the long term after the project is completed, it is intended to leave the rehabilitated tailings dams as a single elevated tree lot. Fences will be maintained around the tailings dam perimeter to ensure the trees and underlying grasses are not endangered by rabbits and stock.

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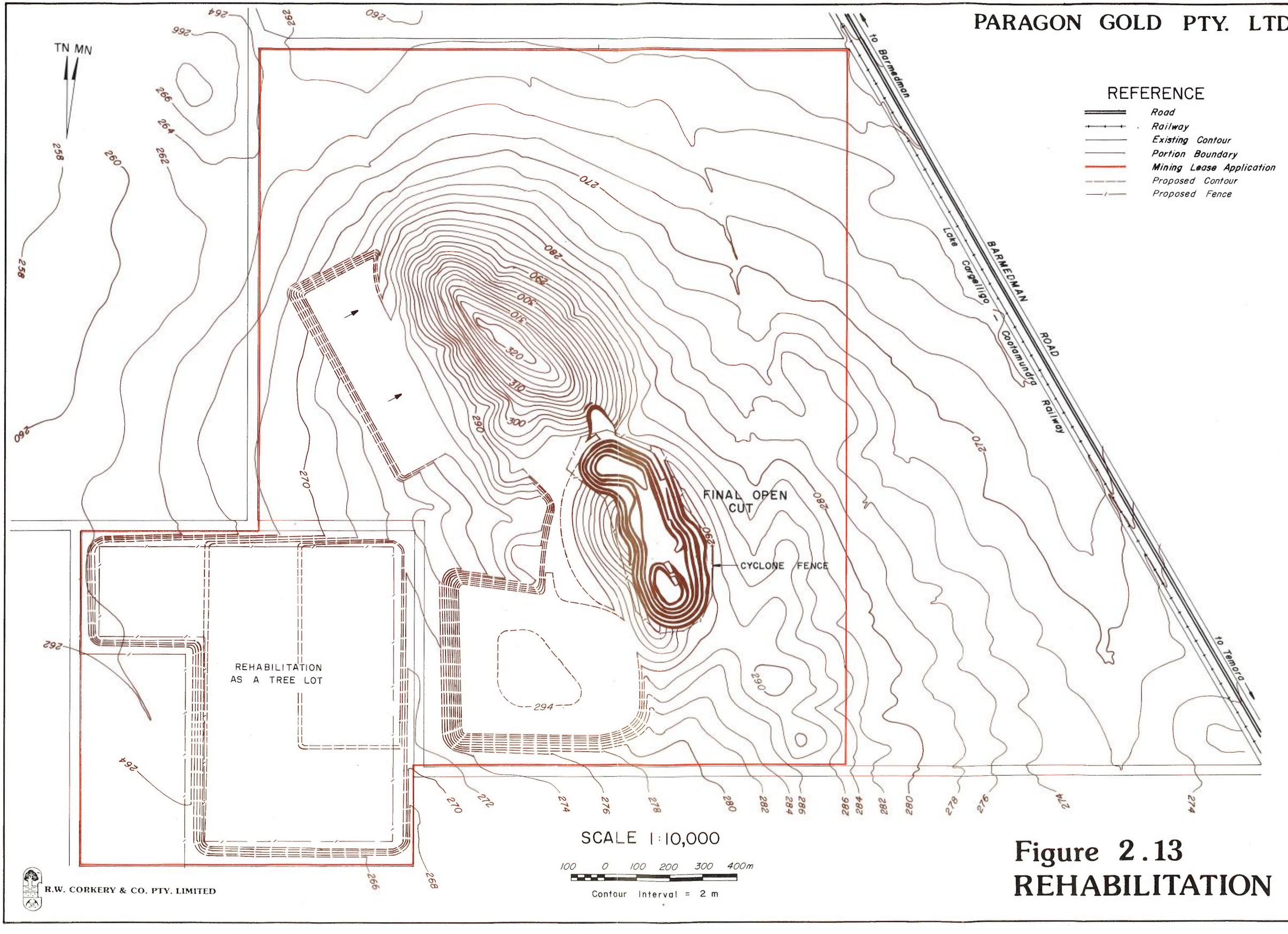

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Figure 2.13
REHABILITATION

PARAGON GOLD PTY. LTD

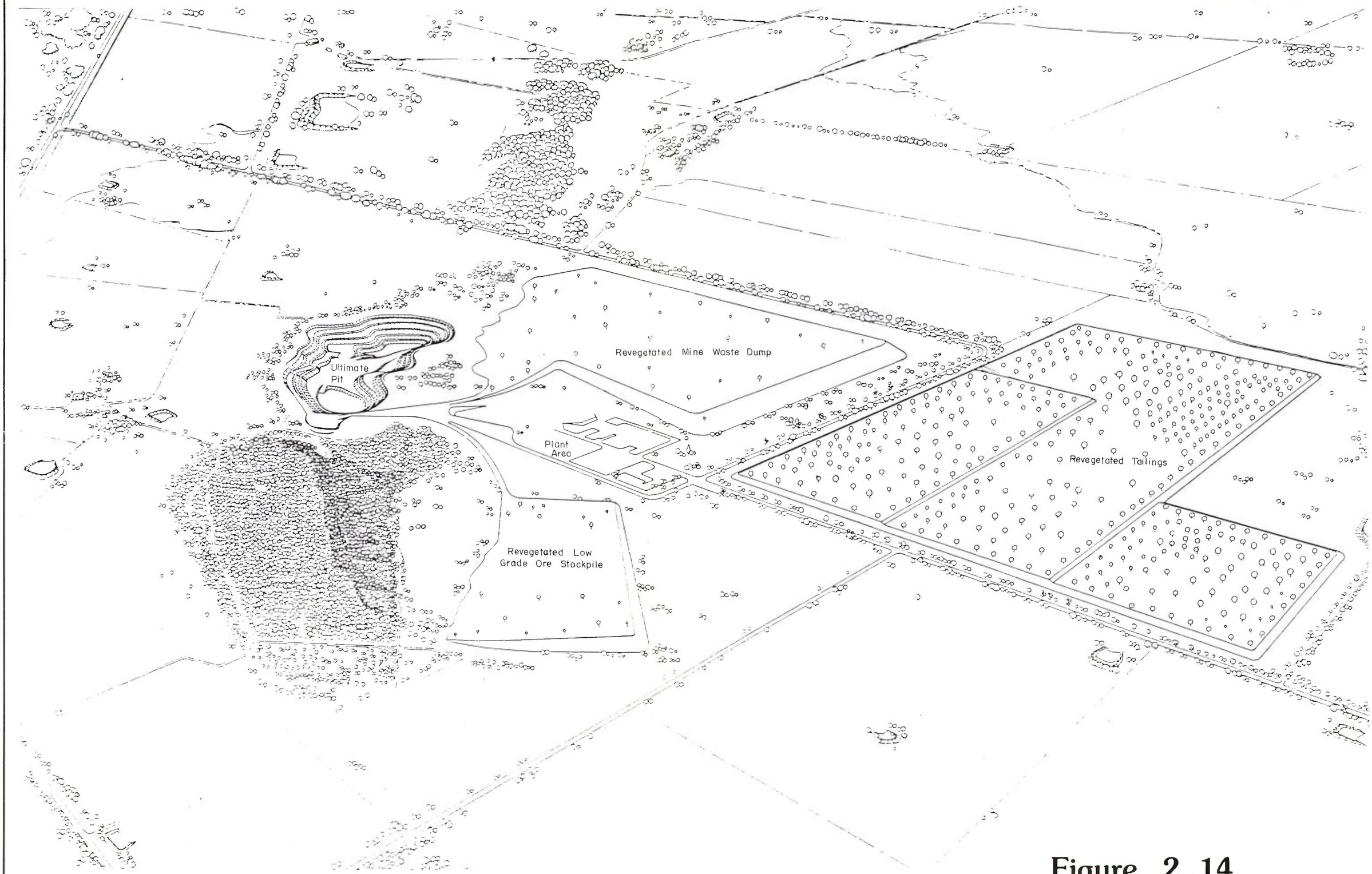

Figure 2.14
FINAL LANDFORM

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SECTION 3

DESCRIPTION OF THE EXISTING ENVIRONMENT

2.14.4 Low Grade Ore Stockpile

It is possible that at the completion of the project, the stockpile may have been removed and all the ore treated. In this case, soil stockpiled at the northern end of the stockpile will be replaced over the stockpile site and seeded.

If part or all of the stockpile remains at the completion of the project, the top will be levelled with a gentle easterly slope and sides battered to 1:3 (Vert:Hor) and grassed.

2.14.5 Waste Rock Dump

The method of construction of the waste rock dump set out in Section 2.5 will ensure the progressive rehabilitation of the dump. The side slopes of the dump will be approximately 1:3 (Vert:Hor) and the final surface will be free draining in all directions. The upper surface of the waste rock dump will be returned to grazing uses or Class 4 Agricultural land.

2.14.6 Treatment Plant Site

All buildings and plant will be removed at the completion of the project. Only concrete slabs will remain. Where appropriate, the ground surface will be ripped and seeded. The site will be left in a safe condition with no slopes exceeding 1:3 (Vert:Hor).

SECTION 3

DESCRIPTION OF EXISTING ENVIRONMENT

3.1 TOPOGRAPHY

Figures 2.2 and 2.3 show that MLA 42 comprises a central northwest trending ridge surrounded by gently sloping land. In the regional context, the site is typical of the southwestern slopes of New South Wales where numerous small hills and ridges crop out of the generally flat topography.

The central ridge comprises two hills separated by a saddle. The northern hill is larger and rises to 321.8 m AHD where a Trig. Station is placed. The Trig. Station is located within a 40 ha reserve covering most of the northern hill. Slopes on the northern hill vary from 5^{o} to 25^{o}. The southern hill has an elevation of approximately 312 m AHD and side slopes of between 5^{o} and 18^{o}. Both hills are prominent local features as they rise approximately up to 40 m above the surrounding plains.

Away from the central ridge, elevations range from approximately 265 to 290 m AHD. Local slopes vary from less than 1^{o} to 4^{o}.

3.2 DRAINAGE

Figure 3.1 shows that MLA 42 lies within the Lachlan River catchment close to its watershed with the Murrumbidgee River. The project site lies within two local catchments in the upper reaches of Barmedman Creek. Barmedman Creek flows northwards and coalesces with Bland Creek, which continues to flow northwards towards Lake Cowal and eventually into the Lachlan River. In the vicinity of Gidginbung, Barmedman Creek is non-perennial.

The central ridge in MLA 42 provides the natural watershed between the eastern and western catchments referred to on Figure 3.3. The eastern and western catchments cover approximately 16 km^2 and 14 km^2 respectively. Figure 3.3 shows two additional catchments adjacent to those already discussed. These have been defined for the purpose of the baseline water quality studies.

In the upper reaches of both the eastern and western catchments, the drainage lines are essentially very shallow and occur within open paddocks. The stream channels are more defined in their middle reaches since they have eroded through the topsoil and subsoil. Further erosion has occurred in the lower reaches of the drainage lines and in places the underlying bedrock is exposed. Stream channels vary from 5 to 25 m wide and 0.6 to 1.5 m deep in the lower reaches of both catchments.

A number of drainage lines in the western catchment have been relocated by landholders as a result of the construction of diversion banks around numerous paddocks. A series of diversion banks occur around the perimeter of the central ridge.

3.3 GEOLOGY

3.3.1 Regional Geology

MLA 42 is located on the western margin of a major geological structure referred to as the Bogan Gate Synclinorium. This structure forms part of the Lachlan Fold belt, one of the major mineral provinces in New South Wales. Numerous gold occurrences of diverse origins occur in the Lachlan Fold Belt. The gold deposits are either associated with deep plutonic level granitoid batholiths exposed on the structural highs or as high level epithermal deposits such as Temora and Peak Hill which are preserved in the synclinorial zones.

Major cross-faults in several sets of different orientations have controlled sedimentation, volcanic centres, mineralisation and intrusions.

PARAGON GOLD PTY. LTD.

NEWELL HIGHWAY

to Wyalong

Barmedman

to Grenfell

Bland Creek

Duck Creek

Barmedman Creek

MLA42

Mirrool Creek

Ariah Park

to Ardlethan

to Coolamon

Lake Centenary

Temora

Trigalong Creek

to Junee

Narraburra Creek

to Young

Springdale

to Cootamundra

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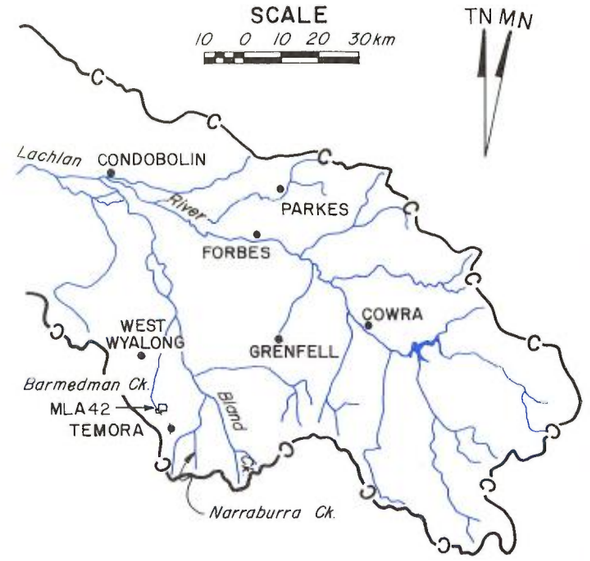
SCALE
10 0 10 20 30km

TN MN



REGIONAL DRAINAGE

REFERENCE

- Major Road
- Minor Road
- Stream
- Built-up Area
- C — Catchment Area Boundary
- Mining Lease Application
- Railway

SCALE 1:200,000

2 0 2 4 6 8 10km

Figure 3.1
DRAINAGE

PARAGON GOLD PTY. LTD.

TN MN

Slingers Lane

Kileys Road

Schmidts Lane

Schmidts Lane

to Barmedman

Lake Cargelligo – Coolamundra Railway

Barmedman Road

to Temora

GIDGINBUNG TRIG 321m AHD

THIS AREA IS UNDERLAIN BY AT LEAST 10 to 12 m OF CLAY.

Barmedman Creek

260 270 280 290 300 310 320

REFERENCE

- Mining Lease Application
- Road
- Railway
- Existing Contour
- Portion Boundary
- Soil Cover
- Conglomerate
- Siltstone
- Altered Volcanics

SCALE 1: 10,000

50 0 100 200m

Contour Interval = 10 m

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Figure 3.2
LOCAL GEOLOGY

3.3.2 Local Geology

Figure 3.2 presents a simplified geology plan of MLA 42. The central ridge in which the gold mineralisation is present comprises altered andesitic volcanics of Palaeozoic Age (360-440 million years old). The altered andesites appear to be unconformably overlain to the south by a sequence of gently dipping (15-20^{o}) sediments consisting of pebble conglomerate, siltstone and sandy siltstone.

A high angle reverse fault trends northwest transecting the chalcedonic bodies in the saddle between the two hills and terminates or displaces the mineralised zone. The exposed chalcedonic outcrop on the northern hill appears to be similar to the low grade zones of the southern hill, where the bulk of the ore body is located. The bulk of the faults in the vicinity of the ore body are oriented north-northwest, northwest and northeast. The volcanics containing the gold mineralisation have undergone intense 'chalcedonic' quartz and quartz-pyrophyllite-alunite alteration. Hence the rocks containing the gold are moderately hard due to the presence of the chalcedonic material.

The chalcedonic alteration appears as two elongate bodies on the southern hill, oriented approximately parallel to the regional foliation with several small pods located between and adjacent to the main bodies. On the northern hill, pods of chalcedonic silicification alternate within quartz-pyrophyllite outcrops.

The mineralisation lies within the partially oxidised zone where all veins and fractures are totally oxidized and kernels of unoxidised pyritic chalcedony are present in oxidised chalcedonic quartz. The totally oxidised zone is relatively shallow due to the impermeability of the chalcedony away from the fractures. Depth of total oxidation is generally 5 to 15 m. However, partial oxidation along fractures and veins extends to cover 80 m and is generally coincident with the depth of chalcedonic alteration. The quartz-pyrophyllite alteration is commonly unoxidised probably due to the lack of open fractures to provide permeability. Thus both alteration type and depth control the extent of oxidation.

3.3.3 Gold Mineralisation

The gold mineralisation is wholly contained within the zone of alteration within the volcanics. Within the oxide zone, gold appears to be concentrated within iron oxides along fractures and veins. In the unoxidised zone beneath the ore body, gold is probably associated with pyrite/enargite veins and disseminations. The gold is fine-grained (<15 microns), occurs as free grains, or as inclusions in quartz or sulphide mineralisation. Pyrite, iron sulphide, is the dominant sulphide mineral in the ore body. Other metallic minerals are rare within the ore body. Oxidation of pyrite veinlets and stringers has produced the large amounts of iron oxide minerals (hematite and limonite) which occur in the ore body.

3.3.4 Ore Reserves

The Company's preliminary estimates of the reserves of ore in the defined ore body on the southern hill are approximately 4.6 million tonnes at 2.8 g/t of gold and 6.0 g/t of silver. Results of recent in-fill drilling are not yet available. The reserve estimates have been prepared assuming a maximum open cut depth of 85 m.

3.3.5 Waste Rock and Low Grade Ore

Waste Rock

The waste rock to be mined in conjunction with the gold bearing ore is essentially an altered andesitic volcanic. Preliminary studies by Brooks and Summerhayes (in prep.) indicate the waste rock has a higher total iron content (as Fe_2O_3) compared to the low grade ore. This reflects the relative abundance of disseminated magnetite in the volcanics which is now primarily weathered and present as iron oxides throughout the rock and on joint surfaces.

An analysis of samples of the waste rock show a high alumina content and variable sulphate content suggesting the presence of the alteration mineral alunite. A small proportion of the sulphate may be due to the presence of pyrite (iron sulphide).

Preliminary weathering tests of the waste rock revealed only a mild acid response which in turn suggests that any leachate from the waste rock would also be slightly acidic.

Low Grade Ore

The low grade ore is essentially the same chalcedonic quartz as the main ore body but has lower gold grades. This is supported by rock analyses by Brooks and Summerhayes (in prep.) revealing a high silica content and relatively low total iron concentrations. The sulphide concentrations in the low grade ore are comparatively lower than the waste rock.

Preliminary tests show that the low grade ore also has a mild acidic response to weathering.

3.4 SOILS

3.4.1 Nature and Distribution

There are three principal soil types within MLA 42. Each is a reflection of the topography and underlying rocks.

(i) Lithosols

These are shallow soils (<0.2 m) developed on the central ridge on MLA 42. The ridge comprises mainly rock outcrop with small quantities of a brown/grey loam developed between rock outcrops. The soil is naturally stony but never-the-less provides a good growing medium for the growth of the existing vegetation.

(ii) Red Yellow Solodic Soils

These soils are developed on the side slopes of the central ridge. They invariably range in depth from 0 (an occasional outcrop) to 0.8 m. Hence, their profile over the site is variable. The most common feature is the persistent A horizon of which the A_2 is invariably bleached. The thickness of the A horizon varies from 0.1 to 0.15 m. The underlying B horizon or subsoil varies in depth from 0.3 to 0.7 m. It is essentially a red, light to medium clay with occasional rock fragments throughout. The B horizon is often mottled, but on MLA 42 does not display the abundance of yellow in the horizon that is more common in the Temora district.

(iii) Red/Brown Earths

These soils are the most typical soil throughout the Temora area since they are associated with the gently sloping land used primarily for crops and pasture. On MLA 42 they are found towards the boundaries and adjacent to Barmedman Creek.

The red/brown earths and solodic soils grade into each other down slope and hence no definite boundary between the soil types can be positioned.

The red/brown earths are characterised by a hard setting light brown A horizon and a well structured red/brown clayey B horizon. The A horizon comprises a thin apedal clay loam overlying the hard setting periodically bleached A_2 horizon. The A horizon varies in thickness on MLA 42 from 0.2 m to 0.4 m closer to Barmedman Creek. In close proximity to Barmedman Creek both the A and B horizons contain rock fragments washed down the creek.

The B horizon or subsoil which varies in thickness from 0.4 to 1.5 m contains varying amounts of ironstone present as small pebbles to concretions up to 0.1 m in diameter. The horizon is well developed and displays an obvious pedal character.

3.4.2 Erosion Potential

Both the red/brown earths and solidic soils are highly erodible. Once the hard-setting A horizon of the red/brown earths is disturbed, the underlying B horizon is relatively easily eroded since it is moderately dispersive. The solodics display a similar degree of erodability.

Since the boundary between the red/brown earth and solodics is variable, it is considered appropriate that all soils away from the central ridge be cared for to ensure soil erosion is avoided.

3.4.3 Value for Rehabilitation

All soils on MLA 42 have value for rehabilitation. The lithosols on the area to be mined have an excellent seed reserve and although limited in quantity, will provide an excellent source of material for rehabilitation or as a basis for a tree screen.

