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AA068152

Environmental impact statement for a proposed open cut
sapphire mining operation at "Menari" - Swan Vale, Inverell
Shire



L96/3110

ENVIRONMENTAL IMPACT STATEMENT
FOR A
PROPOSED OPEN CUT SAPPHIRE
MINING OPERATION
AT
"MENARI" - SWAN VALE
INVERELL SHIRE

Prepared by
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NSW DEPARTMENT OF
MINERAL RESOURCES

15 JAN 1989

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for
R.A. & R.J. FRAZIER
"Menari"
Swanvale via
Glen Innes NSW

413286967

FORM 4

ENVIRONMENTAL IMPACT STATEMENT

This statement has been prepared on behalf of Ronald Allen Frazier and Roslyn Joan Frazier to accompany an application for development approval for an open cut sapphire mining and treatment operation on the property "Menari", Swanvale via Glen Innes NSW.

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

Proposed Open Cut Sapphire Mining Operation at "Menari", Swanvale.

The affected land is Lot 142 D.P.753305 Parish Ross County Gough in the Shire of Inverell.

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

Name, Qualifications of person who prepared the statement.	James Innes Noad B. Surv.(Hons). Registered Surveyor, Licensed Real Estate Valuer (REVRB)
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I, James Innes Noad, of 3/20 Otho Street, Inverell, hereby certify that I have prepared the contents of this statement in accordance with Clause 34 and 35 of the Environmental Planning and Assessment Regulation, 1980.



Date: 17th September, 1996

SUMMARY

An open cut sapphire mine at "Menari", Swanvale, via Glen Innes is proposed, to be operated by R.A. & R.J. Frazier, who are the landowners.

The proposed development, existing environment and details of the actual mining operations are described. Rehabilitation methods and the effect of the development on the environment are discussed.

It is considered that the mining, treatment and rehabilitation methods proposed, together with safeguards to be applied during the course of the development, are sufficient to avoid long term environmental damage, provided close attention is given to dam construction at the plant site area, and will result in only short term environmental disruption.

The development is justifiable on the above grounds and is desirable in terms of the economic benefits which will accrue to the landowners, the Shire of Inverell and the towns of Inverell and Glen Innes.

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1. THE PROPOSED DEVELOPMENT

1.1 Introduction and Objectives

It is proposed to mine and recover sapphires within areas totalling approximately 6 hectares on the property "Menari", in the area known as Swanvale in Inverell Shire. The site is 35km directly east of the town of Inverell and 4km by road south of the Gwydir Highway on the Spring Mountain Road (see Appendices 1 and 2).

The areas to be mined are shown in Appendix 6. Approximately 24,000 bank cubic metres of economic deposits have been indicated by testing. At an estimated mining and treatment rate of 4,000 bank cubic metres per year (on a part-time basis), the mine has a life of 6 years.

1.2 Land Tenure

MLA 3 Inverell comprises part of Lot 142 D.P.753305 (formerly known as Portion 142 - see Appendix 2). Lot 142 D.P.753305 is a perpetual leasehold (Closer Settlement Lease 1955/4) held by Ronald Allen Frazier and Roslyn Joan Frazier. The landowners are the mining lease applicants. Mr and Mrs Frazier also own the property "Spring Valley" (Lot 141 D.P.753305) which adjoins "Menari" on the west.

1.3 Mining Tenures & Conditions

MLA 3 Inverell was applied for under the Mining Act 1992 in 1994. Prospecting operations leading to the mining lease application were carried out under Exploration (Prospecting) Licence 1140 applied for in 1989. In order to commence small scale operations to fund larger scale mining, Mineral Claims 162 and 163 were applied for by Mrs and Mr Frazier respectively and were granted on 20th March 1995 for a period of five years (see Appendices 6 and 7).

The Department of Mineral Resources Conditions of Authority (ML) (1993) applicable to MLA 3 Inverell are 1, 3, 4, 5, 7, 8, 11, 12, 13, 16-24 (inclusive), 26-29 (inclusive), 1-34 (inclusive), 37, 40-43 (inclusive), 58 and 66-77 (inclusive). These conditions comprise Appendix 9 and have been included to indicate the high degree of constraint placed on the miner by the department, on both mining operations and restoration.

1.4 Zoning

The land is zoned Rural Agricultural 1(a) under Inverell Council's LEP 1988.

1.5 Location and access

"Menari" is 39km east of Inverell by road, and 4km south of the Gwydir Highway on the Spring Mountain Road. The latter is gravel formation and, although a school-bus run, is not a through road. South of "Menari", the Spring Mountain Road services six farming and grazing properties, some not resided upon, being visited by their owners only on weekends.

1.6 Objectives

The objective of the development is to establish an open cut mining operation to recover and market sapphires, causing minimal short term environmental disruption with no long term environmental damage. The objective of the restoration and rehabilitation procedures to be adopted is to return the landform at the site to its former (and proposed continuing) usage ie grazing of sheep and cattle on native or improved pastures or for cropping.

1.7 Alternatives

Not to proceed with the development would be to ignore the economic advantages of the proposal to the Inverell and Glen Innes districts in terms of employment, and to the landowners in terms of income generated.

No alternative to open cutting, due to the shallow nature of the deposits, nor to the treatment method to be used is considered practicable. The methods of mining and treatment to be adopted are considered the most efficient and least disruptive to the environment available.

No alternative to treating the material at the site is considered feasible, due to the heavy nature of the sapphire bearing wash. It is not practical to truck the material by public roads to another treatment plant - road registered vehicles and a possible upgrade of the road system would be required and dust and noise problems caused for residences adjacent to the route chosen. "Menari" is relatively remote from heavily trafficked routes and is in an area where sapphire mining has taken place in the past. As a sufficient water supply for treatment is considered to exist at "Menari", the alternative of treating the sapphire wash at another location will not be further considered.

2. THE EXISTING ENVIRONMENT

2.1 Topography

"Menari" is in an area of hilly to undulating grazing land midway between Inverell and Glen Innes, at an average elevation of 850 metres above sea level. Slopes vary between 2 and 12% and the areas to be mined generally follow shallow but defined stream lines with gradients of approximately 4% (see Appendices 2 and 6). The Spring Mountain Road through "Menari" generally follows the watershed.

2.2 Geology

"Menari" is mostly tertiary basalt formation with granite and trap intrusions in the south.

The sapphire bearing wash is overlaid by 1 - 2 metres of overburden and topsoil. The wash has an average thickness of 0.4 metres and consists of clays and gravels composed of fragments of porphyry, basalt and ironstone.

2.3 Soils

"Menari" is within a large tract of country comprising Euchrozem/Black Earth soils of good structural development. There is a distinct but quite localised area of red soils at the plant site. On "Menari" these soils are considered to be stable - see the report by S. McLane, Resource Officer, Department of Land and Water Conservation in Appendix 5. The susceptibility of these soils to erosion and the likely impact of mining and treatment on them, with particular reference to dam construction, is discussed in Mr. McLane's report.

2.4 Climate

The area possesses a "tablelands" climate, with warm summers and cold winters. Average temperatures range from 8° to 28°C in summer and from 0° to 12°C in winter. The average annual rainfall is 765mm which falls predominantly in spring and summer.

2.5 Existing Land Use

"Menari" is operated as a mixed farming property where the grazing of sheep and cattle is carried out on native or improved pastures in conjunction with cropping enterprises such as wheat, barley and summer crops.

2.6 Drainage and Flooding

A broad ridge runs generally east-west through "Menari" and most of the areas to be mined are at the head of any catchments. In the north, shallow gully systems become Wet Creek which enters Swan Brook about 2.5 km east of the Gwydir Highway crossing. In the south, the terrain is somewhat steeper and gully flow lines enter Kings Creek, a substantial tributary of the Macintyre River which it enters some 16km to the west, at the Silver Mines Road crossing near Sheep Station Hill.

The treatment plant site is located beside Spring Gully, a tributary of Kings Creek which it enters at the southern boundary of "Menari". Spring Gully rises 5km east of "Menari" to the southeast of Spring Mountain, a basalt monolith overshadowed by White Rock Mountain.

There are usually permanent low flows or springs in the major gully systems at or near the site although the areas to be mined are not permanent watercourses. The treatment plant area, although adjacent to Spring Gully, should not be affected by flows in that creek. No flood level information is available for Spring Gully which has a stable bed and bank both upstream and downstream of the site.

2.7 Hydrogeology

There is an abundant supply of spring-fed groundwater in the vicinity of the treatment site.

2.8 Archeology

There are no sites or relics of European archeological significance on "Menari" likely to be disturbed by the proposed operations.

The property was inspected on 11th April by Michael Kim, Cultural and Heritage Officer of the Northern Tablelands Regional Aboriginal Land Council, together with an elder of the Anaiwan Local Aboriginal Land Council. Mr. Kim subsequently advised Anaiwan that, due to extensive clearing and cultivation it is impossible to view any artefactual material. He states should any such material be found during mining operations work is to cease and the local Land Council and the NPWS notified. The proponents are agreeable - copies of Anaiwan's advice, the proponents' response and Mr. Kim's report are in Appendix 5.

2.9 Flora

A Flora Survey for the proposal has been prepared by the son of the proponents, John Alexander Frazier, B. App. Sc. Rural Tech. (Agronomy), University of QLD (Gatton).

His report (see Appendix 5) concludes that virtually all of the flora community on "Menari" has been altered from the native undisturbed state and largely replaced with species associated with the present agricultural land use.