The A horizon of both the solodics and red/brown earths, although depleted of their nutrients by cropping and pasture, still provide a good source of nutrient for rehabilitation purposes. All topsoils will require the application of fertilisers to achieve successful revegetation. Experience in the Temora area has shown that if the A horizon is selectively removed from the soil profile and separated from the B horizon, it is very useful for revegetation purposes. Any contamination with the B horizon quickly reduces its usefulness. The B horizon or subsoil will be important in revegetation programmes on site as it will provide a sealing layer between the material and the topsoil. This will improve water retention in the topsoil.

The Soil Conservation Service Temora District Manual (1975) records that between April and October there is invariably sufficient soil moisture to sustain plant growth. Conversely, from November to March, soil moisture is often insufficient and plant growth is retarded due to lack of moisture.

3.5 METEOROLOGY

3.5.1 Source of Data

All temperature, rainfall, evaporation, fog and morning wind readings are drawn from records kept at the Department of Agriculture Experimental Station 5 km north of Temora and 10 km south of the project site. Afternoon wind data is not available at the above Station and records for Cootamundra, the next closest station are examined.

3.5.2 Temperature

Table 3.1 lists the average daily maximum and minimum temperatures at Temora. January and February are the warmest months with average daily maximum temperatures of 31.2^{o}C. Approximately 15 per cent of daily maximum temperatures during these months exceed 36^{o}C. July is the coldest month with an average daily maximum and minimum temperature of 14.2^{o}C and 2.7^{o}C respectively. Frosts are common throughout the winter months.

TABLE 3.1

MEAN DAILY TEMPERATURES - TEMORA EXPERIMENTAL STATION - ^{o}C

Month	J	F	M	A	M	J	J	A	S	O	N	D
Maximum	31	31	28	23	18	14	13	15	18	22	26	30
Minimum	16	16	13	9	5	3	2	3	4	8	10	14

3.5.3 Rainfall

Table 3.2 lists the average monthly rainfall and number of raindays per month. The total average yearly rainfall is 522 mm although during drought years total annual rainfall has been as low as 219 mm (1944). The wettest year on record was 1956 when 978 mm were recorded.

The records over many years tend to show that rainfall is distributed relatively evenly throughout the year. However, the rainfall pattern around Temora is somewhat variable with rain often falling in bursts of up to 100 to 150 mm over a short period. The rainfall in the winter months is related to widespread frontal activity and is generally spread over a greater number of days. Winter rainfall is generally of lower intensity than summer rainfall which is often associated with convection storms. Soil Conservation Service (1975) records that there is a higher rainfall expectancy in winter and spring than summer and autumn.

TABLE 3.2

MEAN MONTHLY RAINFALL - TEMORA EXPERIMENTAL STATION - mm

Month	J	F	M	A	M	J	J	A	S	O	N	D	YEAR
Mean	50	40	43	45	43	40	41	43	39	56	43	39	522
Raindays per month	6	5	5	7	8	10	12	11	10	11	7	5	97

3.5.4 Evaporation

Table 3.3 lists the average monthly evaporation for a seven year period at Temora. Greatest evaporation occurs during January and least during June. July is the only month when rainfall exceeds evaporation.

TABLE 3.3

AVERAGE MONTHLY EVAPORATION - TEMORA RESEARCH STATION (mm)

Month	J	F	M	A	M	J	J	A	S	O	N	D
Max.	316	268	205	120	65	33	40	81	111	161	264	301
Min.	195	170	174	84	52	27	31	43	69	71	156	205
Average	282	235	186	100	59	33	37	53	84	133	204	254

3.5.5 Temperature Inversions

Radiation inversions are the main type of temperature inversions likely to cause any noise to be enhanced. An indication of the frequency of radiation inversions is obtained by examining fog frequencies as fogs are radiation inversions when water vapour is present. Table 3.4 presents the recorded fog frequencies for the nearby Research Station. The maximum recorded fogs in any one month was 7 in July, 1969. On average only seven fogs are recorded annually at Temora.

TABLE 3.4

FOG FREQUENCIES - TEMORA AGRIC. EXPERIMENTAL STATION

Month	J	F	M	A	M	J	J	A	S	O	N	D
Av. No/Month	0	0	0	0	1	2	3	1	0	0	0	0
Max. No. Recorded/Month	0	0	1	1	5	6	7	5	3	1	0	0
Min. No. Recorded/Month	0	0	0	0	0	0	0	0	0	0	0	0

3.5.6 Wind

Records kept at the Temora Research Station show that during summer and autumn morning winds tend to predominate from the northeast and east and periodically from the southwest. During winter, wind directions are variable both in direction and strength. A greater proportion of winds blow from the southwest quadrant than at other times during the year. Afternoon winds based on records from Cootamundra show a dominance in winds from the southwest and west throughout the year.

3.6 WATER RESOURCES

3.6.1 Surface Water

Occurrence

Surface water on and in the vicinity of MLA 42 is confined to non perennial streams and farm dams. The direction of flow after rain events is often controlled by numerous diversion banks.

Quality

The Company and the Department of Mineral Resources has undertaken a programme of water sampling to establish the quality of surface waters prior to the development of the mining operation. The Department of Mineral Resources also undertook a study of the stream sediments at the time of their water sampling. Figure 3.3 shows the location of the water sampling sites.

The results of the water and stream sediment sampling programme are presented in Appendix 1.

The water sampling programme revealed that the stream waters are typical of natural waters and have concentration levels of those trace metals known at Gidginbung in stream sediments within the normal range of crustal abundances (Source: Brooks and Summerhayes, 1985).

The surface waters have a low electrical conductivity and low buffering capacity, and hence would be sensitive to any discharge from the mine or treatment plant. Suspended solids contents of surface waters in the area are naturally high reflecting the dispersive nature of the sodic soils in the area.

3.6.2 Ground Water

Occurrence

Investigations by Groundwater Resource Consultants has revealed that the fractured rocks in the vicinity of Gidginbung carry variable amounts of subsurface water. The greatest flows occur along regional structural features, e.g. the Gilmore Lineament.

The Company's drilling programme has shown that no water is present within 80 m of the surface in the vicinity of the central ridge where mining is proposed. Elsewhere around MLA 42, the water table lies between 25 and 60 m below the ground surface.

There are two registered bores within 5 km of MLA 42. These are located adjacent to the homesteads on "Rose Vale" (Reg. No 18884) and "Corella Park" (Reg. No 27100). Neither bore is being pumped because the water has excessive salinity.

Quality

Analyses of bore water pumped from fractured rocks in the Gidginbung area show that the waters are extremely saline. Electrical Conductivities range from 8,000 to 29,000 umhos/cm at 25^{o}C.

3.7 FLORA

A study of the site's flora was undertaken by Naturalist, Mr David Schlunke between October and December, 1985. A full report on the flora is presented in Appendix 2.

The flora on the site comprises both original native vegetation and pasture and cropland. Figure 3.4 displays the recorded vegetation communities present on the site. Some plants of special significance were observed on the northern end of the ridge near Gidginbung Trig. Station (see Appendix 2).

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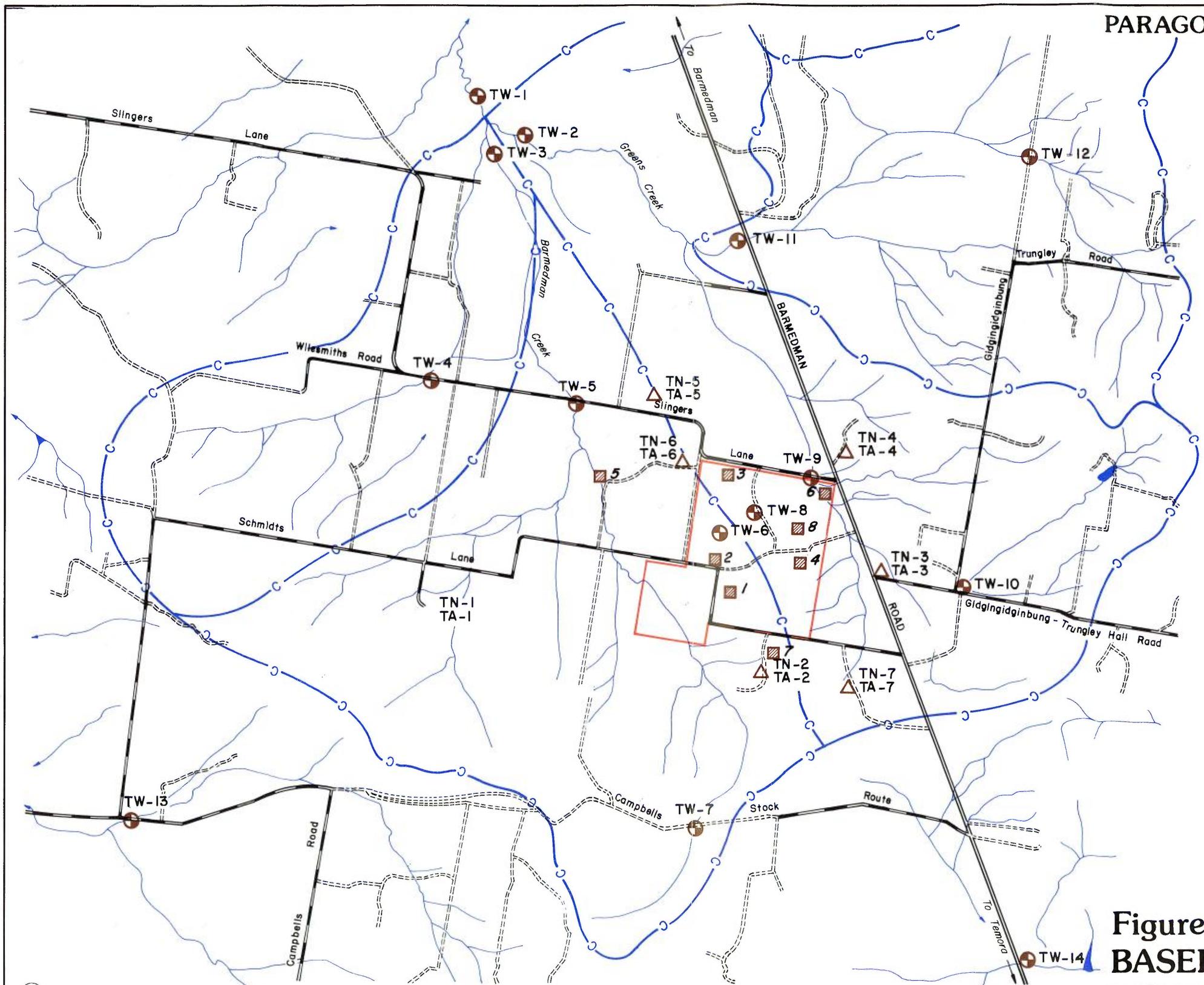

Figure 3.3
BASELINE MONITORING SITES

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TN MN

260

270

280

290

to Barmedman

Lake Cargelligo – Cootamundra Railway

Barmedman Road

to Temora

Barmedman Creek

Grey Box and Yellow Box

Yellow Box E. melliodora

Grey Box E. microcarpa

REFERENCE

- Road
- Railway
- Existing Contour
- Portion Boundary
- Mining Lease Application
- Woodland, predominently Eucalyptus dwyeri with grass understorey.
- Scrubland, predominently Callitris endlicheri (Black Cypress Pine) with shrub understorey.
- Modified woodland.
- Other. Pasture and cropland.

FEATURES OF SPECIAL INTEREST

- x Large Grasstrees
- y Casuarina stricta
- z Rock outcrop

SCALE 1:10,000

100 0 200 400 m

Contour Interval = 10 m

R.W. CORKERY & CO. PTY. LIMITED

Figure 3.4
VEGETATION COMMUNITIES

Remnants of the woodlands that occurred away from the ridge are retained along the road reserves for Schmidts and Slingers Lanes.

Three original native vegetation communities have been recognised on the site.

(i) Woodlands predominated by the tree Eucalyptus dwyeri and an understorey of native grasses, Stypandra glauca and several other shrubs.

(ii) Scrubland predominantly Callitris pine trees with a dense understorey of shrubs rather than native grasses. Within the scrubland community on the northern hill there are a number of plants of special significance associated with some rocky outcrops. These are detailed in Appendix 2.

(iii) Modified Woodland comprising partly cleared original vegetation at the southern end of the hills and regrowth of young trees at the northern end.

Pasture and cropland covers the majority of the site. Some dams constructed in these areas are surrounded by reeds.

3.8 FAUNA

A survey of the fauna on the site by Mr Schlunke recorded a range of birds, reptiles and mammals. Details of the fauna observed and known to occur on the site are enclosed in Appendix 2.

3.9 BACKGROUND NOISE LEVELS

3.9.1 Monitoring Procedures

Background noise levels were monitored at seven sites shown on Figure 3.3. The measurement at these sites was considered sufficient to adequately describe the existing acoustic environment around the project site. Noise levels were monitored in accordance with Australian Standard AS1055.1-1984 on the 25th and 26th March, 1985. The noise levels were monitored using a Bruel and Kjaer integrating peak sound level meter type 2225. The meter was calibrated regularly using a Bruel and Kjaer sound level calibrator type 4230. A series of readings were taken at approximately 2 second intervals for a period of either 5 or 10 minutes using the fast response mode of the meter. All readings are "A" scale readings.

Additional measurements were taken to establish:

(i) effect of wind and vegetation on noise levels, and

(ii) the expected noise levels at surrounding residences.

Both of the above effects were established by measuring noise levels generated by a drilling rig located approximately where the Company proposes to locate the primary crusher.

3.9.2 Statistical Analysis

The data from the monitoring programme was statistically analysed into L_{90}, L_{eq} and L_{10} classes. L_{90} is the sound level exceeded 90 per cent of the sampling time, L_{eq} is the sound level of continuous noise which emits the same energy as the fluctuating sound over a fixed period and L_{10} is the sound level exceeded 10 per cent of the sampling time. L_{90} is considered to be representative of background noise levels.

3.9.3 Results

Table 3.5 presents the results of the background noise level monitoring. The results show the background levels are typical of a rural area with the main sources of noise being birds, wind in trees, insects, and distant road noise. On the few days when wind speeds are lower than those present on the 25th/26th of March, 1985, L_{90} values are often as low as 25 dB(A) during the day. On evenings when wind speeds are low, L_{90} values decrease to approximately 20dB(A). Lowest noise levels and periods of least noise attenuation are still frosty mornings.

On-site measurements to establish the effect of wind and vegetation on noise attenuation revealed the following:

(i) Wind speeds of between 5 and 12 km/hr reduced noise levels by approximately 3 dB(A);

(ii) The woodlands on the Project Site attenuates sound levels by an additional 2.5 dB(A) each time the distance to the noise source is doubled.

Table 3.6 presents the results of noise measurements taken on the mornings of the 6th and 7th February, 1986 at a number of surrounding homesteads whilst a drilling rig was operating close to the site of the proposed primary crusher.

TABLE 3.5
BACKGROUND SOUND LEVELS - TEMORA GOLD PROJECT

Site No.	Location*	Mid Afternoon L_{90}	Mid Afternoon L_{eq}	Mid Afternoon L_{10}	Evening L_{90}	Evening L_{eq}	Evening L_{10}	Night L_{90}	Night L_{eq}	Night L_{10}	Early Morning L_{90}	Early Morning L_{eq}	Early Morning L_{10}
TN-1	Near "Wyoming"	37 (A, C, D)	42	45	34 (A, E, C)	36	38	27 (A, E, C)	29	32	37 (A, D)	40	43
TN-2	Near "The Cedars"	39 (A, D)	48	54	26 (A, E, C)	31	35	26 (A, C, E)	29	32	38 (A, D, C)	40	42
TN-3	Near Residence F	32 (A, B, D)	39	44	32 (A, E, C)	33	35	23 (E, A, C)	26	29	34 (D, A, E)	36	38
TN-4	Near Residence E	40 (A, D, B)	47	51	42 (A, C)	44	47	22 (A, E, C)	28	32	41 (A, D)	44	47
TN-5	Near "Rosevale"	37 (A, D, B, C)	41	44	37 (A, E, C)	39	42	27 (A, D, E)	30	32	35 (A, D, C)	37	40
TN-6	Near Residence D	36 (A, D, C)	41	43	30 (A, E, C)	32	34	28 (A, D, E)	31	35	33 (A, D, C)	34	37
TN-7	Near Residence I	35 (A, B)	41	45	24 (A, D, C, E)	26	29	24 (A, C, E, D)	27	30	40 (A, C)	43	47
FIELD MEASUREMENT CONDITIONS	Date:	25th March, 1985.			25th March, 1985.			26th March, 1985.			26th March, 1985.		
	Time:	3.00 p.m. - 4.50 p.m.			8.00 p.m. - 9.20 p.m.			3.30 a.m. - 4.50 a.m.			6.00 a.m. - 7.10 a.m.		
	Temp:	27^{o}			19^{o}			16^{o}			18^{o}		
	Cloud Cover:	30%			0%			10%			90%		
	Wind Speed:	3 to 4.5 m/s			0.5 to 3.5 m/s			0 to 1.5 m/s			2.0 to 4.0 m/s		
	Wind Direction:	East			East			East			Southeast		

NOTE: L_{90} = Sound level exceeded 90% of the sampling time.
L_{eq} = Level of continuous noise which emits the same energy as a fluctuating sound over a fixed period.
L_{10} = Sound level exceed 10% of the sampling time.
* See Figure 3.3 for site locations.

NOISE SOURCES - Presented in order of predominance
(A) Wind in trees (B) Local Vehicles (C) Distant Vehicles (D) Birds/Animals (E) Insects

TABLE 3.6

MEASURED NOISE LEVELS AT RESIDENCES SURROUNDING MLA 42 DURING THE OPERATION OF A DRILLING RIG*

Residence	Distance from Drilling Rig (km)	Noise Level** 7.30-8.30 am 6/02/85 dB(A)	Noise Level** 6.00-6.45 am 7/02/85 dB(A)
A	4.2	Not Audible	Not Audible
B	1.5	31-36 (Av.= 33)	41-43 (Av.= 42)
"Rose Vale"	2.5	28-31 (Av.= 30)	31-35 (Av.= 33)
"Review"	2.3	Not Audible	Not Audible
E	2.0	Just Audible *	Just Audible *
J	1.5	Just Audible *	Just Audible *

* The drilling rig generated 84 dB(A) at 7 m.

** Wind Conditions: 6/2/85 Wind from south @ 10 km/hr.
7/2/85 Wind from southeast @ 1.5 km/hr.

Note: L_{90} values when the sound levels were "just audible" varied from 24 to 26 dB(A).

3.10 AIR QUALITY

MLA 42 is located within a rural area where the most common air contaminant is dust from agricultural activities and unsealed roads. Other contaminants are seeds, pollen, insects and fire debris.

The Company established a network of seven air quality monitoring sites around the proposed mine site (see Figure 3.3), principally to establish the air quality prior to the commencement of mining. These stations will provide a useful comparison of dust levels before and during mining.

Table A1-3 in Appendix 1 lists the recorded levels at the deposit gauges established since September, 1984.

Only one site (TA-4) displayed relatively high deposit levels. The average level of 4.84 g/m^2/month exceeds the 4.0 g/m^2/month level recommended by the State Pollution Control Commission. This high natural level is attributed to nearby cropland and nearby sheep grazing.

All other sites have average monthly deposit rates varying from 0.89 and 1.87 g/m^2/month which is typical of rural areas.

3.11 LAND OWNERSHIP AND LAND USE

3.11.1 Land Ownership

Figure 3.5 displays the land ownership surrounding MLA 42 and in the vicinity of the potential borefield. The Company owns the entire property covered by MLA 42 which was formerly known as "Lilydale".

3.11.2 Land Zoning

MLA 42 lies entirely within a Non-Urban A zoning within Interim Development Order (IDO) No. 1 for Temora Shire. This order was gazetted in February, 1970 when the area was within the Shire of Narraburra. Mining is a permissable use within the current zoning. Council is currently advocating a draft Local Environmental Plan to supercede IDO No.1. However, the changes will not affect the zoning or requirements in the vicinity of MLA 42.

3.11.3 Land Use

MLA 42 lies within a rural area where the principal activities are grazing sheep and cropping. The Gidginbung wheat silos are located east of the site adjacent to the Barmedman Road and the Lake Cargellico-Cootamundra railway line.

TABLE 3.7

RESIDENCES SURROUNDING MLA 42

Residence	Owner	Distance to closest Point of Open Cut (km)	Distance to closest point of Treatment Plant (km)	Distance to Closest Proposed Activity (km)
A - "Wyoming"	R.J. Madden	4.3	3.6	2.9 (Tailings Dam)
B	D.V. Obst	1.6	1.3	0.9 (Low Grade Stockpile)
C - "Rose Vale"	D.V. Obst	2.6	2.3	1.9 (Low Grade Stockpile)
D - "Review"	H. Noack	2.0	2.2	2.0 (Open Cut)
E - "East Lynne"	B. Wehrestedt	1.6	2.1	1.6 (Open Cut)
F	W. Wheare	1.6	2.1	1.6 (Open Cut)
G "Fairfield"	N.R. & H.M. Taylor	2.2	2.7	2.2 (Open Cut)
H - "Lyndhurst"	B.W. & M.H. Moroney	2.6	3.3	2.6 (Open Cut)
I	G.R. & A.E. Ferguson	1.7	2.4	1.7 (Open Cut)
J - "The Cedars"	V.A. Steinke *	1.1	1.6	0.6 (Overburden Stockpile)
K - "Roselyn"	K. Rodway	2.6	2.2	1.2 (Tailings Dam)
L - "Lilydale"	Paragon Resources N.L.	0.6	1.1	0.6 (Open Cut)

* The northern end of this property, including the residence and its surrounds, is currently being purchased by the Company from Mr Steinke.

3.11.4 Residences

Table 3.7 lists the twelve habitable residences within 3 km of the boundary of MLA 42. The distances from each residence to the open cut and treatment plant are also listed. The closest proposed activity on MLA 42 and its distance to each residence is also given.

3.12 PRE-EUROPEAN HISTORY

An archaeological survey was undertaken over MLA 42 by Brayshaw and Associates, Consultant Archaeologists, of Sydney. In addition, consultation was undertaken with representatives of the State Aboriginal Land Council, the Wiradjury Regional Aboriginal Land Council, and the Narrandera Aboriginal Land Council.

A total of five sites were located during the survey, the locations of which are presented on Figure 3.6. Table 3.8 presents a summary of the contents of each site.

The baked clay locations (L1, L3 and L4) are generally composed of ash, burnt black earth and baked clay lumps. They may represent Aboriginal campfires; however it is very difficult to distinguish between sites which have resulted naturally from bushfires and those made by Aborigines. These sites have all been eroded to such an extent that testing to determine their origin is considered unnecessary.

Scarred trees occur where bark has been removed for the manufacture of such items as canoes, shields or containers, or sometimes for use as roofing for shelter.

Scatters of artefacts generally reflect campsites where artefacts were utilised. The two scatters on the site contain few artefacts and have a low density.

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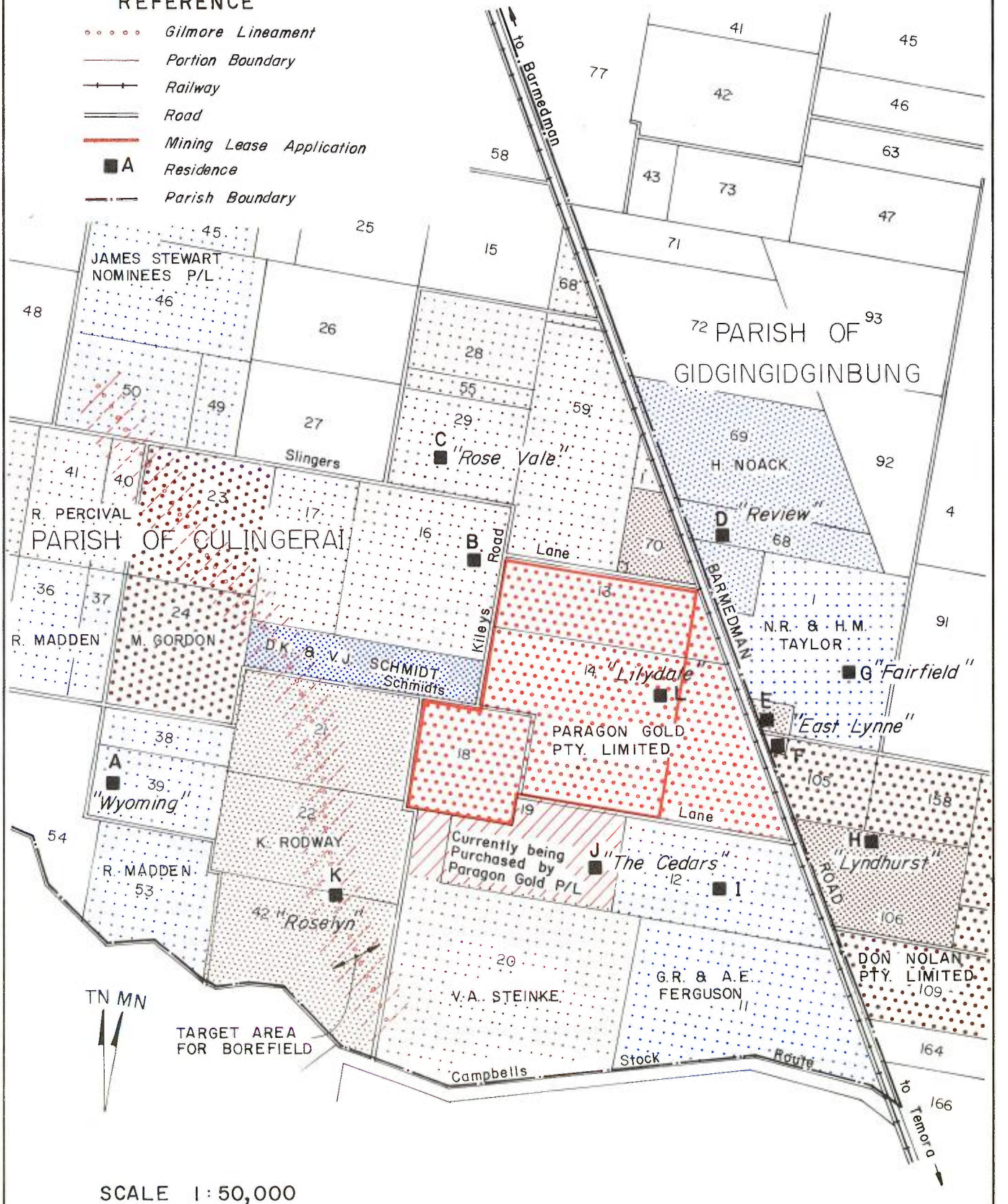

Figure 3.5
LAND OWNERSHIP

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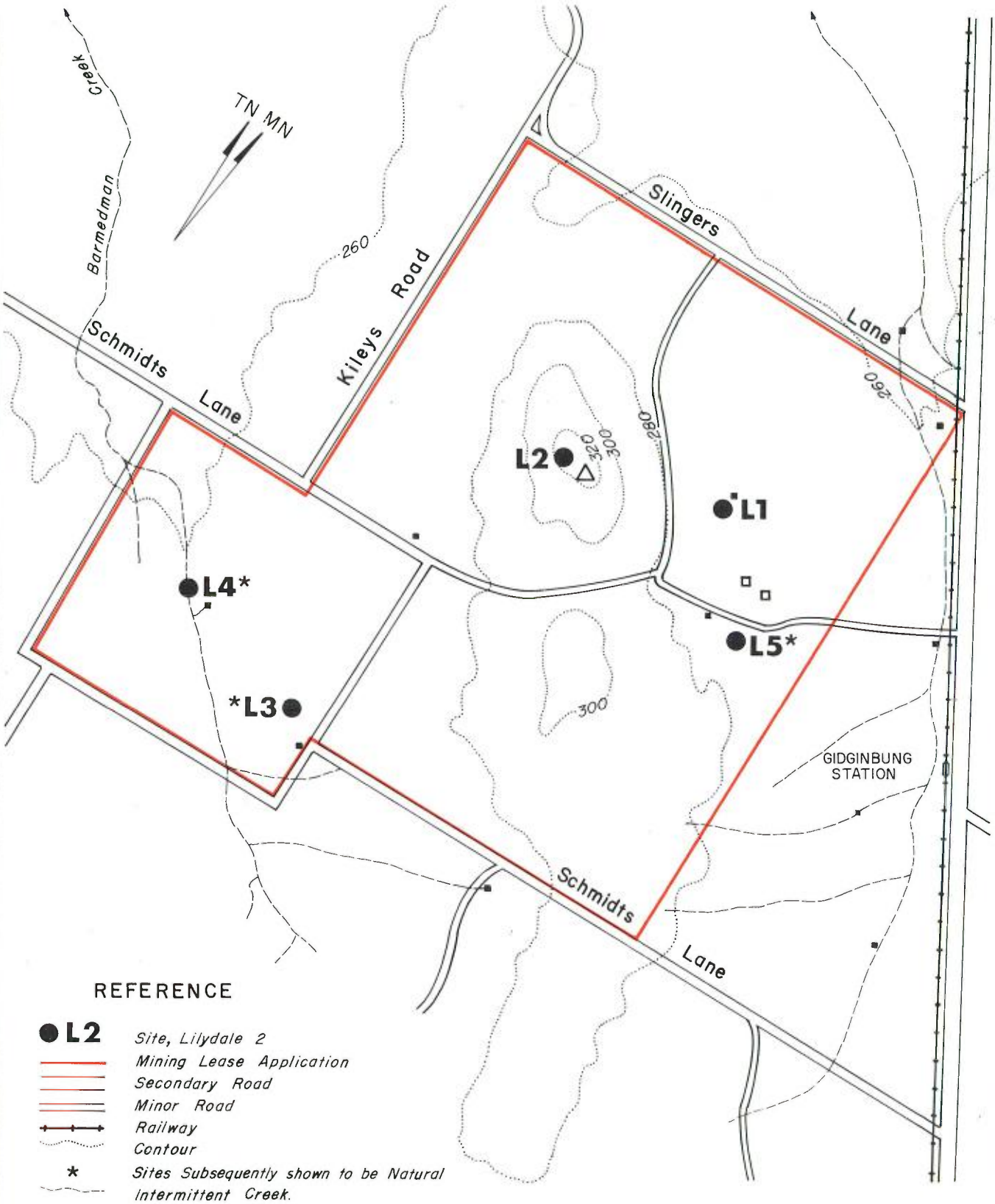

REFERENCE

- ● L2 — Site, Lilydale 2
- Mining Lease Application
- Secondary Road
- Minor Road
- Railway
- Contour
- * — Sites Subsequently shown to be Natural
- Intermittent Creek.
- ▪ Dam
- □ Homestead
- △ Trig Point

SCALE

250 0 250 500 750m

Contour Interval = 20 m

Figure 3.6
ARCHAEOLOGICAL SITES

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TABLE 3.8

ARCHAEOLOGICAL SITES ON MLA 42

Reference No.	Site Content	Comments
Lilydale 1	A total of 9 artefacts (flaked and flaked pieces) were found,7 being in one cluster and most being made of chalcedonic silica. Three locations of baked clay were exposed by sheet and gully erosion. Nearby was a scarred tree of uncertain Aboriginal origin.	National Parks and Wildlife Service does not require salvage of artefacts, and recording of baked clay locations and of scarred tree is sufficient for N.P.& W.S. Wiradjuri Regional Aboriginal Land Council requests preservation of the site perhaps by a levee.
Lilydale 2	A total of 11 artefacts (cores, flakes and flaked pieces), mostly made from chalcedonic silica.	N.P.& W.S. does not require salvage.
Lilydale 3	Lumps of baked clay lying on the surface, disturbed by ploughing.	Recording is sufficient for N.P.& W.S.
Lilydale 4	3 baked clay locations on the banks of Barmedman Creek, all disturbed by erosion.	Recording is sufficient for N.P.& W.S.
Lilydale 5	Scarred Ironbark tree. Aboriginal origin not certain.	Recording is sufficient for N.P.& W.S.

Brayshaw and Associates (1986) recommend that if any of the sites need to be disturbed, consent to destroy the sites would be required from the National Parks and Wildlife Service. If Lilydale 1 is to be disturbed the Wiradjury Regional Aboriginal Land Council, in whose territory MLA 42 occurs, should be consulted; they have suggested the construction of a levee to protect the site from further erosion.

The National Parks and Wildlife Service have recently evaluated the reports of Brayshaw and Associates (1986) and the Wiradjuri Regional Aboriginal Land Council and found that only the scatters of stone artefacts are of aboriginal origin. That is, sites L3, L4 and L5 are not archaeological sites. Details of their evaluation is presented in Appendix 5.

3.13 SOCIO-ECONOMIC FACTORS

3.13.1 Introduction

MLA 42 lies in a rural area close to mid way between the towns of Temora and Barmedman. Wagga Wagga is the closest regional centre to the site. The socio-economic data presented has been drawn from data collected in the 1981 census and where possible updated from Local or State Government sources.

Temora is a prosperous rural service town offering a wide range of services such as:

Education:
- Temora West Primary (Approximately 160 pupils)
- Temora Primary/Infants (Approximately 400 pupils)
- St. Anne's Central School (to Year 10) (Approximately 270 pupils)
- Temora High School (Approx. 450 pupils)

(Source: Department of Education - Temora).

Medical: 15 bed hospital/pathology service
Doctors/Dentists

Service Clubs: Rotary, Apex, Lions, Rotaract, Jaycees, View Club.

Sporting: Boating, Golf, Bowls, Squash, Swimming, Tennis, Table Tennis, Greyhounds, Night Trotting, Motor Racing, Basketball, Cricket, Football, Rifle and Pistol Shooting.

Barmedman is a small relatively depressed rural town that has declined in local importance over many years. It offers only a few services to local residents, such services being:

Education: Barmedman Primary School

Sporting: Swimming Pool, Basketball Courts, Bowls.

3.13.2 Population

Table 3.9 lists the populations of Temora, Barmedman and three rural areas around Gidginbung. Temora and Barmedman have a population of approximately 4,350 and 220 respectively. The three rural areas surrounding Gidginbung have a population equivalent to approximately 1 per 1.4 km^2.

Recent demographic studies by the Department of Education have shown that the population in Temora and its immediate hinterland is gradually declining. Since 1971, the population has decreased by eight per cent.

Table 3.10 lists the age distribution of the populations referred to above. In comparison with State averages, there are significantly more elderly persons and children less than 10 years of age in the Temora district. There are invariably fewer males and females in the 20 to 30 year age group.

TABLE 3.9

POPULATION, EMPLOYMENT AND HOUSING

TEMORA DISTRICT - JUNE, 1981.

Locality (Collector's District)	Average Distance from mine (km)		POPULATION Male	Female	Total	HOUSING Private Dwellings Occupied	Unoccupied
		T	2123	2227	4350		
Temora	15	E	1048	558	1606	1465	142
		U	63	48	111		
		T	106	117	223		
Barmedman	20	E	43	28	71	87	3
		U	12	6	18		
		T	124	111	235		
111204	10	E	63	38	101	65	24
		U	8	2	10		
		T	124	128	252		
111205	10	E	82	41	123	67	2
		U	4	9	13		
		T	142	147	289		
111207	15	E	91	62	153	80	17
		U	6	4	10		

Source: 1981 Census

T = Total number

E = Number employed

U = Number Unemployed

TABLE 3.10

AGE - BY POPULATION - TEMORA DISTRICT - JUNE, 1981

Age (Yrs)	Temora		Barmedman		111204		111205		111207	
	M	F	M	F	M	F	M	F	M	F
0- 4	161	158	8	6	8	16	12	10	11	19
5- 9	231	206	4	14	11	8	9	15	13	18
10-14	196	172	8	10	16	15	11	25	10	11
15-19	171	175	7	6	20	11	16	16	9	18
20-24	157	166	7	10	7	5	12	8	15	11
25-29	125	136	10	7	9	11	8	6	13	12
30-34	165	136	7	7	8	7	5	5	14	9
35-39	130	111	5	4	9	6	6	5	7	6
40-44	109	110	5	4	4	9	8	8	6	8
45-49	108	104	7	6	5	4	10	11	9	16
50-54	107	109	7	5	9	5	9	4	20	5
55-59	84	107	8	9	7	5	9	3	2	5
60-64	96	105	7	6	4	4	5	8	5	2
65-69	87	136	6	9	4	3	3	0	4	3
70-74	86	108	6	6	0	0	2	2	0	0
75+	110	188	5	10	2	0	0	3	3	2
Totals	2123	2227	107	119	123	109	125	129	141	145

Source: 1981 Census

3.13.3 Employment and Services

Employment and unemployment levels in the Temora district are presented in Table 3.8, however, local statistics from the Commonwealth Employment Service show that currently approximately 480 persons are registered as unemployed in the Temora/Ariah Park/Barmedman district. A number of those registered have skills such as equipment/plant operators and other skills that could be used by the Company.

Table 3.11 lists the percentage of persons employed in each industry. The rural areas are naturally dominated by workers involved in agriculture and conversely have fewer professionals, administrators, clerical workers, sales workers and tradesmen.

TABLE 3.11
EMPLOYMENT - BY INDUSTRY - % OF TOTAL EMPLOYED
TEMORA DISTRICT - JUNE, 1981

Employment Category	Temora	Barmedman	111204	111205	111207
Professionals (Dr,teachers etc)	12.5	5.4	1.9	0.0	9.4
Administration	4.8	4.1	0.0	0.0	0.0
Clerical Workers	13.6	12.2	2.8	2.5	5.4
Sales Workers	11.0	6.8	5.7	1.6	4.0
Agriculture	7.7	28.4	73.6	76.2	66.4
Mining, Quarrying	0.0	0.0	0.0	0.0	0.0
Transport	8.1	5.4	1.9	3.3	1.3
Tradesmen, labourers and process workers	25.2	17.6	6.6	7.4	4.0
Service	11.9	12.2	1.9	1.6	3.4
Not known	5.2	8.1	5.7	7.4	6.0

Source: 1981 Census

3.13.4 Housing

Table 3.9 shows there is a considerable quantity of unoccupied housing in the Temora district although such statistics do not necessarily indicate whether the dwellings are habitable. The Company's enquiries in the Temora district have shown that approximately 55 homes are for sale in Temora and that between 3 to 5 homes are available for rent. Further rental properties are available between Temora and Barmedman.

3.14 VISUAL ASPECTS

The bulk of the development associated with the project will be located on the western side of the central ridge in an area visually shielded from the Barmedman Road and properties to the east of Gidginbung. The western side of the ridge and the site of the tailings dam will be visible to motorists travelling along Schmidts, Kileys and Slingers Lanes, and local residents, particularly those in residences B and J.

3.15 TRANSPORTATION NETWORK

3.15.1 Road Network

The roads in the vicinity of MLA 42 are:

Barmedman Road (Trunk Road 57) - a sealed road 5.6 m wide in average condition. 1982 DMR records show the average daily traffic movements along this road 6.5 km north of Temora was 1100 compared to 920 in 1978. Current estimated average daily traffic movements at this point are approximately 1250. Closer to Temora, average daily traffic movement along Barmedman Road are estimated to be approximately 1400.

Schmidts Lane - is a gravel road approximately 8 m wide with an open railway crossing close to its intersection with Barmedman Road. This road services properties up to 8 km west of Barmedman Road. In July, 1984, Temora Shire Council recorded a total of 171 and 65 vehicles at the eastern and western ends of Schmidts Lane over a five day period. The excess at the eastern end near the railway crossing reflected the activities of the Company during their exploration phase at Gidginbung.

Kileys Lane is a gravel road approximately 5 m wide that joins Schmidts Lane and Slingers Lane adjacent to the western boundary of MLA 42. It is narrower than surrounding roads and in need of repair.

Slingers Lane is a gravel road 8 m wide with an open railway crossing close to its intersection with Barmedman Road. A concrete culvert ford also occurs on the lane close to the railway crossing. Council recorded a total of 28 vehicles using this lane over a five day period in July, 1984.

3.15.2 Rail Network

The State Rail Authority maintains the Lake Cargellico - Cootamundra railway line which is located immediately east of MLA 42. A single track on wooden sleepers is maintained in the vicinity of Gidginbung. A 400 m side track is provided for trains collecting grain from the Gidginbung silo.

The State Rail Authority have discontinued passenger services on the line, however, up to 4 to 5 goods train services are scheduled daily principally to transport grain to the seaboard.

3.16 SERVICES

3.16.1 Power

The Northern Riverina County Council is reponsible for the reticulation of power in the Temora-Barmedman area. Figure 3.7 shows the existing power lines in the vicinity of MLA 42.

The County Council maintains two main power lines in the vicinity of Gidginbung.

(i) A 66,000 volt line is located 1.6 km east of the Barmedman Road. This is a major supply line running between Temora and West Wyalong;

(ii) An 11,000 volt line follows the Barmedman Road immediately east of MLA 42.