Mr. Frazier advises minimal floral disturbance from the operation is expected due to the small areas involved, the limited amount of soil disturbance expected at one time and the implementation of a rehabilitation programme early in conjunction with the mining operations. The mineral deposits (which often occur within cultivated areas) are not found near any trees.

No threatened or endangered plants listed on the NPWS ROTAP list (Schedules 1. and 2. to the Threatened Species Conservation Act 1995) are evident on "Menari".

2.10 Fauna

"Menari" was inspected by Stephen Debus, Dip. Natural Resources (Wildlife), Msc (Zoology) in March, 1996. His letter (see Appendix 5) advises that, in his professional opinion, "... no threatened fauna species are likely to be on the proposed mine site or likely to be affected by the proposed mine workings". He concludes that a fauna survey for the purposes of the Threatened Species Conservation Act, 1995 "would not be justified".

3. MINING AND TREATMENT

3.1 Brief History of Mining at Swanvale.

In recent years relatively small scale sapphire mining operations have taken place along Wet Creek and the Swan Brook both above and below the Gwydir Highway crossing. On "Menari" the applicants have commenced works associated with the granted claims, ie erection of a treatment plant, construction of dams for bulk-sampling, and, in March 1996, commenced actual mining operations on MC 162.

Mining has been carried out on ML 1205 within "Warrawee" which adjoins "Menari" on the north, by the landowners, K.J. & J.A. McCulloch. The creek running past the homestead on "Menari" has been mined on "Warrawee" to the southern boundary of the latter and restored creek systems, dams and plant-site areas are visible here from the Spring Mountain Road.

3.1.1. Proponents Mining Experience.

J. A. (John) Frazier (who prepared the Flora Survey) will manage the mining operations. He has three years experience in open cut sapphire mining in the Inverell district, most of it on "Warrawee" (ML 1205), where he gained experience in setting up and running a treatment plant and in exploration and identification of workable deposits.

3.2 Staging of the Development

Mining will proceed in conjunction with the farming and grazing operation carried on by the applicants. Mining will not be continuous but will be carried out for some weeks at a time dependent upon the farming programme.

It is understood that the Department of Mineral Resources will impose working/expenditure conditions of two men/\$35,000 per annum on the lease, which is a realistic figure considering the small area to be mined.

3.3 Production Rates and Life of the Development

As stated previously, reserves of approximately 24,000 bank cubic metres of sapphire bearing material have been established, which, at an expected bulking factor of 1.2, is expected to equate to 28,800 loose cubic metres. As mining and treatment will be carried out as the farming programme and sapphire prices dictate, it would be reasonable to expect that 4,800 loose cubic metres of wash will be processed per year giving the operation, on known reserves, a life of 6 years. There are indications that further mineable reserves exist but, as the wash found so far is very patchy, quantifying ultimate reserves will be dependent upon further testing carried out while actual mining operations are underway.

3.4 Mining Method

3.4.1. General

The mining method, which is one widely practised within the local sapphire industry by smaller operators on more productive soils, can generally be described as follows:

The areas of economically mineable sapphire-bearing gravels or wash are firstly defined by trenching.

Mining is usually sequentially upstream in transverse strips across the deposit, working away from any stream line. Each strip is about 5-10m wide with blocks up to 20m in length. The land is prepared for mining by stripping the topsoil layer from the area to be mined and stockpiling it or depositing it on a previously mined and backfilled strip. Overburden is then pushed into the adjacent mined-out strip and/or sidecast with a backhoe. The backhoe also digs the wash and loads it into 11-14 cubic metre tip-trucks. The mining and rehabilitation sequence is such that no more than 0.5 hectares is disturbed at any one time around the active mining face. The wash is hauled to the treatment plant where the heavy minerals are separated from the clays and gravels. The fine fraction is pumped or gravitated to a series of settling dams and the coarser fraction returned to the base of the cut by the trucks. Haul roads from the cut to the plant are constructed from process tailings and are graded and drained to minimise soil erosion.

Careful attention is paid to drainage and efforts are made to stabilize flow-lines as soon as mining has been completed. If and when necessary, channels are constructed around the workings to divert creek flows and contour banks constructed above the mining areas to divert overland flows. When mining has been completed, channels are filled in, re-vegetated and original flow-lines restored in section. Mined areas are reformed to the natural surface profile existing before mining commenced - the final effect being that no evidence of the former mining activities remains. Eroded or degraded areas are improved. The mined areas are not fully rehabilitated until a period of time has been allowed for settling, and "topping-up" of topsoil has taken place. The treatment plant is dismantled and removed and the site rehabilitated. The settling dams are broken down, allowing surplus moisture to disperse, and shaped, as part of restoration procedures. Some dams may be retained for stock watering purposes.

3.4.2. Mining at "Menari"

The area of mining reserves at "Menari" are shown in Appendix 6. The deposits are generally 20 to 30 metres wide following existing waterways which are shallow in section rather than in well defined channels. Spring Gully has a more defined channel and some reserves have been established off flow-lines.

As stated above, mining of Mineral Claim 162 commenced in March 1996. Between 25th March and 5th April, approx. 540 cubic metres of wash material was processed (see Appendix 6 and photographs 9 and 10 in Appendix 3). No further mining has taken place to date. From the excavation shown in photograph 9 the fine material from the treatment process has been deposited in the settling dam closest to the plant site (photograph 10). Oversize material has not been returned to this cut, being utilised for gravelling of vehicle aprons and wash stockpiling areas close to the plant site. This cut will be backfilled from stockpiles of surplus rock raked from cultivation areas, prior to replacement of over-burden and topsoil. This cut has only a small catchment above it and material from the open cut is ultimately constrained from entering Spring Gully by the earth embankment more clearly illustrated in photograph 6. It is pointed out that

development consent has already been received to mine the claims - a Statement of Environmental Effects for the proposal was prepared by John Frazier.

3.4.3. Mining sequence

Mining operations will normally proceed in an up-stream direction as much as possible. It is proposed to mine in the following sequence (see also Appendix 6). As stated above, exploration indicates the reserves are patchy and the areas shown proposed to be mined are an indication only of areas in which economic deposits are expected to occur.

1. The claims and adjoining areas adjacent to the treatment plant site.
2. East of the homestead.
3. North-west of the homestead.
4. Spring Gully, north-east of the Spring Mountain Road. Reserves indicated here are particularly patchy and only a very small percentage of the length of Spring Gully will be mined and, most likely, not the actual flow line of the gully.

The areas to be mined will be protected from above with contour banks and hill-side runoff diverted into existing flow lines. Care will need to be taken with the diversion of overland flows into the gully lines and good soil conservation practices will be followed in this regard. Exclusive of the catchment for mining area 4 (Spring Gully) the largest hill-side catchment, east of the homestead, is about 44 hectares. The remaining hill-side catchments, due to most of the mining areas being at the head of the waterways, are much smaller in area.

As soils are considered stable and as it is unlikely the bed of any substantial waterway will be mined, the EPA requirement of a "full and detailed fluvial geomorphologic study" does not appear to be warranted in this case.

3.5 Treatment Methods

The treatment plant (already in place to treat material from the granted claims) has been constructed on the site shown in Appendices 6 and 7 (see also photographs 1 - 6 in Appendix 3). The site including dams will, ultimately, occupy an area of about 2 - 3 hectares.

The plant (the function of which is to liberate the sapphire material from the basalt, clays and other earth and rock materials) has a capacity of 45 loose cubic metres per day and is typical of small treatment plants in use within the sapphire mining industry in the district, consisting of a number of steel fabricated modules on a concrete slab base.

The treatment operation is a wet process and wash is dumped from the trucks into a bin where it is hosed with high pressure water into a scrubbing and screening circuit consisting of trommel and jigs. The screened undersize product flows into a jig which will concentrate the heavier minerals. The fine waste material (slurry) is gravitated to the settling dams and oversize wash returned to the open cut by the trucks. Clear water from the settling dam is reused.

3.6 Water Requirements

3.6.1. Treatment Plant Dams

The treatment plant will process approximately 400 bank cubic metres of wash per month when operating, each cubic metre of wash requiring an estimated 6,000 litres of water to treat, 600 litres of which will be make-up water. The total monthly water requirement will be 2.4 megalitres. The pressure dam as constructed has a capacity of about 1.3 megalitres, with additional storage available initially in the settling dams.

The capacity of the settling dams, as presently constructed for bulk sampling of the claim areas, is about 1.4 megalitres. Approximately 50% of the sapphire bearing wash is expected to be deposited in the settling dams as slurry and, as this material is not proposed to be returned to the cuts, 12 megalitres of slurry may be expected to be generated by the operation in the expected life of the mine. Allowing an average depth of 2.5 metres, with walls, an area of 1 hectare will be required for settling dams. Such an area is available to the west, east and north-east of the existing dams. Should further testing indicate additional mineable reserves, dried slurry will be required to be returned to the cut or further settling dams constructed.

All dam walls will be of earthen wall construction from material excavated on site. They will be protected from above by contour banks to exclude surface run-off except where surface run-off is to be collected for processing water.

3.6.2. Source of Water

An embargo under the Water Act exists on the collection of surface water flows, which precludes the damming of defined stream lines such as occur on the southern and western sides of the treatment plant site. There is, however, an ample supply of water from a spring on the northern side of Spring Gully east of the plant site. The water table at the clean water dam is above the level of the floor of the dam and supplies are expected to be replenished partly from this source. As required, water will be pumped from the spring to the clean water (pressure) dam.

3.7 Energy Requirements

The treatment plant will be powered by two 5hp petrol engines. Mobile plant such as backhoe and trucks will be diesel powered.