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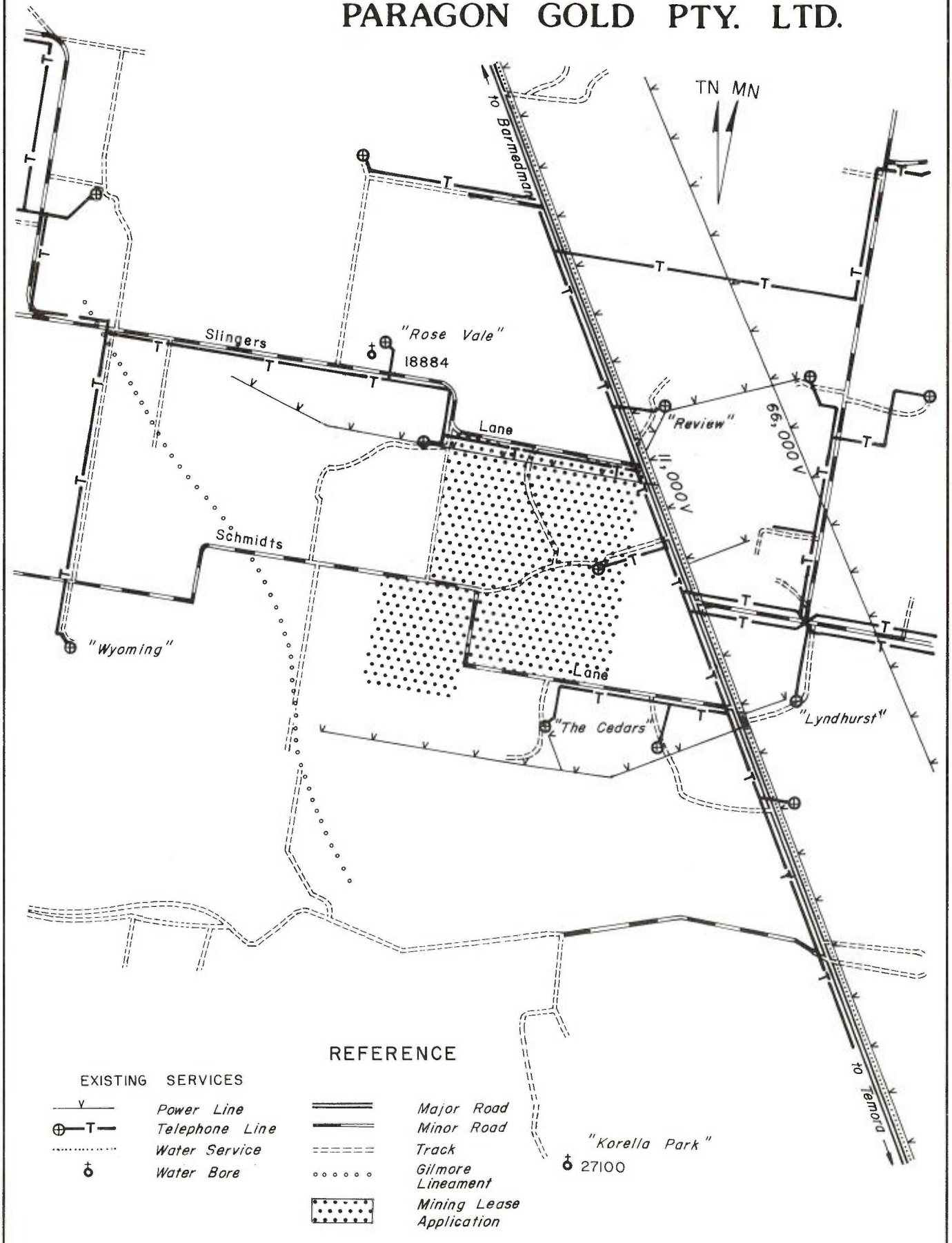

REFERENCE

EXISTING SERVICES

- Power Line
- Telephone Line
- Water Service
- Water Bore
- Major Road
- Minor Road
- Track
- Gilmore Lineament
- Mining Lease Application

SCALE 1:50,000

0·5 0 0·5 1·0 1·5 2 km

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Figure 3.7
SERVICES

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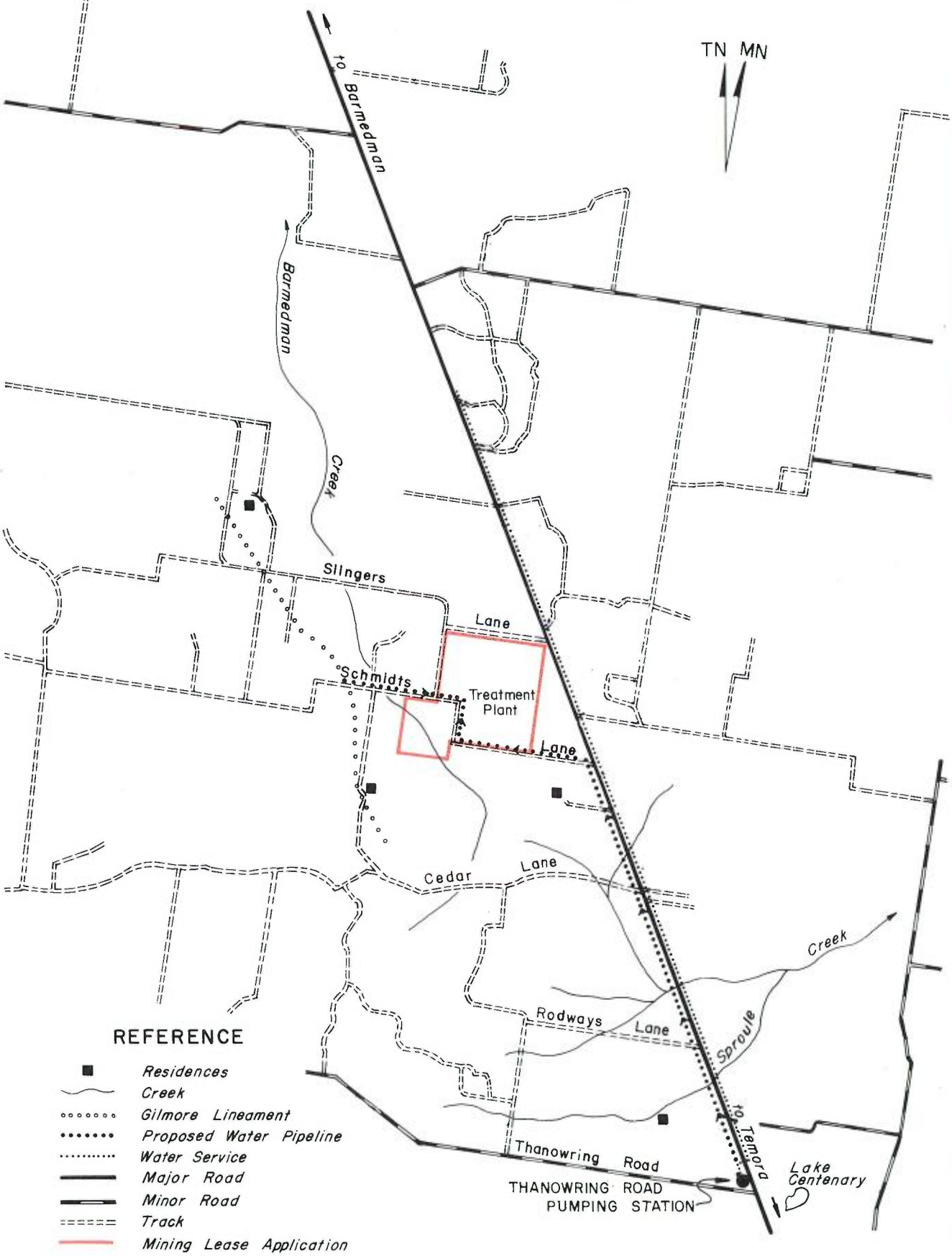

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Figure 3.8
WATER PIPELINE

3.16.2 Water

The Northern Riverina County Council (NRCC) is also responsible for the reticulation of water within the Temora area. The County Council obtains all its water supplies from the Murrumbidgee River, 85 km south of Temora. There are no available reticulated water services in close proximity to MLA 42. A 300 mm pipeline servicing Barmedman, West Wyalong and Ungarie is located adjacent to the Barmedman Road. This pipeline is maintained by the Public Works Department.

The NRCC has advised the Company that insufficient water is available within the above line to satisfy their continued water requirements. The closest point to MLA 42 where significant water could be obtained for the Company's mining operation is the Thanowringa Road Pumping Station (see Figure 3.8). The Public Works Department advise that there is insufficient capacity for approximately two months of each year (during summer) to supply the Company's requirements from this source.

Local residents utilise tank supplies, natural runoff or water from the NRCC for their water supplies (see Figure 3.7).

3.16.3 Telephone

Telecom provides telephone services to all local residences (see Figure 3.7). All services are underground. Telecom advises that there is adequate capacity in the line network for provision of telephones and telex facilities for the mining operation.

SECTION 4

DESIGN AND OPERATIONAL STANDARDS

SECTION 4

DESIGN AND OPERATIONAL SAFEGUARDS

4.1 AIR POLLUTION CONTROLS

4.1.1 Nature of Contaminants

The principal potential air contaminant that could be generated by the project will be dust arising from construction activities, vehicle movements, drilling and blasting, soil stripping, crushing, and the tailings dam.

Other potential sources of air pollution would be:

(i) exhaust emmissions from diesel and petrol driven equipment and motors;

(ii) fumes from blasting;

(iii) burning off pushed timber;

(iv) small quantities of chemical emissions.

4.1.2 Dust Control Measures

The measures to be adopted to limit the dispersal of dust are as follows:

Construction Activities

The pushing of topsoil and excavations to create areas for plant construction will generate limited dust. Areas affected will be small, however, if considered necessary, areas will be watered before the activity commences.

Vehicle Movements

Dust generated by vehicle movements on Schmidts Lane and on the site will be controlled principally by the regular maintenance of the road surface with gravel crushed on the project site.

On-site haul roads will be regularly watered to ensure dust levels are minimised. Areas such as the pad approaching the crusher will receive particular attention.

Drilling and Blasting

The air track drills will be fitted with dust collectors. Standard blasting practice will ensure dust is kept to a minimum.

Soil Stripping

Soil stripping will be undertaken progressively ahead of the construction of the tailings dam, waste dump and low grade ore stockpile. This progressive approach will ensure too much area is not disturbed at any one time. Where appropriate, watering will be undertaken prior to soil removal.

Crushing and Grinding

The treatment plant will incorporate a dust collection system and wet dust scrubbing facilities. The rock will remain wet throughout the remaining processes. Dust will be collected at the following points:

(i) crusher discharge;
(ii) conveyor load points;
(iii) screens (Note: the screens will be enclosed with rubber hoods).

Dust slurry will be pumped to the plant discharge sump. Dust collection at the head of the fine ore bin will be by means of a dry insertable type dust collector with reverse pulse air cleaning of the filter media.

Tailings Dam

Once the tailings dams have dried out sufficiently to allow vehicles to travel on the dam surface, then the soil spreading and vegetation programme will be commenced. This will consequently limit the time the tailings are exposed to the elements.

4.1.3 Control Measures for Other Potential Air Contaminants

Exhaust Emissions

The earthmoving equipment and on-site vehicles will be fitted with appropriate exhaust controls. The Company will ensure that equipment used on site by themselves and by its contractors will be properly maintained to ensure that no unacceptable exhaust emissions are emitted.

All earthmoving vehicles exhausts will be directed upwards or sideways so as not to impinge on the ground.

Blasting Fumes

The fumes liberated by blasting will be quietly dispersed into the local atmosphere without any hazardous levels extending beyond the open cut. Hence, no safeguards are necessary.

Burning Off

After all usable timber/firewood is obtained, the remaining timber will be burnt as soon as possible to ensure the natural sap assists in burning. This burning off will be undertaken during a period allowable and under suitable atmospheric conditions. This safeguard will ensure that minimal smoke is generated.

Chemicals

Odours from chemicals used in the plant such as sodium cyanide(NaCN) and sodium hydroxide (NaOH) may be detectable from time to time in close proximity of the plant.

Sodium cyanide doesn't have an odour, however, when it comes into contact with water, (e.g. rainfall/high humidity), hydrogen cyanide (HCN) is formed which does have an odour that resembles "bitter almonds". The principal safeguard proposed by the Company to eliminate this odour is to ensure that stores of sodium cyanide are kept dry and away from the atmosphere in secured premises.

During the gold stripping operation, minute quantities of ammonia are evolved which will be dissipated by installation of an exhaust fan above the electrolytic cell.

No other chemicals used will produce odours.

4.2 WATER POLLUTION CONTROLS

4.2.1 Potential Sources of Water Pollution

The principal potential water pollution controls are:

(i) Mine water collected in the open cut after rainfall;

(ii) Surface runoff from the waste rock dump and low grade ore stockpile;

(iii) Surface runoff from the tailings dam;

(iv) Subsurface seepage from the tailings dam into Barmedman Creek;

(v) Spillage of chemicals and fuel from the plant;

(vi) Site runoff.

4.2.2 Water Pollution Control Measures

Mine Water

Any rainwater or groundwater seepages into the open cut will be pumped directly from the open cut to the process water system.

Surface Runoff on the Project Site

A network of drains shown on Figure 4.1 will be used to collect all surface runoff close to site boundary. These drains will collect water from the waste rock dump, low grade ore stockpile, and around the treatment plant. The drains will direct the runoff to the dams shown on Figure 4.1, from which the water will be pumped to the tailings dam.

The drains will have a trapezoidal cross-section and will be progressively extended as the waste rock dump and low grade ore stockpile are extended.

The drainage network will be designed to ensure no surface water escapes from the site. Detailed plans of the drainage network will be forwarded to the State Pollution Control Commission for approval before they are installed.

Tailings Dam

Surface runoff from the walls of the tailings dam will be collected in a drain constructed close to the base of the slope. These drains will also be directed to a sump that will be pumped back to the tailings dam.

The tailings dam will be designed to ensure that there is adequate capacity for all surface water from the site to be stored without causing overtopping.

The tailings dams have been located in an area where they are underlain by 10 to 12 m of clay. The proposed construction method involving the "keying in" of the tailings dam into the underlying clay will ensure that no water from the tailings dam enters Barmedman Creek through groundwater seepage.

Barmedman Creek Diversion

The construction of part of the tailings dam across the course of Barmedman Creek will necessitate the construction of a new "channel" for the creek. The channel will be excavated in the position shown on Figure 4.1. It will be designed to ensure its long term stability and effectiveness to carry the water carried in the creek after rain. The new channel will have the same bankfull discharge capacity as the existing watercourse. The creek diversion will be licenced by the Water Resources Commission.

4.3 SOIL EROSION CONTROLS

The Company is conscious of the need to conserve the soil resources on site to assist in the long term rehabilitation of the site. The main features of the Company's soil conservation programme will be:

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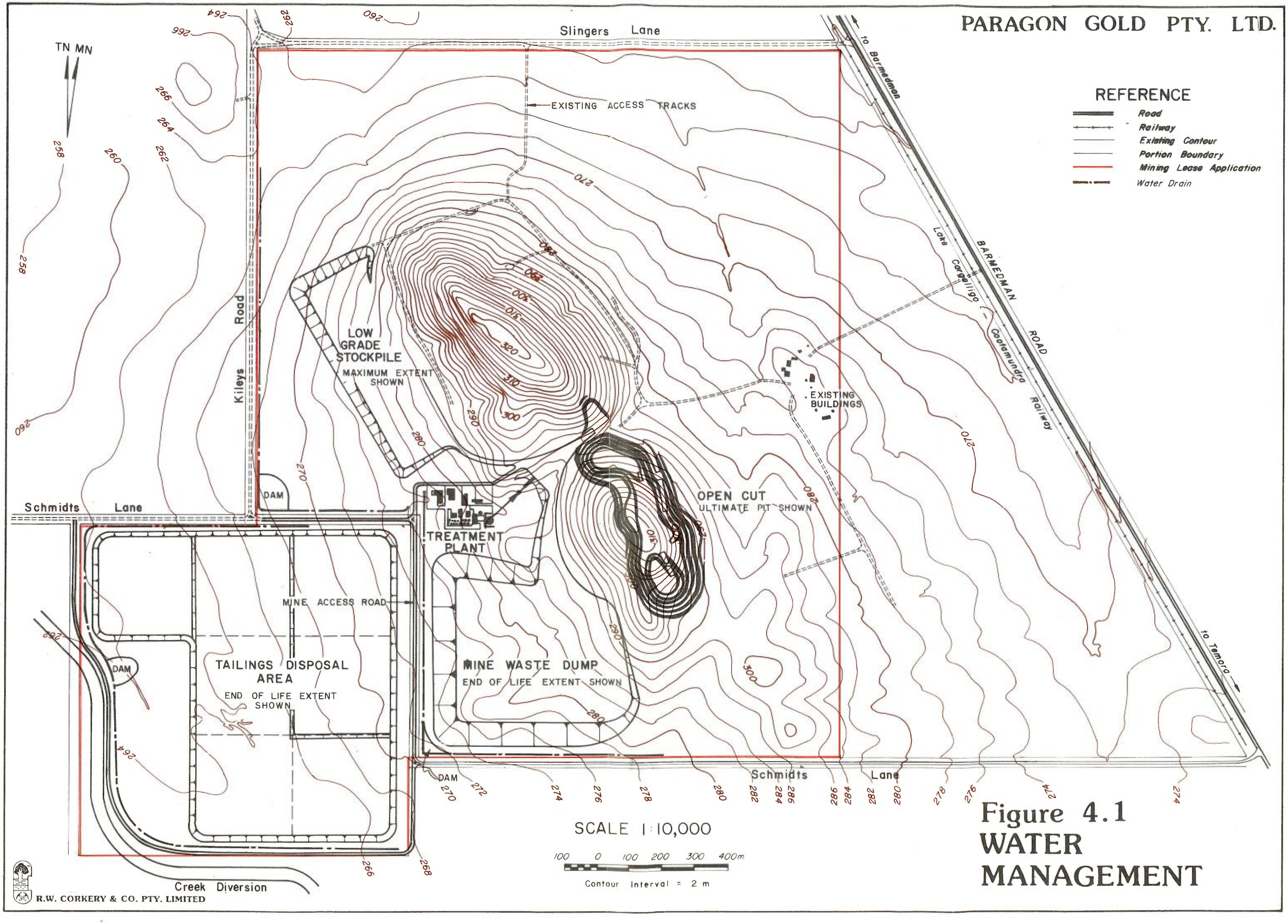

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Figure 4.1
WATER MANAGEMENT

(i) All soil in areas to be disturbed will be removed and placed in pre-determined areas. It is proposed to remove the topsoil (A horizon) and approximately 150 mm of the clayey B horizon.

(ii) The removed topsoil and subsoil will be placed in stockpiles less than 1.0 m and 3.0 m in height respectively. Those stockpiles to be retained for periods in excess of three months will be seeded (if necessary) to stabilize the soil mounds;

(iii) The existing drainage controls on the lower slopes of the central ridge will be retained to direct runoff around disturbed areas;

(iv) The progressive re-vegetation programme on the tailings dam, and waste rock dump will assist in natural slope stabilisation. It is noted that progressive re-vegetation of the low grade ore stockpile will not be undertaken as the soil would cause problems in the C.I.P. plant if and when the ore is treated;

(v) The Company proposes to work closely with the local office of the Soil Conservation Service to ensure that the controls are adequate.

4.4 CONTROLS ON BLASTING

The controls to be placed on the blasting within the open cut are required to ensure that:

(i) The generation of dust and fly rock is minimised.

(ii) Ground vibration from blasting is limited to acceptable levels and hence avoid any problems with the Company's treatment plant and nearby residents.

(iii) Noise levels at nearby residences are within acceptable limits.

The above factors will be overcome through proper mine planning and correct blasting practice.

The following safeguards will be incorporated into the Company's blasting practice:

(i) Adequate stemming of the drill holes will ensure the airblast is reduced to an acceptable level.

(ii) The detonating system will be adequately confined either within the hole or covered with waste materials prior to blasting.

(iii) Cracks and fissures in the rock face will be avoided so that the burden on the material to be fragmented will be even. Consequently, premature fragmentation will be avoided. The amount of explosives in each hole will be adjusted to account for the natural jointing and hence avoid over-charging.

(iv) The type of explosive will be selected to suit the rock to be fragmented.

(v) Ground vibration will be kept within the specified limits by:

(a) keeping the material to be blasted to a suitable volume by adjusting the distance between the blast holes and the face.

(b) Care will be taken in the spacing of the blast holes.

(vi) A test blast will be carried out using the above safeguards to check fragmentation and re-evaluate site constants. The airblast overpressure and ground vibration will be monitored to ensure that the specified limits discussed in Section 5.9 are not exceeded and to assist in the design of future blasting.

(vii) Blasting will be undertaken two or three times weekly primarily to ensure ground vibration is minimised. Nearby residents will be advised of the proposed regular time of blasting.

(viii) Blasting will only be undertaken during acceptable meteorological conditions.

The Company proposes that inspections be made of the nearby residences be made prior to any blasting to establish their existing structural condition.

Once development consent is granted, the Company will need to provide the State Pollution Control Commission with details of its blasting practice when approval is sought under Section 27 of the Noise Control Act.

4.5 NOISE CONTROLS

4.5.1 Site Preparation

Site preparation will involve the use of a range of earthmoving equipment, principally a D9 bulldozer, scraper and grader. All this equipment will be fitted with standard exhaust mufflers. Other vehicles periodically present on the site will include cranes, low loaders and concrete trucks.

Normal construction noise e.g. hammering, will occur primarily between the hours of 7.00 am and 10.00 pm daily.