3.8 Workforce and Plant Requirements

Plant	Capacity	Number	Employees (part time)
Backhoe (bucket/loader)	0.3m ³ /0.5m ³	1	1
Bulldozer (Cat. D7)		1	1
Trucks	11&14m ³	2	2
Treatment Plant			1
Total (see following)			2

The plant listed will not be used full time during mining operations, the backhoe operator will operate the bulldozer and one truck and the plant operator another truck as required.

Amenities as required by the Department of Mineral Resources will be provided at the plant site. The operators, being landowner/applicant family members will also use the amenities at the "Menari" homestead.

Should there be a conflict between mining and farming activities casual labour will be employed, usually on the farming activities. Contract bulldozing may be employed on dam construction.

3.9 Hours of Operation

Mining, treatment and rehabilitation will usually be carried out between 7am and 5pm Monday to Friday.

3.10 Access

Mr & Mrs R.A. Frazier reside on "Menari" - John Frazier resides on "Spring Valley".

The development of the mine will not increase the traffic on the local roads significantly. While mining is in progress, no more vehicle movements per day than is generated by farming activities might be expected.

3.11 Haulage

Trucks carrying the sapphire bearing wash will use haul roads constructed of gravels and oversize from the mining operations. Pipe culverts and other drainage structures will be provided where necessary so as not to inhibit flows within the creeks or laterals. The (public) Spring Mountain Road will be crossed in three places only, a maximum of two crossings being in use at any one phase of the mining operations.

3.12 Rehabilitation

3.12.1 General

The successful rehabilitation of mined land is, of course, central to the process of gaining approval to mine and is a stated interest of each government department consulted in the preparation of this statement.

3.12.2 Management Plan for rehabilitation at "Menari"

It is intended to rehabilitate the mined land to its grazing land or cropping usage. These operations will be carried out sequentially with the mining operation as described previously and as follows.

Once a strip has been mined the following operations will take place:

1. Oversize waste material will be trucked back from the treatment plant and dumped in the cut.
2. Overburden will be side-cast by the backhoe as it mines the adjacent cut.
3. More overburden from adjacent areas will be pushed into the mined cut with a bulldozer or backhoe.
4. The overburden will be levelled.
5. Topsoil will be replaced with the backhoe and bulldozer.
6. Once the ground has been allowed to subside, any depressions remaining will be filled with topsoil ensuring that adequate drainage of the restored areas is maintained. With bulking and topping up of topsoil there will not be any appreciable alteration in the profile of the areas mined.
7. The land will be contoured as appropriate and spread with a suitable fertilizer and grass species as detailed in Appendix 8.

Haul roads will be removed or retained as required.

On the cessation of mining and treatment, the settling dams will be fenced to exclude livestock until they have dried sufficiently to enable machinery to batter down the walls to a stable slope.

The pressure dam will remain for stock watering or be treated as for the settling dams. Retained dam walls and spillways will be left in a stable, maintenance free condition.

The treatment plant will be dismantled and removed. The concrete foundation will be broken up and buried and the whole area contoured and top-soiled.

3.12.3. Soil Stability under mining operations

The Department of Land and Water Conservation was requested to provide soils information for MLA 3 Inverell to determine their suitability for mining operations.

The report (see Appendix 5) by Mr. S. McLane, Resource Officer DLWC, concludes that the soils at "Menari" are stable and should not be altered during the stripping, stockpiling and replacement process, but see further comments on dam construction in 4.1.2.

4. ANALYSIS OF ENVIRONMENTAL IMPACTS

4.1 Water Management

4.1.1 Mining

The aim of water management in the proposed development is to conserve water and to prevent any pollution of Spring Gully or Wet Creek causing deleterious effects on surface water quality. Water that falls within open cuts, on topsoil stockpiles or on inadequately re-grassed areas will be constrained from entering the creek system by contour banks and silt traps.

4.1.2 Treatment Plant and Dams

A contour bank will be constructed above the treatment plant area to prevent overland flows from entering the dams and to prevent runoff entering areas contaminated with silt, oils or grease. On-site fuel storage and disposal of oil and domestic wastes will be carefully controlled. Sumps or bunded areas will collect any spills. Quantities of fuels and oils kept at the plant site will be small and the site is a sufficient distance from Spring Gully so that no injury to the aquatic ecosystem should occur from any accidental spill.

Mr S. McLane's report in Appendix 5 does, however, raise concerns regarding the adequacy of construction of the settling and clean water dams. At the date of his inspection the dams were only partially constructed and little evidence of compaction was visible. Further works have been carried out on these dams (see photographs 3, 5, 6 & 9 in Appendix 3) and compaction of the dam walls commenced. Mr. McLane suggests that material from the clean water dam should line the settling dams. He indicates also that attention needs to be paid to transfer between structures and the provision of spillways and cut-off trenches.