TABLE 4.1

SOURCES OF NOISE - OPEN CUT AND TREATMENT PLANT

NOISE SOURCE	PROPOSED SAFEGUARDS	NOISE LEVEL (dB(A) at 7 m)	SOURCE OF NOISE LEVEL
OPEN CUT			
Compressor	Silenced model	75	Atlas Copco Aust. Pty. Ltd.
Track drill	Specially designed hood, shield & hoses	90	Atlas Copco Aust. Pty. Ltd.
D-9 Bulldozer	Standard Muffler	87	R.W. Corkery & Co.
Dump Truck	Standard Muffler	85	Blackwood Hodge (Aust. Pty. Ltd.)
Front-end Loader	Standard Muffler	88	Waugh and Josephsons
TREATMENT PLANT			
Primary Crusher	Partially enclosed	97	Eden Dynamics Pty Ltd.
Secondary Crusher	Partially enclosed	85	Dept. of Mineral Resources
Ball Mill	Rubber Lined	85	Dunlop International

4.5.2 Open Cut

The main sources of noise during mining will be equipment preparing the site, drilling, blasting and loading/transportation of rock.

Table 4.1 lists the equipment likely to be used in the quarrying operation, the proposed safeguards and measured spectator noise levels. Since the Company proposes to engage a contractor to undertake the mining on their behalf, they will stipulate in any contract that all equipment will be fitted with appropriate safeguards such as mufflers and engine cowling to ensure the requirements of the State Pollution Control Commission are satisfied.

4.5.3 Treatment Plant

The dominant source of noise between the hours of 7.00 am and 10.00 pm from the processing plant will be the crushers. At night between the hours of 10.00 pm and 7.00 am the main noise source at the plant will be the ball mill.

Table 4.1 also lists the noise sources in the treatment plant, the proposed safeguards, and measured spectator noise levels. In addition to those safeguards set out in Table 4.1, the Company has planned its crusher layout to enable the primary crusher to be "keyed into" the side of the ridge, hence increasing its sound protection.

Few additional safeguards could be undertaken around the processing plant to limit noise generation.

4.6 VISUAL CONTROLS

The Company's principal concern in the placement of the treatment plant, stockpiles, dumps and tailings dams was their visibility from the Barmedman Road. Other more local controls proposed are:

(i) Tree planting on the eastern boundary of the open cut (see Figure 2.2);

(ii) Progressive rehabilitation of the tailings dam and rock waste dump;

(iii) All buildings will be painted in a green hue;

(iv) The site will be kept tidy at all times.

4.7 SAFEGUARDS FOR INSTALLATION OF SERVICES

4.7.1 Water

The water pipeline from the Thanowring Road Pumping Station will be installed with the following safeguards:

(i) The exact location of the pipeline route will be discussed with landholders prior to its installation to ensure least inconvenience is caused and that all local factors are fully understood.

(ii) All fences will be repaired/replaced at the conclusion of the installation of the pipeline.

(iii) All soil and subsoil disturbed during the installation of the pipeline will be replaced and if necessary, seeded and fertilised.

(iv) Special care will be taken to ensure the creek crossings are not degraded. Where appropriate, stone armouring will be undertaken.

(v) Any agricultural improvements such as contour banks will be re-instated once the pipeline is installed.

(vi) The pipeline route will be inspected periodically after installation to ensure the pipeline has not caused any problems with the land it crosses, or nearby land.

If a borefield is developed to the west of MLA 42, the safeguards outlined above will also be implemented for the installation of the bores, connecting pipeline and the pipeline to the treatment plant. The power line required for the borefield will be installed along the route of the pipelines to ensure any disturbance is minimised.

Once the exact location of the borefield and the pipelines is determined, the Company will lodge a Mining Purposes Lease Application for approval to install the borefield. The above safeguards and any other requirements of landowners could be incorporated either within an agreement with landowners or as conditions of the Mining Purposes Lease.

4.7.2 Power

The 66,000 V power line to the treatment plant will be installed following discussions with landowners to finalise a route and the location of poles. The safeguards to be incorporated throughout the installation of the power line will include:

(i) All surplus rock/soil excavated from pole holes will be removed and the final surface around each pole prepared to ensure the soil resources are not degraded;

(ii) The power line will be positioned to ensure no trees need to be removed or lopped;

(iii) The power line will be installed at a sufficient height to ensure no problems occur with vehicles or trains passing beneath the line.

4.7.3 Telephone

The additional linework for the installation of telephone services will involve a line being placed beneath the surface on the Company's property. Topsoil will be replaced over the trench after the line is installed. The location of the line will be properly marked.

SECTION 5

THE PROJECT'S IMPACT ON THE ENVIRONMENT

SECTION 5

THE PROJECT'S IMPACT ON THE ENVIRONMENT

5.1 TOPOGRAPHY

The main changes to the existing topography on MLA 42 that will remain after the completion of the Temora Gold Project will be:

(i) A void up to 80 m deep will be left at the completion of mining. This will be in contrast to the original hill on the site. The removal of the southern hill will result in approximately one third of the overall ridge at Gidginbung being removed. The higher end of the ridge on which Gidginbung Trig. Station is located will remain, hence the overall impact on the local topography will be minor.

(ii) The waste rock dump and tailings dam will remain in their positions shown on Figure 2.2. Their occurrence will be a noticeable change in the local topography principally due to their 1:3 (Vert:Hor) batter slopes on the edges. Their upper surfaces will, however, be flat and have a similar appearance to the original topography.

(iii) If the low grade ore is not treated through the plant, the stockpile will be similarly noticeable as the waste rock dump and tailings dump. No impact would result if the entire low grade ore is treated since the stockpile would be removed and the original topography re-instated.

(iv) Local changes around the site of the treatment plant site would remain. The impact of these changes would be minor.

5.2 DRAINAGE

The principal impacts of the project on the local drainage system are:

(i) The diversion of Barmedman Creek around the tailings dam. This diversion will have no impact on the drainage of water upslope of the site nor along its grade.

(ii) Runoff from within the vicinity of the open cut and treatment plant will be collected and utilised on site. The impact of this reduction in runoff will be minor. Only one dam in the proximity of the western boundary is likely to suffer any significant reduction of inflow and if necessary the Company could provide the landowner with replacement water.

(iii) The long term impact of the drainage controls will be negligible since those drains and dams not required for the pastoral use of the land will be removed at the completion of the project.

5.3 WATER RESOURCES

5.3.1 Surface Water

The project will only have a minor impact on the supply of surface water as outlined in Section 5.2. As a result of the water pollution control measures retaining water on site, lower stream flows immediately adjacent to the site could be expected.

The project will not adversely affect the quality of water flowing in Barmedman Creek. The proposal to retain all water on site will ensure that no contaminated water is released into nearby watercourses. The Company will continue monitoring the quality of water in local streams at a number of the sites discussed in Section 3.6.1.

5.3.2. Subsurface Water

The Company's proposed pumping programme will be the first major pumping programme in the district as the water is too saline for any agricultural use. The pumping programme will create local cones of depression in the vicinity of each bore, however, the testing programme undertaken by Groundwater Resource Consultants to date has shown that adequate recharge could be expected.

The Company's pumping programme will have no impact on the two bores within 5 km of MLA 42 since the bores are not used and are geologically not directly connected to the fracture system in which the borefield is proposed.

The design of the tailings dams and their location above 10 to 12 m of clay will ensure that no seepage from the dam enters the subsurface. Hence, there will be no impact on the subsurface water supplies or quality.

5.4 SOILS

The design and operational safeguards outlined in Section 4.3 will ensure the soil resources on the site are properly removed, stored and replaced. The Company's desire to maintain all soil on site in good condition throughout the project will result in a negligible impact on the soil resources.

Furthermore, the Company's commitment to the soil conservation programme on "Lilydale" will ensure the soil resource on all their land is retained.

5.5 AIR QUALITY

The safeguards outlined in Section 4.1 will ensure the dust levels in the vicinity of MLA 42 will not increase significantly beyond the levels discussed in Section 3.10. Dust levels at all residences will not exceed 4 g/m^2/month unless local agricultural activities cause increases.

Dust may be noticeable on the site during soil stripping, however, its duration and impact is similar to ploughing/scarifying which is a common feature in the Temora District.

The measures also outlined in Section 4.1 for the control of potential air pollutants other than dust should ensure the impact from these sources is negligible.

5.6 FLORA

The Company's mining operation will result in the removal of the bulk of the scrubland present on the southern hill. Parts of the woodland and modified woodland on the fringes of the hill will also be removed. The impact of the reduction of these vegetation communities will be minor since significant occurrences of the same communities are found on the northern hill.

The Company will endeavour to retain the large grasstrees present on the southern side of the northern hill (see Figure 3.4).

The construction of the tailings dams will result in the removal of a number of yellow and grey box trees along Barmedman Creek. The Company will seek approval through the local office of the Soil Conservation Service to remove the trees in this area since Barmedman Creek is a prescribed stream under Section 26D of the Water Act. The Company will, however, retain similar trees along the access road to the mine.

The re-vegetation programme on the surface of the tailings dam will incorporate tree planting, principally to generate a tree lot on the site. A selection of local eucalypts including yellow and grey box will be planted on the tailings dam surface. The effectiveness of the tree planting programme will be enhanced by the early use of trial plots.

The features of special interest on the northern hill will not be affected by the Company's project.

5.7 FAUNA

The reduction of trees on the southern hill and the frequent noise will result in many of the birds that currently frequent the southern hill re-locating to the northern hill. The removal of the trees will also reduce the available habitat of the mammals observed on site. The long-term impact on the site's flora is, however, considered minor.

5.8 NOISE LEVELS

5.8.1 Introduction

The impact of the noise levels generated by the project has been assessed in conjunction with Eden Dynamics Pty Ltd., Acoustical Consultants of Sydney. The criteria used for assessment are based on criteria issued by the State Pollution Control Commission.

5.8.2 Criteria for Noise Assessment

Table 5.1 presents the criteria accepted and used by the State Pollution Control Commission to assess noise impact.

5.8.3 Predicted Noise Levels

The predicted noise levels have been prepared from information on the noise levels of each item of equipment and the measured attenuation rates from the site to the surrounding residences (see Section 3.9). Table 5.2 lists the predicted noise levels at residences within 3 km of the project site.

TABLE 5.1

CRITERIA USED TO ASSESS NOISE IMPACT

Period	Maximum Sound Pressure Level Measured at Residence* dB(A) Maximum	Noise Source
Daytime (7.00am-10.00pm Monday-Friday) (7.00am-6.00pm on Saturdays)	45	Average noise of whole operation over a long period.
Nightime (10.00pm-7.00am Monday-Friday)	35	All noise sources
Other Times (6.00pm Saturday to 7.00am Monday)		

* That is, a residence not related to the project.
Source: S.P.C.C. Noise Control Manual.

It should be noted that the levels set in Table 5.1 are for persons outside their residence. Accordingly, if persons are inside their residence with windows open for ventilation, noise levels could be expected to be reduced by 5 to 10 dB(A). A reduction of more than 10 dB(A) could be expected if all windows and doors are closed. In this case, air conditioners can be used for ventilation purposes.

TABLE 5.2
PREDICTED NOISE LEVELS AT RESIDENCES SURROUNDING MLA 42

Residence	Open Cut			Treatment Plant		Dump Trucks	Closest Activity
	Year 1	Year 5	Year 10	7am-10pm	10pm-7am		
	dB(A)			dB(A)	dB(A)	dB(A)	
A - "Wyoming"	20	10	5	31	22	30	35 (TD)
C - "Rose Vale"	30	27	22	38	24	34	42 (LGOS)
D - "Review"	39	31	24	38	19	29	39 (OC)
E - "East Lynne"	43	35	28	38	24	32	43 (OC)
F - W. Wheare	43	35	28	38	24	32	43 (OC)
G - N. & H. Taylor	38	30	23	37	23	28	38 (OC)
H - "Lyndhurst"	37	27	22	32	18	28	37 (OC)
I - G. & A. Ferguson	40	30	25	37	23	40	40 (OC)
K - "Roselyn"	37	27	22	42	24	36	37 (TD)

OC Open Cut
TD Tailings Dam
LGOS Low Grade Ore Stockpile

Note: These levels may be increased or reduced by 5dB(A) depending on the wind directions or absence/presence of a temperature inversion.

The project will increase the background noise levels within 2 to 3 km of the site, that is, during periods when existing noise levels are low.

Site Preparation

Noise levels generated by earthmoving equipment will be attenuated to levels within the criteria set out in Table 5.1. These levels are experienced primarily during daylight hours and will consequently be inoffensive. The noise levels will be similar to those heard at nearby residences during ploughing/stripping operations.

Open Cut

Noise from the open cut will be noticeable especially during the first year of operation when the activities are undertaken without any shielding. After the first year's operation, the open cut benches will assist in noise reduction. During the first year, noise levels will exceed 35 dB(A) during the period when this maximum level applies. Hence, the impact during the first year's operation of the open cut will be significant. The impact will naturally decrease as the open cut develops downwards.

Waste Rock Removal

The removal of waste rock will be audible at most residences on still evenings between 10.00 pm and 7.00 am. Although just within the limits listed in Table 5.1, the noise levels will be up to 10 dB(A) higher than the background levels generated by the treatment plant.

Treatment Plant

The crushing plant will be audible during the day only when natural background levels are low. Its shielded location ensures the levels are kept as low as possible. It is likely of an evening as wind velocities and natural background levels drop, that between the hours of 7.00 pm and 10.00 pm, the noise from the crushing plant may become more noticeable.

During the night, the principal source of noise will be the rubber lined ball mill. This is a relatively quiet item of equipment and as shown in Table 5.2 will be barely audible on very still evenings.

5.8.4 Conclusion

The project will result in noticeable changes to the local noise climate. These changes will, however, be minor for much of the time since the wind will regularly raise local background levels around each residence. Greater impact will occur during still evenings in the first year of operation. The likely exceedance of the State Pollution Control Commission criteria of a Sunday is not considered as significant since the area is a typical rural area where activities also take place seven days per week.

5.9 BLASTING

5.9.1 Criteria for Assessment

Ground Vibration

Australian Standard 2187, Part 2 -1983- "Use of Explosives" recommends the peak particle velocity from a blast should not exceed 10 mm/sec at residences. The State Pollution Control Commission suggests limits lower than the Australian Standard at 5 mm/sec between the hours of 9.00 am and 3.00 pm (Monday to Saturday) and 2 mm/sec 6 am to 9.00 am and 3 pm to 8.00 pm (Monday to Saturday).

Outside of these hours (including public holidays) the limit set is 1 mm/sec.

The limits for ground vibration are set to ensure nearby residents are not alarmed by obvious movement of objects within their homes, or damage to their homes.

Noise Levels

The State Pollution Control Commission suggests limits of 115 dB linear or unweighted decibels (approximately 85 dB(A) for blast overpressure or peak sound level during the hours of 9.00 am to 3.00 pm Monday to Saturday. Lower levels are set outside these hours. For comparative purposes, 85 dB(A) is similar to the noise level heard by a person slamming a car door.

5.9.2 Assessment of Impact

The Company's preliminary assessment indicates that the ground vibration limits set out in Section 5.9.1 will not be exceeded at the surrounding residences or at the Gidginbung wheat silo. It is noteworthy that the blasting programme is also designed not to cause damage to the Company's treatment plant which is considerably closer to the open cut than the surrounding houses.

Residents within 3 km of the open cut could hear the blasting depending on prevailing winds. All local residents will be advised of the regular time of blasting to ensure there is no alarm caused.

5.10 LAND USE AND ADJACENT LANDOWNERS

5.10.1 Site's Land Use

The land use on the site will naturally change when the project is underway. The portion of MLA 42 on the eastern side of the central ridge that will not be used for the project will be farmed, most likely on a leasing arrangement with local landowners. The Company will endeavour to maintain the farm programme developed originally for "Lilydale" in those areas not affected by the project.

The Company intends to return as much of the property as possible to grazing at the completion of the project. The proposal to utilise the top of the waste rock dump and low grade ore stockpile as grazing areas will result in only limited areas (the tailings dam) not being useful for long term grazing purposes. The value of tree lots, however, has also been recognised and supported by the Department of Agriculture as an important component of a rural area.

5.10.2 Adjacent Land Uses

The Company's project will not adversely affect the use of the adjacent land for grazing and cropping. Stock may avoid areas adjoining the access road (Schmidts Lane) and other adjacent areas during the noisy periods of the day and during shift changeovers. However, they are likely to return to these areas for feeding during the quieter evening period.

5.10.3 Adjacent Landowners

The adjacent landowners will be aware of the project throughout its development and operation due to increased local traffic movements, increased noise and visibility to properties west of MLA 42.

The diversion of Schmidts Lane around MLA 42 should not cause landowners to the west any inconvenience in their travels along Schmidts Lane.

The impact of the increased noise levels for adjacent landowners will vary according to their proximity to the project site, the prevailing meteorological conditions and the more immediate noise sources around their homes. All residents within 3 km will notice an increase in the local background noise level, however, the level attained will not be excessive and will soon be recognisable as the normal background level.

Adjacent landowners to the west of MLA 42 will notice the activity as the site develops. The visual impact will gradually decrease as the disturbed areas and tailings dam and waste rock dump are grassed.

The project has been discussed with all adjacent landowners throughout the preparation of the Environmental Impact Statement and all comments and constructive suggestions are gratefully acknowledged. It is noteworthy that some adjacent landowners expressed interest in employment at the project site for themselves and their families.

The Company recognises the benefit of maintaining excellent relations with local landowners throughout the entire life of the project. Accordingly, they will ensure that all environmental problems are either minimised to acceptable levels or eliminated.

5.10.4 Landowners along the Borefield

If the borefield is installed, it will have negligible impact for the landowners on whose land it is located. The safeguards outlined in Section 4.7 will ensure negligible impact occurs.

5.11 PRE-EUROPEAN HISTORY

The project will not disturb the two genuine archaeological sites on MLA 42 (L1 and L2). Correspondence from the National Parks & Wildlife Service (Appendix 5) indicates that no further archaeological studies are required since the sites are of minor importance.

5.12 SOCIO-ECONOMIC FACTORS

5.12.1 Employment

The provision of up to 100 jobs during the construction period will have an immediate impact on local employment. Where possible, the Company will engage local contractors and labourers. Other employment generated locally during the construction period will be for local utilities such as the Northern Riverina County Council and Telecom. Indirect employment will increase locally through the provision of accommodation, food and refreshments.

Once the project site is developed and production is underway, the regular employment of approximately 55 persons will create a moderate impact on the level of local employment. Since approximately one half of the employees will be engaged locally there will be a positive impact on local unemployment.

Apart from the direct employment outlined, a significant number of additional persons are likely to be indirectly employed as a result of the Company's project. Such employment could occur in fields such as fuel delivery, services, schools and shops. This additional employment is estimated at between 50 to 60 persons.

5.12.2 Population

The project will result in a nett increase of approximately 75 persons living in Temora and the surrounding district throughout the life of the project. This estimate has been made assuming approximately 28 "out of town" employees are engaged for the project. This increase in population will be a reverse to the population trend recorded over the last 15 years.

5.12.3 Housing

The project will cause the present availability of rental housing to decrease significantly, however, the Company will encourage many of its "out of town" employees to purchase or build homes in the Temora area. Sufficient homes and home blocks for building are available for purchase to provide a good standard of living for the Company's employees.

5.12.4 Local Services

The generation of additional jobs and population will place an increased demand on local services. However, the Company has received assurances that there is sufficient capacity in local schools, the hospital and other local services to cater for the increased population. Only additional staff may need to be employed. Since Temora's population has decreased in the last fifteen years, there is adequate capacity for many of the towns services, e.g. water and sewerage.

The Company's estimated $40,000 weekly payroll will provide a significant stimulus to the local economy, much of which will be spent on housing, food and services.

The overall effect of the project on the Temora area will be a stabilisation of the good services that may have declined if the town continued primarily as a rural service centre.

5.13 VISUAL ASPECTS

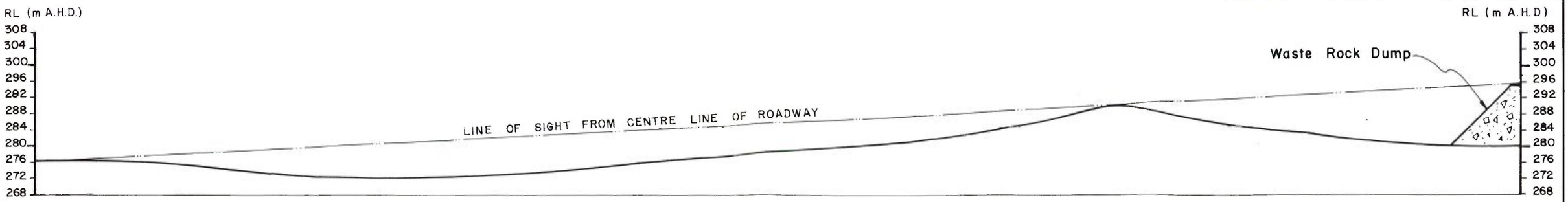
The location of the treatment plant, waste rock dump, tailings dam and low grade ore stockpile on the western side of the central ridge will minimise the visual impact of the project.

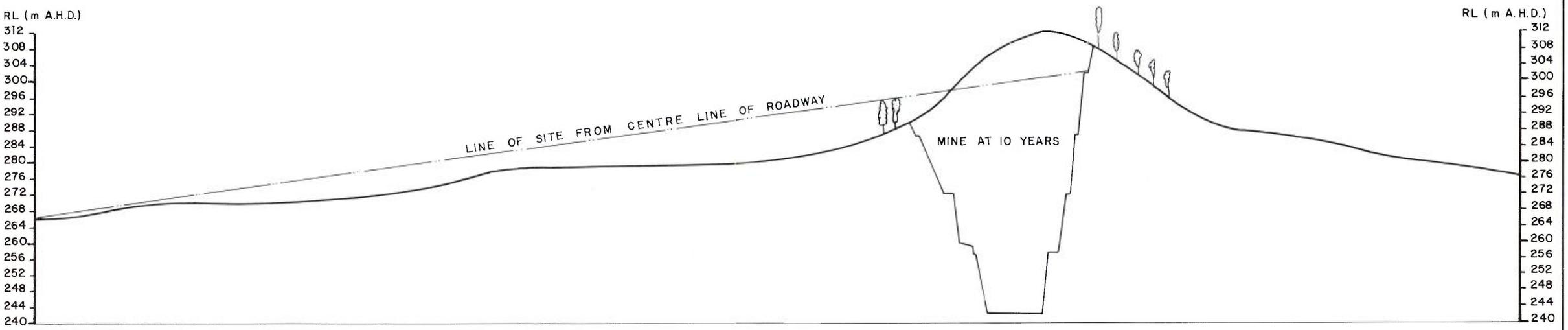
Open Cut

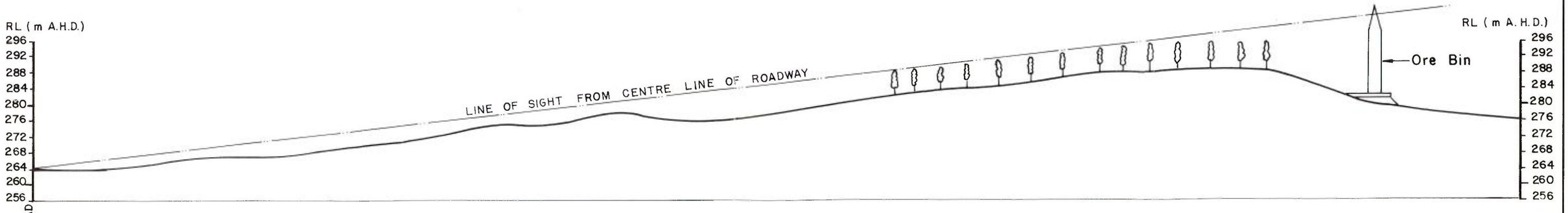
The open cut on the southern hill will be located slightly on the eastern side. Consequently, a 250 m section of western wall up to 5 m high will be visible from Barmedman Road (See Figure 5.1). The exposed rock will be a reddish grey/brown of low intensity and will be planted with creepers. Hence it should cause little visual impact.

The lights on the edge of the open cut used to allow mining activities to continue at night will be visible locally.

PARAGON GOLD PTY. LTD.







BARMEDMAN ROAD

R.W. CORKERY & CO. PTY. LIMITED

Figure 5.1
SIGHT LINES

Treatment Plant

The treatment plant will be finished predominantly in a green hue which will minimise visual impact. All buildings and plant will be visible from the roads west of MLA 42. The fine ore bin will be the most visible feature of the plant. The top 2 to 3 m of the bin and its feed conveyor may be visible from certain vantage points along the Barmedman Road (See Figure 5.1).

Tailings Dam

The tailings dam will only be visible from adjoining properties and Schmidts/Kileys Lanes. The side slopes of the dam will be grassed, and hence should not provide a major contrast to persons passing the dam.

Waste Rock Dump

The final height of the waste dump has been chosen to ensure it is not visible from Barmedman Road (See Figure 5.1). Hence, it will only be visible from sites west of MLA 42.

5.14 TRANSPORTATION NETWORK

5.14.1 Road Network

The Company's project will result in increases in traffic levels on the local road network. During the construction period there will be a greater proportion of heavy vehicles delivering equipment and plant to the site. The impacts of these increased levels are as follows:

Barmedman Road (Trunk Road 57)

During the construction period, between 60 and 120 car movements and a maximum of 24 truck/heavy vehicle movements will occur per day. This additional traffic will represent an increase of between 7 and 13 per cent in the average daily traffic using the road.

Once in production, traffic travelling to and from the mine will account for approximately 5 per cent of the total traffic using Barmedman Road.

Schmidts Lane

The temporary closure of Schmidts Lane through MLA 42 will have negligible impact since an alternate route is proposed around the tailings dam.

Kileys and Slingers Lanes

Traffic levels in Kileys and Slingers Lanes may increase marginally since it is likely that some employees may rent homes in the immediate area north of Gidginbung.

5.14.2 Rail Network

The project will result in a significant number of additional vehicles travelling across the rail crossing on Schmidts Lane. The increased traffic should cause no impacts since there is good visibility and the Company will upgrade the crossing (see Section 2.12.1) to ensure the tracks are not damaged.

5.15 SERVICES

5.15.1 Power

The Northern Riverina County Council will be able to supply the Company's power requirements without detriment to any other consumers. The safeguards set out in Section 4.7 should also ensure that the installation of the power line to the treatment plant is done without causing local environmental problems.

5.15.2 Water

The construction of a pipeline from Thanowring Road Pumping Station will cause no impact on other water users as the pipeline will be a private pipeline.

The possibility of obtaining subsurface water west of MLA 42 will also have no impact since the water is too saline for any agricultural use. The impacts of both pipelines will be negligible since they will be subsurface and installed subject to a range of safeguards.

5.15.3 Telephone

Telecom advises that they will be able to supply the Company with the required number of communication lines from the existing network. Hence, there will be no impact on local telephone services. No impacts will occur as a result of the installation of the required services.

SECTION 6

EVALUATION OF THE PROJECT

SECTION 6

EVALUATION OF THE PROJECT

6.1 JUSTIFICATION OF THE PROJECT

Clause 45(f) of the Environmental Planning and Assessment Regulation, 1980 requires this Statement to justify the proposed development in terms of environmental, economic and social considerations.

6.1.1 Environmental Considerations

The Company's project will be adequately safeguarded during its construction and operation to ensure that the environment around Gidginbung will not be adversely affected. The principal impacts the project will have on the local environment will be:

1. The noise climate in the vicinity of Gidginbung will change during the life of the operation. The project will be audible, subject to certain meteorological conditions for approximately 3 km from the site. Noise levels will be highest during the early stages of mining when the open cut is being developed. For the remainder of the operation, noise levels will be within limits specified by the State Pollution Control Commission.

2. The landform around the project site will be altered with the excavation of the open cut (65 - 80 m below ground level) and the construction of a tailings dam, waste rock dump and low grade ore stockpile. These landforms whilst visible from areas west of MLA 42 will not be obtrusive.

3. Representative sections of three vegetation communities will be removed during the project, however, its impact will be reduced by the fact that a much larger area of similar vegetation is located immediately north of the area to be disturbed.

4. The local road network will be changed to enable part of Schmidts Lane to become the mine access road and divert other traffic around the project site.

The local environment will be cared for in terms of air pollution and water pollution.

The Company is keen to maintain a good relationship with all adjacent landowners and residents of the Temora district. This will naturally involve the Company maintaining acceptable environmental standards throughout the entire project.

6.1.2 Economic Considerations

The Company's project will have the following economic benefits:

Temora District

The project will generate considerable employment for local persons and contractors during the construction phase and operation of the project. At least $40,000 per week will be issued in wages. In addition, Company spending on fuel, accommodation and other services will also benefit the Temora district. The provision of a significant source of road base (at cost) will be of a major benefit to the residents of the Temora District.

New South Wales

The State will benefit from increased employment and the payment of a royalty which will amount to between $400-$500,000 based on current metal prices.

Australia

The Commonwealth will also benefit from increased employment and taxes paid.

6.1.3 Social Considerations

The principal social considerations that will result from the Company's project will be:

(i) Provision of approximately 55 permanent jobs and considerable indirect employment.

(ii) A need for local housing - this should be easily satisfied.

(iii) Local services will be used wherever appropriate. Many local services which may otherwise have been scaled down, will be maintained whilst the mine is operative.

6.2 CONSEQUENCES OF NOT PROCEEDING WITH THE PROJECT

1. An economic deposit of gold bearing ore would not be mined.

2. The economic and social benefits outlined in Section 6.1, especially increased employment, would not result.

3. The Company's shareholders would not benefit from a profitable mining venture.

REFERENCES

Brooks, K.A. and Summerhayes, G.J. (1985) - Preliminary Environmental Investigation and Hydrogeochemical Study at Gidginbung Gold Prospect, Temora, NSW - Geological Survey Report GS 1985/022.

Brooks, K.A. and Summerhayes, G.J. (in prep) - Gidginbung Gold Prospect: Chemical & Characterisation of Waste Rock and Low Grade Ore.

Brayshaw, H. and Donlon, D. (1986) - An Archaeological Survey near Temora, NSW - Brayshaw and Associates.

Soil Conservation Service (1975) Temora District Manual.

APPENDICES

APPENDIX 1

BASELINE ENVIRONMENTAL DATA

TABLE A1-1

BASE-LINE SURFACE WATER ANALYSES - TEMORA

Date Sampled	DISCHARGE	pH	E.C.	HCO_3	Cl	SO_4	Ca	Mg	K	Na	S.S.	UNFILTERED As	Cu	Pb	Zn	Fe	Mn	Cd	FILTERED As	Cu	Pb	Zn	Fe	Mn	Cd
Units	megalitres/day		uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
STREAMS																									
TW-1																									
24.07.84	< .1	6.85	80	20	8	5	2.25	2.65	8.0	10.5	190	<0.005	0.020	0.010	<0.005	4.60	-	0.15							
05.10.84	24.9	6.3	70	26	5	6	2.0	1.85	5.75	8.7	96	<0.001	0.008	0.015	0.020	2.00	0.05	0.16	<0.001	0.002	0.008	<0.001	1.80	0.012	0.050
10.10.84	< .1	6.4	95	40	8	5	3.40	3.75	6.0	11.5	65	<0.005	0.005	0.005	<0.005	3.45	0.05	<0.002	<0.005				3.00	0.050	
05.06.85	1.3	5.7	120	34	3.7	11	2.3	4.1	6.3	16.0	300	<0.001	0.009	0.017	0.014	6.50	0.09	<0.002	<0.001	0.005	0.007	0.004	5.60	0.010	<0.002
16.08.85	10.8	5.4	62	14	3.7	3	0.7	1.6	4.8	8.4	890	<0.001	0.010	0.010	0.013	1.80	0.13	0.48	<0.001	0.006	0.009	0.008	1.60	0.016	0.420
15.11.85	57.5	5.50	83	22	7.0	7	1.2	1.6	6.4	7.8	690	<0.001	0.005	0.011	0.008	4.20	0.92	0.22	<0.001	0.004	0.006	0.004	3.80	0.010	0.021
TW-2																									
24.07.84	< .1	6.70	70	20	7	5	2.10	2.50	5.5	10.5	150	<0.005	0.005	0.005	<0.005	4.25	-	<0.002							
05.10.84	9.9	6.7	90	35	6	8	2.9	2.6	6.9	10.0		<0.001	0.006	0.011	0.010	1.90	0.50	0.03	<0.001	0.002	0.008	<0.001	1.90	0.009	0.030
10.10.84	< .1	6.3	71	24	65	7	1.85	2.0	5.8	9.0		<0.005	0.005	0.005	<0.005	2.95	0.05	<0.002	<0.005				2.35	0.050	
16.08.85	44.2	5.5	58	14	7.1	4	0.8	1.7	4.5	8.1	245	<0.001	0.065	0.005	0.005	1.20	0.10	0.25	<0.001	0.005	0.005	0.004	1.00	0.014	0.200
TW-3																									
24.07.84	< .1	6.80	110	25	15	5	3.80	4.65	5.5	18.0	100	<0.005	0.010	0.015	<0.005	22.50	-	0.002							
05.10.84	14.3	6.4	69	26	5	12	2.1	1.85	6.6	8.6		<0.001	0.006	0.014	0.012	2.20	0.55	0.18	<0.001	0.001	0.001	<0.001	2.10	0.014	0.020
10.10.84	< .1	6.45	95	40	7	<2	3.65	3.80	6.0	11.0	50	<0.005	0.010	0.010	<0.005	3.40	0.05	<0.002	<0.005				2.65	0.050	
16.08.84	19.4	5.80	62	17	4.4	2	0.8	1.70	5.0	8.8	715	<0.001	0.050	0.035	0.050	1.20	0.09	0.26	<0.001	0.004	0.004	0.003	1.20	0.014	0.240
15.11.85	13.1	5.40	83	24	4.0	8	1.20	1.60	6.4	7.8	500	<0.001	0.005	0.012	0.008	3.00	0.09	0.23	<0.001	0.004	0.006	0.003	3.50	0.010	0.200
TW-4																									
24.07.84	< .1	6.60	95	20	10	<2	1.90	3.50	10.0	14.5	70	<0.005	0.005	0.015	<0.005	4.40	-	<0.002							
05.10.84	.8	6.4	105	29	10	15	1.85	2.6	7.8	14.0		<0.001	0.004	0.018	0.014	2.00	0.40	0.08	<0.001	0.001	0.010	<0.001	2.00	0.012	0.030
10.10.84	Still	6.70	120	40	11	5	2.50	3.95	6.0	16.0	75	<0.005	0.005	0.005	<0.005	3.20	0.05	<0.002	<0.005				2.65	0.050	
21.03.85	.2	6.0	66	20	3.2	6	1.1	2.2	7.0	9.8	395	<0.001	0.055	0.014	0.002	5.80	0.55	0.26	<0.001	0.003	0.009	0.002	4.10	0.008	0.260
05.06.85	Still	6.0	135	52	2.7	10	2.5	4.8	4.2	16.0	490	<0.001	0.005	0.012	0.010	5.20	0.07	<0.002	<0.001	0.002	0.009	0.003	4.00	0.005	0.019
16.08.85	10.4	5.7	69	21	3.4	3	0.8	2.3	5.0	9.8	210	<0.001	0.011	0.011	0.020	2.20	0.07	0.46	<0.001	0.006	0.009	0.014	2.10	0.015	0.400
15.11.85	1.7	5.5	87	26	4.0	6	0.8	1.90	6.7	8.9	105	<0.001	0.035	0.010	0.010	3.80	0.47	0.31	<0.001	0.003	0.004	0.005	3.50	0.008	0.280
TW-5																									
24.07.84	< .1	7.40	110	35	9	5	6.05	6.0	5.5	14.5	75	<0.005	0.010	0.015	<0.005	9.50	-	<0.002							
05.10.84	.7	6.7	90	35	6	8	2.9	2.6	6.9	10.0		<0.001	0.005	0.013	0.007	1.80	0.25	0.04	<0.001	0.001	0.008	<0.001	1.80	0.008	<0.020
10.10.84	Still	6.95	140	65	8	5	5.35	6.0	12.5	13.5	30	<0.005	0.005	0.005	<0.005	2.00	<0.02	<0.002	<0.005				1.80	<0.02	
21.03.85	Still	6.3	105	34	3.8	29	2.6	3.4	7.0	13.0	650	<0.001	0.006	0.017	0.001	6.00	0.04	0.42	<0.001	0.003	0.007	<0.001	4.30	0.008	0.400
05.06.85	Still	6.0	99	24	2.4	11	2.1	3.8	4.3	13.0	360	<0.001	0.007	0.018	0.009	5.60	0.05	<0.002	<0.001	0.004	0.007	0.004	4.50	0.006	<0.002
16.08.85	Still	6.1	56	15	6.5	2	0.8	1.2	5.7	6.3	185	<0.001	0.009	0.095	0.013	1.40	0.06	0.27	<0.001	0.005	0.005	0.006	0.90	0.012	0.180
15.11.85	1.3	5.5	85	21	4.0	7	1.2	1.7	7.2	7.3	100	<0.001	0.003	0.009	0.007	2.7	0.02	0.25	<0.001	0.002	0.006	0.004	2.70	0.003	0.190
TW-7																									
24.07.84	< .1	6.30	80	5	17	<2	2.05	4.25	3.25	8.0	255	<0.005	0.010	0.005	<0.005	2.10	-	<0.002							
TW-8																									
24.07.84	< .1	6.80	40	5	19	5	1.40	1.80	3.85	3.0	310	<0.005	0.005	0.010	<0.005	1.75	-	<0.002							
16.08.85	Still	5.90	51	9	8	6	0.8	1.80	5.40	4.3	420	<0.005	0.005	0.010	<0.005	4.90	-	<0.002							
TW-9																									
24.07.84	< .1	6.80	80	20	9	5	2.5	2.6	7.0	11.0	90	<0.001	0.014	0.075	0.013	0.70	0.02	0.18	<0.001	0.007	0.005	0.001	0.60	0.008	0.180
05.10.84	1.1	6.3	78	26	11	4	2.4	1.6	5.8	9.7		<0.001	0.004	0.078	0.011	1.90	0.05	0.02	<0.001	0.001	0.002	<0.001	0.78	0.014	0.020
10.10.84	< .01	6.8	115	50	11	<2	3.65	3.45	6.5	13.5	90	<0.005	0.005	0.005	<0.005	2.85	0.05	<0.002	<0.005				1.90	0.050	
21.03.85	Still	6.6	175	61	6	10	5.4	4.1	8.4	18.0	120	<0.001	0.010	0.095	0.003	3.60	0.03	0.37	<0.001	0.005	0.008	<0.001	3.60	0.006	0.360
16.08.85	3.9	5.8	65	17	9.5	5	0.9	1.5	5.0	8.5	210	<0.005	0.015	0.010	<0.005	5.20	-	<0.002							
15.11.85	Still	5.2	130	19	21.0	7	2.0	2.2	7.9	13.0	160	<0.001	0.004	0.011	0.013	3.20	0.05	0.250	<0.001	0.003	0.005	0.005	2.50	0.006	0.250
TW-10																									
24.07.84	< .1	7.1	125	40	5	5	3.7	4.2	5.0	20.5	175	<0.001	0.010	0.095	0.013	1.50	0.08	0.59	<0.001	0.007	0.009	0.008	1.10	0.012	0.500
05.10.84	1.4	6.4	79	27	7	7	2.5	1.45	6.7	9.5		<0.001	0.004	0.031	0.009	1.80	0.03	0.03	<0.001	0.001	0.002	<0.001	0.78	0.014	<0.020
10.10.84	Still	6.95	150	50	17	5	3.15	2.55	7.0	20.5	15	<0.005	0.005	0.005	0.005	2.35	0.05	0.005	<0.005				1.90	0.05	
16.08.85	Still	5.90	80	17	8.2	5	1.20	1.70	4.60	11.0	230	<0.005	0.005	0.010	<0.005	3.75	-	<0.005							
TW-11																									
24.07.84	< .1	6.7	90	25	15	5	2.2	3.1	5.5	13.0	100	<0.001	0.009	0.011	0.008	1.00	0.03	0.66	<0.001	0.008	0.009	0.008	1.00	0.022	0.640
05.10.84	46.7	6.4	83	30	7.5	5	5	1.9	2.0	11.0		<0.001	0.003	0.028	0.010	1.50	0.05	0.06	<0.001	0.002	0.006	<0.001	1.0	0.006	0.050
10.10.84	< .01	6.8	115	25	9	<2	3.75	4.2	5.5	14.0	60	<0.005	0.005	0.005	<0.005	3.50	0.15	<0.002	<0.005				2.00	0.005	
16.08.85	Still	5.7	60	17	4.8	4	0.8	1.6	4.2	8.3	180	<0.001	0.005	0.019	0.007	1.70	0.03	0.08	<0.001	0.001	0.009	<0.001	2.50	0.009	<0.020
15.11.85	Still	5.9	129	43	11.0	6	1.8	2.5	6.0	16.0	210	<0.001	0.005	0.008	0.010	3.40	0.07	0.20	<0.001	0.004	0.005	0.005	3.10	0.009	0.180
TW-12																									
05.10.84	.65	6.9	120	46	9.5		1.85	2.8	5.6	19.0		<0.001	0.085	0.010	0.065	1.40	0.07	0.58	<0.001	0.008	0.008	0.005	1.00	0.014	0.580
21.03.85	Still	6.4	105	40	10.5	11	1.8	3.5	6.7	21.0	110	<0.001	0.006	0.068	0.010	3.20	0.04	0.36	<0.001	0.005	0.003	0.002	3.20	0.008	0.360
05.06.85	Still	5.8	105	34	5.6	11	1.5	3.2	4.2	14.0	150	<0.005	0.005	0.005	<0.005	5.20	-	<0.002							
16.08.85	Still	6.0	75	24	5.4	3	0.6	1.5	3.2	11.0	145	<0.001	0.007	0.010	0.010	1.60	0.07	0.29	<0.001	0.005	0.005	0.003	0.90	0.010	0.160
15.11.85	Still	6.0	140	50	12.0	6	1.7	2.9	6.4	17.0	175	<0.001	0.006	0.014	0.007	2.90	0.04	0.30	<0.001	0.004	0.008	0.003	2.30	0.004	0.280
TW-13																									
24.07.84	< .1	7.15	150	35	9	10	2.8	4.7	5.5	25.0	50	<0.001	0.004	0.007	0.009	3.00	0.05	<0.002	<0.001	0.003	0.004	0.004	2.90	0.005	<0.002
05.10.84	2.6	6.5	70	27	5.5	3	3.9	1.3	7.6	5.9		<0.001	0.006	0.013	0.014	1.20	0.02	0.08	<0.001	0.001	<0.001	0.002	1.50	0.009	0.030
10.10.84	Still	6.6	150	70	8	5	7.4	2.85	22.5	8.0	85	<0.005	0.005	0.005	0.025	2.35	0.20	<0.002	<0.005				1.65	0.200	
15.11.85	20.7	5.6	106	27	11.0	3	3.6	1.50	14.0	6.0	105	<0.001	0.003	0.007	0.011	1.30	0.05	0.260	<0.001	0.003	0.004	0.006	1.20	0.010	0.240
TW-14																									
24.07.84	< .1	6.6	125	25	12	5	4.55	5.5	13.5	18.5	205	<0.005	0.010	0.010	<0.005	7.50	-	<0.002							
05.10.84	12.96	6.5	89	35	7	9	2.2	2.4	5.5	14.0		<0.001	0.004	0.013	0.012	2.50	0.03	0.06	<0.001	0.002	0.010	0.002	4.10	0.012	0.040
10.10.84	< .01	6.75	215	90	21	5	8.85	9.0	4.5	25.0	55	<0.005	0.005	0.005	<0.005	3.50	0.10	<0.002	<0.005				2.35	0.050	
16.08.85	Still	6.2	81	21	10	5	0.9	2.0	4.5	10.0	280	<0.001	0.006	0.010	0.012	2.20	0.11	0.60	<0.001	0.005	0.008	0.010	1.70	0.020	0.600
15.11.85	19.0	5.5	124	27	18.0	7	1.9	2.1	9.0	13.0	96	<0.001	0.006	0.010	0.010	2.20	0.03	0.29	<0.001	0.004	0.004	0.005	2.10	0.090	0.290
DAMS																									
11.10.84																									
TWD-1		6.65	75	15	9	10	2.1	1.3	8.0	7.0	75	<0.005	0.010	0.005	<0.005	14.00	1.25	<0.002	<0.005				2.95	0.450	
TWD-2		6.8	50	15	7	5	1.4	2.0	3.35	5.0	40	<0.005	0.005	0.005	<0.005	2.70	0.05	<0.002	<0.005				1.65	0.050	
TWD-3		6.7	35	10	6	<2	1.3	1.7	4.45	3.5	25	<0.005	0.005	0.005	<0.005	2.55	0.05	<0.002	<0.005				1.95	0.050	
TWD-4		6.75	80	10	13	<2	1.55	2.35	4.05	11.5	80	<0.005	0.005	0.010	<0.005	4.45	0.10	<0.002	<0.005				3.20	0.050	
TWD-5		6.7	75	25	8	<2	3.3	2.75	7.5	9.0	55	<0.005	0.010	0.010	<0.005	4.45	0.15	<0.002	<0.005				3.55	0.100	
TWD-6		6.55	85	30	10	2	2.15	2.6	5.0	9.5	40	<0.005	0.005	0.005	<0.005	3.40	0.10	<0.002	<0.005				2.75	0.050	
TWD-7		6.7	50	10	10	<2	1.6	1.75	4.5	5.5	35	<0.005	0.005	0.005	<0.005	3.10	0.15	<0.002	<0.005				2.15	0.050	
TWD-8		6.85	85	25	11	5	2.25	3.1	5.0	10.0	90	<0.005	0.005	0.010	0.010	4.60	0.15	<0.002	<0.005				3.00	0.050	