As stated in 3.6.1., should additional reserves be established or the percentage of slurry exceed the estimated 50% of the wash, further areas for settling dams, beyond the one hectare area thought sufficient, will be required, or slurry will need to be returned to the cut, increasing the number of truck movements required for the operation and the cost of mining. Due to the patchy nature of the reserves of wash found so far on "Menari", the areas shown in Appendix 7 as sites for future dam construction may well be more than ample for the operation, but, considering that slopes here are in the order of 6 to 10%, care will need to be taken with all aspects of dam construction and water management.

4.2 Hydrogeology

A spring has existed at the site of the area opened up for a sump for a considerable period. Treatment operations are not expected to exhaust the groundwater supplies in the area.

4.3 Cumulative Effects of the Proposed Mining Operation

The proposed operations will have no effect on flood flows in Spring Gully, nor is it likely that sedimentation or siltation of the channel downstream of the site will occur. Silt from side gullies carrying overland flows diverted around mining areas will be detained by silt traps before entering the creek system.

Mining will not take place in the vicinity of the banks of Spring Gully in adverse weather conditions. Stockpiled material can be treated when mining is not possible due to wet conditions.

There appears to be no evidence to suggest that mining and restoration of creek banks and adjacent flats on the heavier soils in the Inverell and Glen Innes area causes long term environmental problems for the waterway systems.

Note the EPA requirement in their letter of 15th August 1995, for a "full and detailed fluvial geomorphologic study". Following an inspection by their field officer (see their letter of 22nd April 1996) the EPA now advises that they do not require such a study, recommending only that the creek (Spring Gully) is progressively rehabilitated in accordance with Department of Land and Water Conservation recommendations.

4.4 Flora and Fauna

No trees are proposed to be removed by the mining operations although some small amount of farm timber has been used in the plant site construction.

It should be noted here that, under Section 3A of the Rivers and Foreshores Improvement Act, a permit is required for any excavations or constructions between the banks or within 40 metres of the banks of any defined watercourse. Also, under Section 21D of the Soil Conservation Act, an authority is required before damaging or destroying trees between the banks or within 20 metres of the banks of a prescribed stream. Under SEPP 4 the Director of the Department of Land and Water Conservation is the consent authority for all proposals involving the clearing of native vegetation. Additionally, the National Parks and Wildlife service must be agreeable to the removal of any trees.

Due to the lack of tree cover, the mining operations will have little impact on native flora and fauna according to Frazier and also Debus (see above 2.9 & 2.10).

4.5 Agriculture

It is expected that the mining operations will have minimal long term impact on grazing and cropping pursuits in the immediate vicinity of the mine. There is no evidence to suggest that mining of this type will have deleterious effects on agriculture either by soil erosion, salinity, loss of fertility, or proliferation of weeds. Measures will be taken if necessary to minimise short term disruption caused by dust, noise and vehicle movement. There are no significant vegetation communities or faunal habitats in the area. Practical experience has shown that sheep and cattle grazing pursuits are quite compatible with open cut sapphire mining.

The lease holder, under Condition of Authority 29, is required to make all reasonable efforts to prevent the introduction and establishment of noxious weeds.

4.6 Access and Haulage

Haul roads constructed to enable trucks to carry the sapphire-bearing wash to the treatment plant will be graded and drained to ensure erosion is prevented. At maximum processing rate of 400

bank cubic metres per month (assuming 10 working days), 3-4 return truck movements per day will be required. Although not registered for public road use, the trucks used will be suitably muffled and maintained. It is reasonably anticipated that owners and occupiers of the relatively small number of properties south of "Menari" using the Spring Mountain Road for access to the Gwydir Highway would become familiar with these mining operations and the location of the haul road crossings, which will, in any case, be signposted for the benefit of all road users travelling near the site.

4.7 Noise

A report on the noise impact of the proposal development has been prepared by Ellis Environmental Services of Tamworth (see Appendix 5).

The report concludes that "offensive noise will not be apparent at any residential premises". The homestead on "Menari" occupied by the applicants is not considered to be an affected residence.

4.8 Dust & Bushfires

The only operation likely to generate dust is vehicular movement on the haul roads although the number of vehicle movements per day when mining is in progress is small. Mining should not cause dust problems due to the inherent moisture content of the over-burden and wash and the treatment plant using water as a fundamental ingredient in the breaking down process. Statutory approval should not be required in regard to the Clean Air Act, 1961.

Plant will be fitted with suitable spark arresters and grass fires have not proven to be a problem with the kind of operation proposed.

4.9 Visual Aspects

The mine will have a short term negative impact on the visual amenity of the site but "Menari" is remote from any highly settled area and there is no through traffic.

Items of non-operative and obsolete mining equipment will be kept as far as possible out of direct vision of travellers on the Spring Mountain Road. The treatment plant area will be maintained in a neat and tidy state.

4.10 Final Land Use

As described, rehabilitation will be progressive during the life of the project and when complete, the mined land will be used for sheep and cattle grazing and cropping. The final land form of the site will conform with that existing prior to any mining operations and the plant site will be fully rehabilitated other than for any dams required by the landowner after mining ceases.

5. JUSTIFICATION AND CONSEQUENCES

The proposal is justifiable on the following grounds:

1. The mining operation will provide employment opportunities for the landowner/applicants, their son and casual and contract labour.
2. The landowners will benefit economically with supplementary income after a period of prolonged drought.
3. Revenue will accrue to local, state and federal governments in the form of rates, royalties, rentals, personal and company and pay-roll taxes. The sale of sapphires overseas provides export income.
4. The Inverell community will benefit with the injection of approximately \$40,000 in wages per annum for six years. Opportunities, on a small scale, will be created for local service industries, particularly light engineering, machinery and fuel companies.

6. CONCLUSION

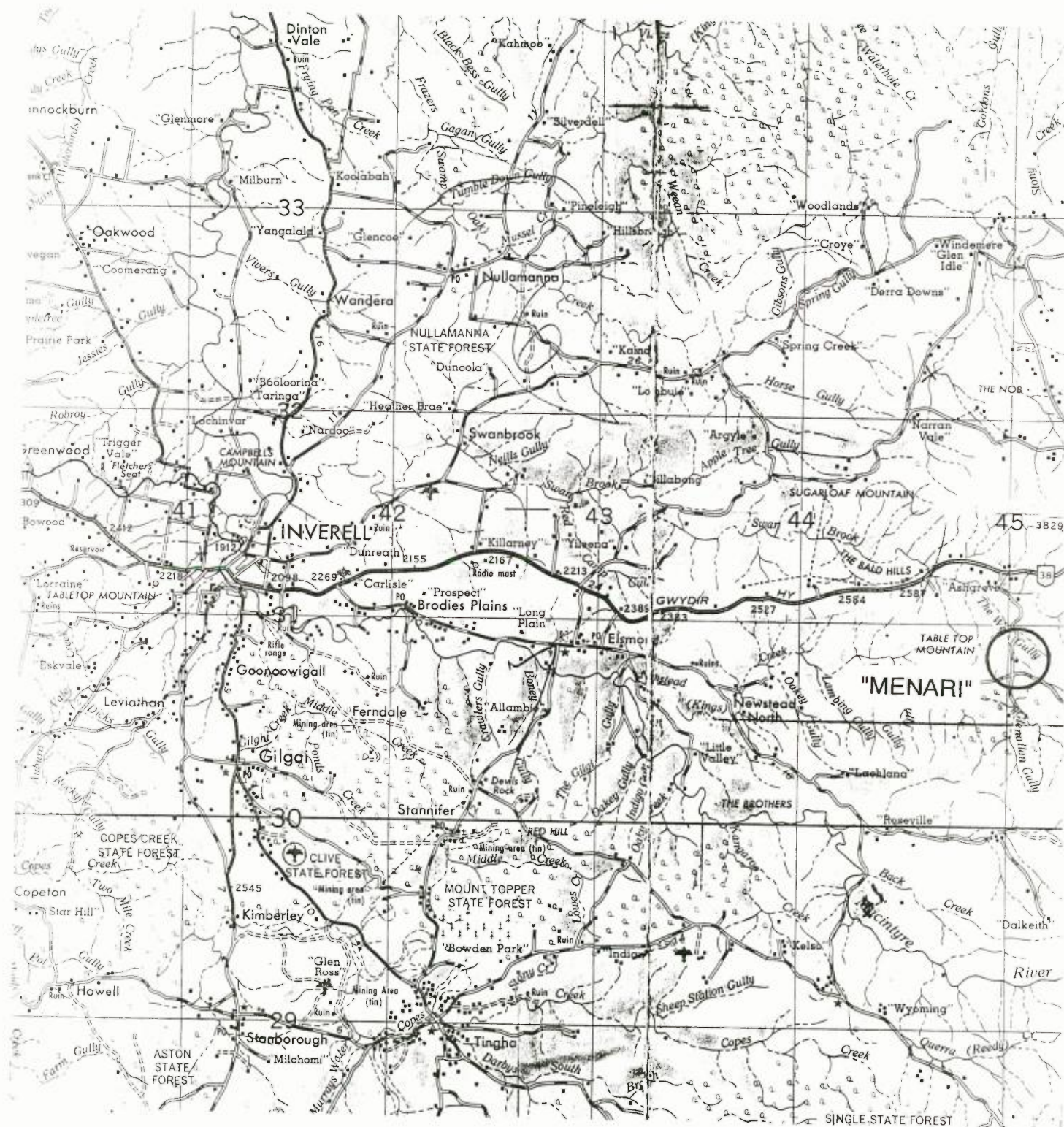
Mining operations are constrained by the requirements of the Department of Mineral Resources and the Department of Land and Water Conservation who have the responsibility of regulating and overseeing the operation and the successful restoration and rehabilitation of mined lands. The Conditions of Authority imposed on the applicant by the Department of Mineral Resources (see Appendix 9) are comprehensive, exacting and cover most of the issues raised by other government departments. The operations require the lodgement of a security deposit and mining to be conducted in accordance with a plan of management approved by the Director-General which is reviewed 12 monthly (the Mining, Rehabilitation and Environmental Management Plan or "MREMP"). There are stringent conditions placed on the rehabilitation of mined lands.