TABLE A1-2
BASE LINE STREAM SEDIMENT ANALYSES - TEMORA

Site No.		TW-1		TW-2		TW-3		TW-4		TW-5		TW-7		TW-8		TW-9		TW-10		TW-11		TW-12		TW-13		TW-14	
	Size Fraction	Wt%	TMC	Wt%	TMC	Wt%	TMC	Wt%	TMC	Wt%	TMC	Wt%	TMC	Wt%	TMC	WT%	TMC	Wt%	TMC	Wt%	TMC	Wt%	TMC	Wt%	TMC	Wt%	TMC
ARSENIC	+600 µm	25	<20	50	<20	52	<20	15	<20	50	<20	37	<20	19	<20	61	<20	73	<20	15	<20	53	<20	14	<20	31	<20
	-600+200 µm	68	<20	27	<20	52	<20	77	<20	46	<20	27	<20	17	<20	28	<20	17	<20	59	<20	43	<20	31	<20	12	<20
	-200+100 µm	5	<20	9	<20	10	<20	6	<20	3	<20	13	<20	14	<20	5	<20	4	<20	10	<20	1	<20	22	<20	13	<20
	-100 µm	2	<20	15	<20	11	<20	1	<20	1	<20	24	<20	51	<20	6	<20	6	<20	16	<20	1	<20	34	<20	43	<20
CADMIUM	+600 µm		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1
	-600+200 µm		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1
	-200+100 µm		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1
	-100 µm		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1
COBALT	+600 µm		<5		10		10		<5		<5		<5		5		5		10		5		5		10		10
	-600+200 µm		<5		<5		5		<5		<5		<5		5		5		1		<5		5		5		10
	-200+100 µm		5		<5		5		<5		<5		<5		5		5		15		<5		10		5		10
	-100 µm		10		5		5		<5		<5		5		5		15		15		<5		10		5		10
COPPER	+600 µm		5		10		15		25		10		25		20		25		25		15		10		25		20
	-600+200 µm		5		5		10		10		5		20		15		20		25		10		10		15		15
	-200+100 µm		10		10		10		10		10		20		10		20		40		5		25		20		15
	-100 µm		10		10		10		10		15		20		15		25		3		5		15		15		20
IRON	+600 µm		1.65		2.10		3.05		1.50		2.10		13.0		5.05		8.0		4.5		1.4		3.05		3.1		3.85
	-600+200 µm		0.80		1.00		0.95		0.70		1.05		3.60		1.85		1.95		2.95		0.75		1.65		1.80		2.2
	-200+100 µm		1.20		1.20		1.10		0.85		1.10		2.35		2.05		2.15		3.65		1.05		2.65		1.7		2.05
	-100 µm		1.90		1.60		1.70		1.05		1.70		1.90		2.45		2.35		3.05		1.2		2.15		2.05		2.5
LEAD*	+600 µm	5	5	15	10	10	25	30	20	10	15	15	25	20													
	-600+200 µm	<5	<5	<5	<5	5	10	10	10	10	10	10	15	15													
	-200+100 µm	5	5	10	<5	10	10	15	15	10	10	15	15	15													
	-100 µm	15	5	5	5	20	10	15	15	10	15	15	20	20													
MANGANESE	+600 µm	95	85	155	60	70	15	175	175	260	95	70	440	185													
	-600+200 µm	70	80	75	25	40	105	20	195	360	40	60	370	180													
	-200+100 µm	185	120	120	70	65	90	40	420	435	110	240	330	175													
	-100 µm	230	155	175	85	95	90	60	440	300	105	170	405	215													
NICKEL	+600 µm	<5	<5	5	10	<5	<5	<5	5	5	10	5	20	15													
	-600+200 µm	<5	<5	5	5	<5	5	5	<5	10	<5	5	10	15													
	-200+100 µm	5	<5	5	5	5	<5	10	<5	10	5	15	5	10													
	-100 µm	10	<5	5	<5	<5	<5	10	5	10	5	10	10	15													
ZINC	+600 µm	10	10	10	30	10	25	15	20	20	20	10	45	50													
	-600+200 µm	10	15	10	5	10	20	25	15	25	10	10	30	35													
	-200+100 µm	20	20	15	10	10	20	25	30	40	10	30	35	40													
	-100 µm	25	25	20	10	20	20	35	35	30	20	20	45	45													

* - Content in %
TMC - Trace Metal Content in micrograms/gram

TABLE A1-3
DEPOSIT GAUGE ANALYSES - TEMORA

Site No.	TA-1			TA-2			TA-3			TA-4			TA-5			TA-6			TA-7		
	Insoluble Solids	Loss on Combustion	Rainfall (mm)	Insoluble Solids	Loss on Combustion	Rainfall (mm)	Insoluble Solids	Loss on Combustion	Rainfall (mm)	Insoluble Solids	Loss on Combustion	Rainfall (mm)	Insoluble Solids	Loss on Combustion	Rainfall (mm)	Insoluble Solids	Loss on Combustion	Rainfall (mm)	Insoluble Solids	Loss on Combustion	Rainfall (mm)
PERIOD																					
03.09.84 - 03.10.84	0.59	0.39	53	0.51	0.33	53	0.75	0.31	53	0.52	0.28	52	0.80	0.37	20	0.52	0.29	48	1.14	0.48	45
03.10.84 - 30.10.84	0.79	0.26	41	0.31	0.75	59	1.31	0.36	49	15.70	4.01	52	0.82	0.26	59	0.60	0.29	54	0.56	0.16	55
30.10.84 - 03.12.84	0.86	0.28	56	3.72	2.28	50	2.36	0.81	53	1.34	0.33	55	1.34	0.33	53	1.05	0.29	55	3.12	1.52	50
03.12.84 - 02.01.85	1.19	0.41	4	1.82	0.83	2	1.96	0.46	4	3.77	1.86	5	1.73	0.42	3	1.77	0.70	5	0.74	0.24	2
02.01.85 - 01.02.85	1.62	0.40	9	1.63	0.51	7	2.43	0.42	12	1.48	0.35	5	2.30	0.37	3	2.27	0.85	1	1.48	0.36	7
01.02.85 - 04.03.85	1.14	0.80	6	1.51	0.84	3	1.45	0.93	3	4.12	2.48	2	0.95	0.57	3	2.17	0.92	5	1.05	0.59	2
04.03.85 - 03.04.85	1.02	0.31	49	2.42	0.96	56	1.70	0.36	56	1.17	0.29	56	1.11	0.24	50	1.88	0.67	54	1.17	0.25	50
03.04.85 - 02.05.85	0.75	0.42	20	2.13	0.68	14	1.70	1.55	18	0.61	0.13	12	1.10	0.30	11	0.53	0.26	12	0.62	0.28	19
02.05.85 - 03.06.85	1.10	0.30	49	2.75	1.56	65	2.81	1.11	59	12.3	6.9	56	0.72	0.32	53	0.65	0.12	58	1.27	0.29	56
03.06.85 - 04.07.85	0.32	0.22	13	1.00	0.37	12	0.95	0.30	23	3.5	1.60	16	0.44	0.21	20	0.56	0.15	17	0.29	0.16	14
04.07.85 - 03.08.85	0.84	0.35	16	0.79	0.36	17	0.66	1.27	16	3.17	1.95	14	0.59	0.29	15	0.52	0.87	14	0.31	0.44	13
03.08.85 - 04.09.85	0.81	0.48	73	3.07	0.98	89	1.00	0.29	85	7.02	2.83	80	0.43	0.25	84	0.46	0.34	91	0.36	0.14	90
04.09.85 - 03.10.85	0.43	0.20	41	2.42	1.22	34	0.54	0.30	35	2.59	1.02	37	0.50	0.28	41	0.84	0.35	37	0.31	0.13	32
03.10.85 - 05.11.85	0.45	0.21	56	2.33	1.22	52	0.85	0.02	69	55.30*	15.60	74	1.00	0.38	88	0.59	0.23	69	0.48	0.16	64
05.11.85 - 03.12.85	0.92	0.24	110	Sample broken in transit			0.50	0.12	114	6.17	2.18	114	1.30	0.41	115	1.53	0.65	113	Sample Broken in Transit		
03.12.85 - 03.01.86	1.00	0.27	59	1.53	0.55	81	1.41	0.44	104	12.94	3.10	88	1.95	0.50	73	1.40	0.36	87	1.00	0.33	91
03.01.86 - 04.02.86	1.29	0.36	19	2.02	0.63	18	1.22	0.27	7	1.07	0.27	19	2.48	0.51	25	2.75	0.72	16	0.66	0.21	16
Mean	0.89	0.35		1.87	0.88		1.39	0.55		4.84	2.66		1.15	3.53		1.18	0.47		0.91	0.36	

* Deleted from Mean

Insoluble Solids and Loss on Combustion expressed as g/m^2/month.

APPENDIX 2

A FLORA AND FAUNA SURVEY OF

MLA 42 NEAR GIDGINBUNG, NSW

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TEMORA NSW 2666

For: R.W. Corkery & Co. Pty Ltd

Date: January, 1986

SECTION A2.1: INTRODUCTION

A survey of the flora and fauna of MLA 42 (Wagga) was undertaken between October and December, 1985. The aim of the survey was to establish the nature and distribution of vegetation communities and fauna over the area proposed for mining and its related activities.

The survey involved six visits to the site to observe fauna and observe/collect flora specimens. Night spotting of birds and mammals was undertaken on two occasions. Some flora samples were forwarded to the National Herbarium in Sydney for positive identification.

SECTION A2.2: FLORA

The vegetation communities on the site may be divided broadly into two types:

(i) Original native vegetation;

(ii) Pasture and cropland.

A2.2.1 Original Native Vegetation

The original native vegetation occurs on the two hills in the centre of MLA 42. The remainder of the site comprises pasture and cropland from which the original vegetation has been cleared. Figure 3.4 displays the distribution of the original vegetation communities. The original native vegetation on the hills may be divided into three communities.

(i) Woodlands - predominated by the tree Eucalyptus dwyeri and an understorey of native grasses, Stypandra glauca and several other shrubs.

(ii) Scrubland - comprising predominantly Callitris pine trees with a dense understorey of shrubs rather than native grasses.

(iii) Modified Woodland comprising partly cleared original vegetation at the southern end of the hills and regrowth of young trees at the northern end.

Woodlands

The woodlands occur on the entire eastern side and lower slopes of the western side of the larger (northern) hill. On the smaller hill, the woodlands are restricted to narrow strips on the eastern and western edges. The dominant tree in the woodlands in Eucalyptus dwyeri, a small tree, frequently of mallee form. Along the lower edges of the woodlands some larger eucalypts are found intermingled with E. dwyeri notably E. albens (White Box), E. microcarpa (Grey Box) and a few specimens of E. sideroxylon (Red Ironbark).

The black cypress pine (Callitris endlicheri) gradually becomes more common on the uphill side of the woodland.

The lower edge of the woodlands marks the point of major soil development and the start of land cleared for agriculture.

Scrubland

The scrubland is dominated by Black Cyprus pine (Callitris endlicheri) where the slope is steeper with shallower and rockier soil. The understorey is basically shrubs of considerable diversity and density. On the northern hill there are some rocky outcrops near the ridge. Associated with those outcrops may be found a number of plants of special significance. These plants are discussed under the section on Environmental Status.

Modified Woodland

The modified woodland located at the southern end of the southern hill covers an area of approximately 2 ha where some mature trees have been left standing and pasture established between them, that is, mostly native grasses established underneath.

The main trees are White Cypress pine (Callitris columellaris), Black Cypress pine (Callitris endlicheri) and specimens of many eucalypts. At the northern end of the northern hill the small trees are mostly Eucalyptus dwyeri, with a few cypress pines. On a small rise to the west of the saddle between the two hills is a cluster of E. dwyeri, and the trees along Barmedman Creek further west are Grey Box and Yellow Box (E. melliodora). Where Barmedman Creek leaves the site on the western boundary of MLA 42, there is a specimen of River Red Gum (E. camaldulensis). Around "Lilydale" homestead near the eastern edge of the ridge is a clump of E. dwyeri and a few Red Ironbarks (E. sideroxylon).

Condition of Native Vegetation

The northern and southern hills have areas of damage due to drilling and earlier gravel quarrying. The southern hill, the site of the proposed open pit, has been already severely damaged.

The northern hill has a number of drill "platforms" and tracks, some of which have not been used for drilling to date. To date, this work has been done with obvious consideration for the native vegetation and damage has been kept near to the minimum.

PASTURE AND CROPLAND

This vegetation community covers the majority of the site. It is common throughout the district and can be expected to be a habitat for various species of birds, mammals and reptiles, etc. There are several small farm dams on the site which are visited by various water birds. One dam only is of greater interest, that is, on the watercourse in the southwest corner of the site. This dam is surrounded by dense reeds of several species and may sometimes be a breeding habitat for the Clamorous Reedwarbler, Little Grassbird, Brown Quail and other birds.

A2.2.2 REGIONAL CONTEXT OF VEGETATION COMMUNITIES

Figure 2.1 shows the location of MLA 42 within the regional context of surrounding native vegetation communities. MLA 42 lies 4 km north-northeast of the recently gazetted Big Bush Nature Reserve. Geologically, Big Bush is different. Being on shales, the flora, and to some extent the fauna, is different. Big Bush contains considerably less E. dwyeri and more E. sideroxylon and considerable differences in understorey. There are also some notable differences in bird populations.

Approximately 14 km east and northeast of MLA 42 there are the Boginderra hills and a Nature Reserve covering the Narraburra Hills. The vegetation on both the Narraburra and Boginderra Hills are developed on granite and have different flora and fauna, although possibly less different than Big Bush Nature Reserve.

Approximately 11 km south of MLA 42 is the closest point of Ingalba Nature Reserve which has similarities to (and some differences from) the natural vegetation on MLA 42.

In respect to vegetation, the site bears the greatest similarity with the Pinnacle (or Mt. Sheila) approximately 12 km north-northeast, however, the Pinnacle is underlain by conglomerate rocks.

A2.2.3 ENVIRONMENTAL STATUS

The combination of geology, flora and fauna on the site is considered unique in the local setting. However, the area of original native vegetation on the site is very small, and the proposed open pit and associated mining activities do not, at this stage, endanger the northern hill. It should be recommended that all care be taken not to further disturb the northern hill.

There are, however, several rather valuable, environmental features on the larger hill: notably the rare orchid Pterostylis setifera, occuring only in a few locations throughout the world. The fern Asplenium flabellifolium which is found only in a few places in this region, but occurs more commonly in the higher rainfall areas including rainforests. Two specimens of a sandfly bush, Zleria aspalathoides was found in the same location; it is not recorded elsewhere in this district. All three, the orchid, fern and sandfly bush, occur only on the large rock outcrop on the northern hill. Special consideration, therefore, should be given to the preservation of this outcrop (see Figure 3.4).

In addition, two very old and large grasstrees located near the saddle on the larger hill (see Figure 3.4); a few specimens of Casuarina stricta and some unusual Eucalypts, probably hybrids, on the western side of the southern hill should be preserved if possible. The vegetation along Schmidts Lane on MLA 42 is considered to have value since it is a sample of the original vegetation on an area that has otherwise been completely cleared for agriculture (a common feature with country roads and lanes). The roadside vegetation differs from that on the hills. As well as the obvious value of lanes with original vegetation to the countryside itself - appearance, windbreaks, etc. the species found growing there provide information about the soils, which is of agricultural value.

A2.3 FAUNA

The accompanying lists of Birds, Mammals and Reptiles specify those recorded on the site during this brief survey and those occurring in the district which could reasonably be expected to be found on the site at some time.

A2.3.1 Birds

The Diamond Dove breeds on the site. This is the only known breeding place for this species in the district (though the bird is not rare in other districts).

There is a remarkable lack of Thornbills, Warblers, Weebills - all the niches being occupied by breeding White-plumed Honeyeaters. Doubtless, at other times of the year there would be migrations of these species from Big Bush where they breed in large numbers, and where there are very few White-plumed Honeyeaters.

Seven species of birds of prey were recorded on the site, including the rare Black Falcon. Two species were nesting at the time of the survey and many others might be expected to nest there, as these birds prefer to nest on hills such as these.

A2.3.2 Reptiles

The rocky outcrops might provide habitats for several specialised geckos, and the carpet snake - no longer a common species in this district.

A2.3.3 Mammals

The most common of these being three introduced species: the rabbit, the fox and the feral cat. Control measures ought to be taken. Brushtail possums are considered to be relatively common since three specimens were seen in one hour of spotlighting. Faeces and fur of this possum were found in abundance.

TABLE A2-1

FLORA RECORDED AND KNOWN TO OCCUR ON MLA 42

Species	Abundance
Astroloma humifusem	1
Indigophera australia	2
Microtis unifolia	3
Cassinia longifolia	1
Acacia verniciflua	1
Acacia doratoxylon	1
Callitrix tetragona	1
Callitris endlicheri	1
Rhagodia hastata	2
Eucalyptus dwyeri	1
Solanum aviculare	1
Solanum cinereum	2
Helichrysum bracteum	1
Omphalolappula concava	2
Hibbertia stricta	1
Grevillea floribunda	1
Acacia penninervis	2
Phyllanthus thymoides	1
Stipa setacea	1
Anagallis arvensis	1
Actinotus gibbonsii	1
Dodonaea truncatiales	1
Wahlenbergia communis	1
Hardenbergia violacea	1
Goodenia hederaceae	1
Stypandra glauca	1
Stipa densiflora	1
Lysanthe strygosa	1
Cheilanthes tenuifolia	1
Aristida sp.	1
Danthonia eriantha	1
Callitris columellaris	1
Agropyron scabrum	1
Bursaria spinosa	2
Melichrus urceolatus	1
Acacia ulicifolia	2
Helichrysum ramosissimum	2
Exocarpus cupressiformis	2
Daviesia virgata	1
Lomandra filformis	3
Lepidosperma laterale	3
Solanum triflorum	2
Dianella revoluta	3
Acacia bayleyana	3
Lomandra multiflora	3
Xanthorrhoea australis	3
Casuarina distyla	1
Lomandra longifolia	3
Kunzea ambigua	3
Zieria aspalathoides	3
Senecio sp.	2
Isotoma axillaris	1
Bulbinopsis bulbosa	2
Asplenium flabellifolium	3
Casuarina stricta	3
Euphorbia drummondii	2
Thysanotis tuberosus	2
Podolepsis sp.	3
Eucaluptus albens X sideroxylon hybrid (?)	4? 3
Eucalyptus microcarpa	1
Eucalyptus albens	1
Pterostylis setifera	4
Brachyloma daphnoides	1
Amyerna miquellii	1

Abundance

1 Abundant on Site
2 Common on Site
3 Few Present on Site
4 Rare Australia-wide

Roadside species additional.

Pittosporum phylliraeoides	1
Acacia difformis	1
Acacia hakeoides	1
Brachychiton populneum	2
Cassia sturtii	1
Myoporum montanum	1

Flora not collected but could be expected in season:

Drosera glanduligera
Drosera peltata
Drosera auriculata

Additional Orchids: Because the survey was done too late in the spring season most orchids had finished flowering. The list below is from Big Bush Nature Reserve, Ingalba Nature Reserve and Bodinderra Nature Reserve.

Thelymitra carnea
Calochilus robertsonii
Diuris
Prasophyllum
Caladenia caerulea
Glossodia major
Pterostylis acuminata
Pterostylis nana
Pterostylis revoluta
Eriochilus cucullatus
Pterostylis parviflora
Pterostylis rufa
Thelymitra ixioides
Thelymitra pauciflora
Acianthus fornicatus
Caladenia catenata
Caladenia angustata
Caladenia filamentosa
Diuris maculata
Prasophyllum rufum

TABLE A2-2

AVIFAUNA RECORDED AND KNOWN TO OCCUR ON MLA 42

	Hoary Headed Grebe	**	Wood Duck
	Little Grebe		Black Shouldered Kite
	Darter		Black Kite
	Great Cormorant		Square Tailed Kite
	Pied Cormorant		Whistling Kite
	Little Black Cormorant	*	Brown Goshawk
	Little Pied Cormorant	**	Collared Sparrowhawk
	Pacific Heron	*	Wedge-tailed Eagle
*	White Faced Heron	**	Little Eagle
	Cattle Egret		Spotted Harrier
	Great Egret		Swamp Harrier
	Plumed Egret	*	Black Falcon
	Little Egret	*	Australian Hobby
	Rufous Night Heron		Peregrine Falcon
	Little Bittern	*	Brown Falcon
	Brown Bittern		Nankeen Kestral
	Sacred Ibis	*	Stubble Quail
*	Straw-necked Ibis		Brown Quail
	Yellow-billed Spoonbill	*	Painted Button Quail
	Freckled Duck		Little Button Quail
	Mountain Duck		Black-tailed Native Hen
*	Black Duck		Dusky Moorhen
	Grey Teal		Coot
	Chestnut Teal		Bush Stone Curlew
	Shoveller		Masked Plover
	Pink-eared Duck		Banded Plover
	Hardhead		Black-fronted Dotteral

* indicates recorded on the site.

** indicates recorded breeding on the site during survey.

NOTE: The remainder of those listed have not been recorded on site but have been recorded in the district and could reasonably be expected to be found on the site at certain times.

	Pied Stitt
	Red Knot
	Sharp-tailed Sandpiper
**	Peaceful Dove
**	Diamond Dove
*	Common Bronzewing
*	Crested Pigeon
*	Galah
	Little Lorikeet
	Swift Parrot
	Superb Parrot
*	Cockatiel
*	Budgerigar
*	Eastern Rosella
	Crimson Rosella
*	Mallee Ringneck
**	Red Rumped Parrot
	Blue Bonnet
	Turquoise Parrot
	Pallid Cuckoo
	Fan-tailed Cuckoo
	Black-eared Cuckoo
	Rufous-tailed Bronze-cuckoo
*	Southern Boobook
	Barking Owl
	Barn Owl
**	Tawny Frogmouth
*	Owlet-nightjar
*	Spotted nightjar
	Spine-tailed Swift
	Fork-tailed Swift
*	Kookaburra
	Sacred Kingfisher
	Red-backed Kingfisher
*	Rainbow bee-eater
	Dollarbird
	Singing Bushlark
	White-backed Swallow
*	Welcome Swallow
	Tree Martin
*	Fairy Martin
*	Richard's Pipit
*	Black-faced Cuckoo-shrike
	Little Cuckoo-shrike
	Ground Cuckoo-shrike
	White-winged Triller
	Flame Robin
*	Red-capped Robin
	Hooded Robin
*	Eastern Yellow Robin
*	Jacky Winter
	Shrike-tit
	Gilbert's Whistler
	Golden Whistler
*	Rufous Whistler
*	Grey Shrike-thrush
	Leaden Flycatcher
	Satin Flycatcher
*	Restless Flycatcher
	Rufous Fantail
*	Grey Fantail
*	Willie Wagtail
*	Grey Crowned Babbler
**	White-browed Babbler

* indicates recorded on the site.

** indicates recorded breeding on the site during survey.

NOTE: The remainder of those listed have not been recorded on site but have been recorded in the district and could reasonably be expected to be found on the site at certain times.

	Clamorous Reedwarbler	*	Brown-headed Honeyeater
	Little Grassbird		White-naped Honeyeater
*	Rufous Songlark	*	Painted Honeyeater
*	Brown Songlark		White-fronted Honeyeater
**	Variegated Fairy Wren		Eastern Spinebill
	Chestnut Rumped Hylacola		Black Honeyeater
	Speckled Warbler		Crimson Chat
	Weebill	*	White-fronted Chat
	Western Warbler	*	Mistletoe Bird
	Inland Thornbill	*	Spotted Pardolote
	Chestnut-rumped Thornbill		Striated Pardolote
	Buff-rumped Thornbill	*	Silvereye
*	Yellow-rumped Thornbill	**	Diamond Firetail
*	Yellow Thornbill		Zebra Finch
	Southern Whiteface		Double-barred Finch
	Sittella		Plum-headed Finch
	White-throated Tree Creeper		Olive-backed Oriole
*	Brown Treecreeper	*	White-winged Choughs
*	Red Wattle-bird	*	Apostlebird
*	Spiny-cheeked Honeyeater	*	Magpie Lark
*	Striped Honeyeater		White-breasted Woodswallow
	Noisy Friarbird		Masked Woodswallow
	Little Friarbird	*	White-browed Woodswallow
	Bluefaced Honeyeater		Black-faced Woodswallow
*	Noisy Miner	*	Dusky Woodswallow
	Yellow-faced Honeyeater	*	Grey Butcherbird
	White-eared Honeyeater		Pied Butcherbird
**	Yellow-tufted Honeyeater	*	Australian Magpie
	Fuscous Honeyeater	*	Little Raven
**	White-plumed Honeyeater	*	Australian Raven
*	Black-chinned Honeyeater		

* indicates recorded on the site.

** indicates recorded breeding on the site during survey.

NOTE: The remainder of those listed have not been recorded on site but have been recorded in the district and could reasonably be expected to be found on the site at certain times.

TABLE A2-3

REPTILES RECORDED AND KNOWN TO OCCUR ON MLA 42

	Eastern Snake-necked Turtle or Long-necked Tortoise
*	Marbled Gecko
	Tree Dtella
	Wood Gecko
	Thick-tailed Gecko
	Aprasia inaurita (?)
	Delma sp.
	Bearded Dragon
	Nobbi
*	Gould's Monitor (Goanna)
*	Lace Monitor (Goanna)
*	Cryptoblepharus boutonii
	Ctenotus strauchii
	Cunningham's Skink
	Tree Skink
	Lerista muelleri
	Morethia boulengeri
	Eastern Blue-tongued Lizard
	Shingle-back
	Typhlina bituberculata
	Carpet Python
*	Eastern Brown Snake
	Curl Snake (?)
	Bandy-Bandy
	Red-bellied Black Snake

* indicates species recorded on site. Others may be expected.

TABLE A2-4

MAMMALS RECORDED AND KNOWN TO OCCUR ON MLA 42

*	Echidna
	Yellow-footed Antechinus
	Fat-tailed Dunnart
	Common Ringtail Possum
	Sugar Glider
*	Common Brushtail Possum
	Eastern Grey Kangaroo
	Swamp Wallaby
	Grey-headed Flying Fox
	Little Red Flying Fox
	Little Mastiff Bat
	Gould's Long-eared Bat
	Lesser Long-eared Bat
	Gould's Wattled Bat
	Little Broad-nosed Bat
	Little Forest Eptesicus
	Spotted-tailed Quoll (?)

* Recorded on site.

APPENDIX 3

ENERGY STATEMENT

The format of this Energy Statement follows the Guidelines set out by the Energy Authority of N.S.W.

1. BACKGROUND INFORMATION

The Company proposes to develop an open cut mine to win approximately 4.6 million tonnes of ore containing gold and silver. The ore will be crushed and treated in a carbon-in-pulp treatment plant. The annual throughput of ore will be approximately 500,000 tonnes.

The open cut mine will be developed to a depth of 85 m below the existing surface. For every tonne of ore mined there will be approximately 1.2 tonnes of waste rock and 0.2 tonnes of low grade ore. The waste rock and low grade ore will be stockpiled close to the open cut. All ground material after treatment will be placed into a tailings dam.

2. OPERATIONAL ENERGY REQUIREMENTS

2.1 Construction Period

During the construction of the treatment plant, the Company will utilise electrical power and fuel driven vehicles.

The power requirement for welding, erection, etc. during this period is estimated at 50 kw.

The following fuel driven vehicles will be used on site:

- Cranes
- Bulldozer
- Scraper
- Concrete Mixer
- Front-end Loader
- Small Trucks.

The Company expects that the above vehicles will use approximately 100,000 litres of fuel during the construction period.

2.2 Open Cut Mining

The Company estimates that the fuel usage to operate the equipment involved in drilling, loading and transportation of the ore will amount to approximately 500,000 litres annually.

2.3 Treatment Plant

The treatment plant will be operated primarily by electrical power with an estimated 30 kwh per tonne. Therefore, the annual electrical power usage will be approximately 15,000 megawatt hours.

The only other energy source is L.P.G. which is required to operate a kiln in the gold room.

2.4 Total Fuel Usage

The annual liquid fuel usage for the project will be approximately 500,000 litres.

3. JUSTIFICATION OF LIQUID FUEL USAGE

3.1 Open Cut Mining

There is no alternative economic method to remove the ore and rock.

3.2 Treatment Plant

The Company is maximising its use of electrical power.

APPENDIX 4

New South Wales Government

Department of Environment and Planning

R.W. Corkery and Co. Pty. Ltd.
P.O. Box 80,
ORANGE, N.S.W., 2800 58

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

Telephone (02) 266 7111 Ext. 7490

Contact: Mr V. Thomson

Our reference: 85/11375

Your reference:

Dear Sir,

PROPOSED GOLD MINING AND TREATMENT PLANT, LOT 14, PARISH CULINGERAI, GIDGINBING NEAR TEMORA

Thank you for your letter of 29th October, 1985, indicating that you are consulting with the Director with regard to the preparation of an environmental impact statement (EIS) for the above development.

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

3. The Director has no specific requirements pursuant to clause 35 of the Regulation in regard to the form or content of the EIS.

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

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

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

Yours faithfully,

C.J.Wright
Manager, Assessments Branch
Delegate for the Director

DEPARTMENT OF ENVIRONMENT AND PLANNING
ATTACHMENT No. 1

STATUTORY REQUIREMENTS FOR ENVIRONMENTAL IMPACT STATEMENTS.

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

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

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

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

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

DEPARTMENT OF ENVIRONMENT AND PLANNING
ATTACHMENT No.2

ADVICE ON THE PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR A MINING AND PROCESSING OPERATION

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

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

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

1. Description of the proposal.

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

This section should provide specific information on the nature, intent and form of the development. It should, as far as possible, include such details as the processes involved highlighting any proposed crushing or blasting, water management and treatment, chemical processing disposal of wastes, landscaping and rehabilitation. A description should also be provided of associated operations such as the transport of materials.

Particular details that may be relevant include:

- Characteristics and economic significance of the resource
- Quantity of materials to be mined.
- Methods fo extraction/plans of operations.
- Details of treatment process.
- Type of machinery and equipment to be used.
- Expected life of the operation.
- Number of persons to be employed.
- Hours of operation.
- Details of necessary stockpiling.

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- Quantities and source of power required.
- Site drainage and erosion controls.
- Proposals for rehabilitation and landscaping.
- Quantities and source of water required for the proposal.
- Recycling of waste water.
- Disposal of tailings and hazardous waste materials.
- Transport storage and handling of chemicals and associated safety measures.
- Proposals for rehabilitation, and assurances or effective completion.

2. Description of the Environment.

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

3. Analysis of Environmental Impacts.

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

- Any possible siltation, sedimentation or downstream effects of the operation.
- Any likely cumulative effects of the proposed operation when considered together with other operations in the vicinity.
- Effects on flora and fauna.
- The effects on the agricultural viability of the adjoining land holdings.
- Likely noise/vibration disturbance caused by the operations, including transport operations, on nearby residences and main northern railway lin.
- Other impacts of trucking movements, including access over railways and onto highways.
- Dust nuisance likely to be caused.
- Water treatment and other pollution control measures.
- Effects on water quality of nearby watercourses.
- Disposal of waste material including tailing and spent ore.
- Effects on the visual environment.
- Any likely affectation of sites of Aboriginal archaeological or European heritage value if located in vicinity of operations.
- The proposed end use of the site and likely effectiveness of rehabilitation.
- Effects on the neares community, especially demand for housing, community facilities and services.

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

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4. Contact with relevant Government Authorities.

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

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

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

APPENDIX 5

New South Wales Government

National Parks and Wildlife Service

Box 39 P.O.
Coonabarabran, 2357

Our reference: DW:CJ

Your reference:

Telephone: (068) 42 1311

Mr R. W. Corkery,
R. W. Corkery & Co. P/L,
P.O. Box 80,
ORANGE NSW 2800

13th March 1986

Dear Mr Corkery,

Attached is my evaluation of the archaeological impact study on the Paragon Gold lease area. Due to the lack of research in the area, site recognition and assessment is often difficult for archaeologists not familiar with the Western Region.

As a result, the recommendations are concerned with only two small sites which I understand can readily be avoided and would receive no disturbance by development as planned.

D. Witter.

D. C. Witter
for Director

EVALUATION AND RECOMMENDATIONS OF AN ARCHAEOLOGICAL IMPACT STUDY NEAR TEMORA.

by Dan Witter
March 1986

INTRODUCTION

The following report was submitted to me as a National Parks and Wildlife Service archaeologist for the Western Region, stationed at Coonabarabran. It was prepared for R. W. Corkery and Co P/L for Paragon Gold P/L.

"An archaeological survey near Temora, NSW"
H. Bradshaw and D. Donlon
January 1986

Also with this report was another report form the Wiradjuri Regional Aboriginal Land Council.

"Survey report of Paragon Mining Lease, Temora"
Roland Williams
January 1986

I will procede to evaluate the results of this work and the recommendations offered. I will then propose those recommendatios which are appropriate for the policies and statutory obligations of the National Parks and Wildlife Service.

RESULTS OF SURVEY

Five sites were described. One contained flaked stone, a hearth and a scarred tree. Two sites contained hearths only. One other site was of flaked stone and the other was a scarred tree. The flaked stone consisted of 20 items altogether, mainly of chalcedoney.

EVALUATION OF RESULTS

The evaluation of the results will assess the identification of the sites and their significance.

The two scarred trees were well illustrated by photographs. Both scars are too irregular to be recogniseable as the removal of a bark slab. It is also unlikely that that ironbark trees were used for this purpose. After a close examination of the photographs it is clear that these trees cannot be accepted as Aboriginal scarred trees. Consequently, site Lillydale 5, cannot be regarded as a valid site. The trees on site Lillydale 1 is also not a relevant part of that site.

Three of the sites were defined as having hearths of fired clay. Photographs and descriptions of these features were provided in the report. Upon careful consideration of this information, none of the fired clay features are prehistoric hearths. All are natural, caused by burning stumps and logs due to bush fires. The best examples illustrated were clearly too massive to be the clay balls used in real hearths. In addition there was no indication of the fire pit which would have contained the hearth. As a result, sites Lillydale 3 and 4 are not valid sites. The fire clay features on Lillydale 1 also is not a cultural element.

The flaked stone presentation sites, Lillydale 1 and 2 are genuine. On the first site there were 9 pieces in a 20 x 5 metre area, and in the other there were 11 items in a 20 x 15 metre area. Even if all of the flaked stone is combined, there is not an adequate quantity for statistical analysis. Other forms of analysis would also be uncertain considering the low density of the material on the sites. None of the items found were of rare or outstanding types. Other sites with abundant flaked stone should be common in the area and provide better material. The sites Lillydale 1 and 2 are therefore of a low value for research or education. It would also be difficult to support a high value to be assigned to these sites by the Aboriginal community.

In summary only 2 of the 5 sites described are genuine archaeological sites. Both of these are small, low density flaked stone scatters. None of the fired clay features or scarred trees are archaeological.

Doubts were expressed by Bradshaw and Donlon regarding the fired clay features and scarred trees. On the basis of my experience in the region, I can confirm that these finds are not cultural.

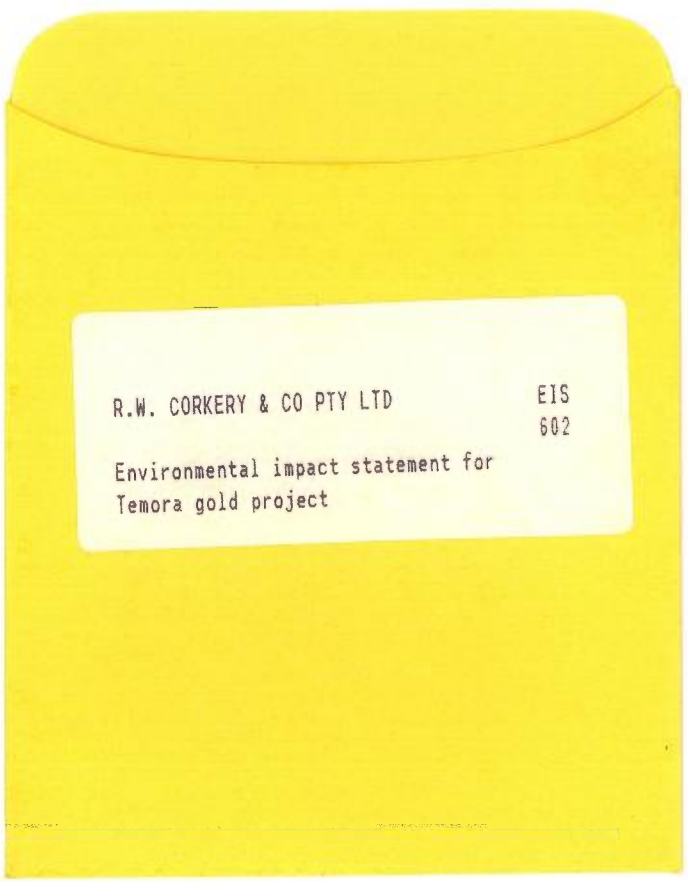
RECOMMENDATIONS

The recommendations below have taken into account those proposed by Bradshaw and Donlon as well as by Williams.

1. No avoidance, protection, or other management measures are recommended for the sites defined as Lillydale 3, 4 and 5. If concern is expressed by the Aboriginal community it will be necessary for a National Parks and Wildlife Service officer to explain in greater detail why these cannot be accepted as sites.

2. Avoidance procedures should be estabished for Lillydale 1 and 2. If this is not possible, a consent to destroy will be reequired. Since these artefacts are of low resource potential such an application is not likely to have objections.

3. In the interim, the flaked stone on sites Lillydale 1 and 2 should be left in place. It is difficult to justify the erosion control measures recommended in William's report. The material is of low educational value. If a collection is desired by the Aboriginal community, a collection permit would be appropriate.



R.W. CORKERY & CO PTY LTD

EIS
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Environmental impact statement for
Temora gold project

Borrower's name	Date	Ex:

RAECO