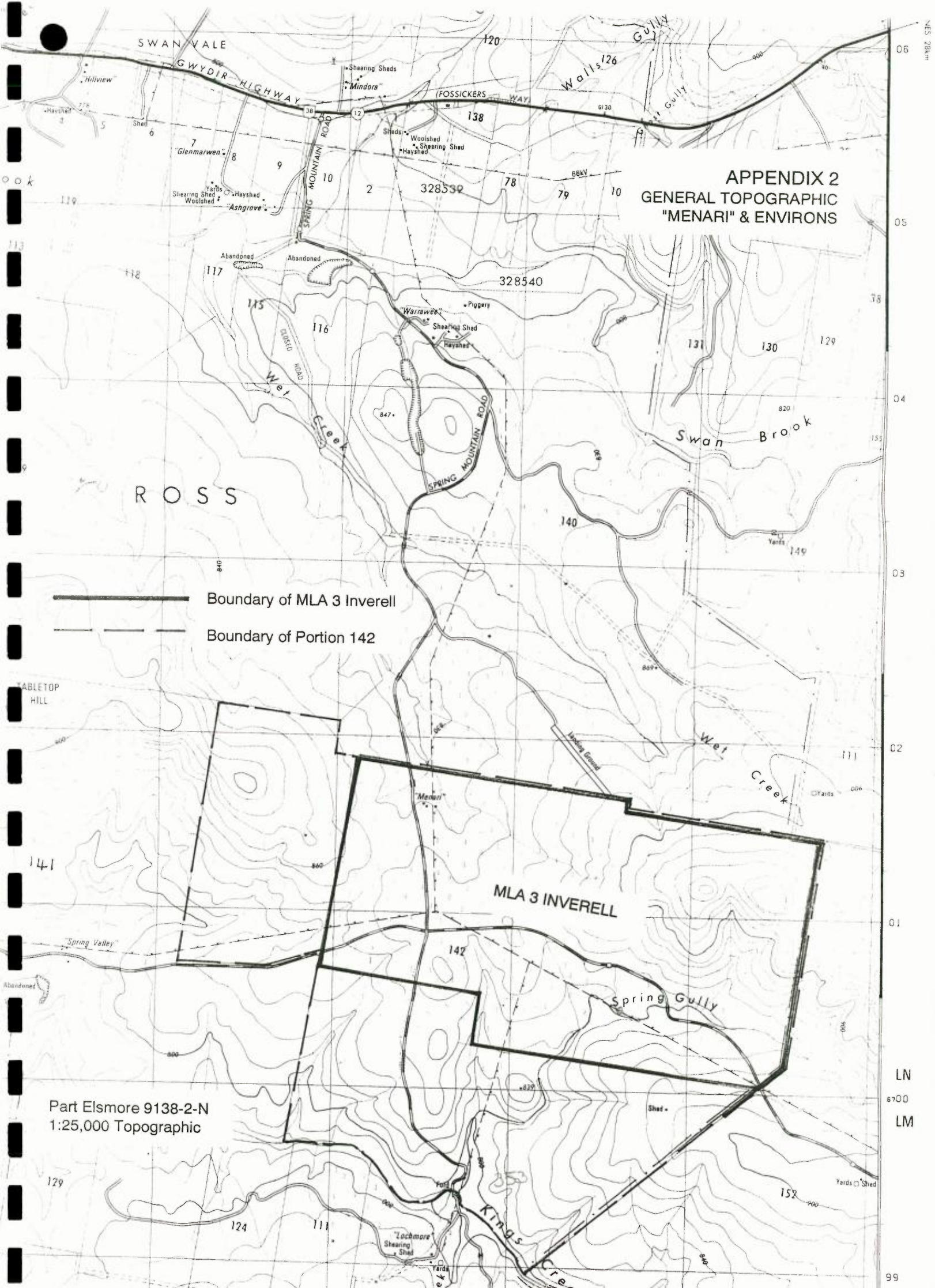
The environmental impact of the proposed sapphire mining at "Menari" will be minimal and short term. The most obvious effects of mining, following restoration, will be the presence of the restored settling dams above Spring Gully, although, being on the downhill side of the Spring Mountain Road, they will not be particularly visible to passers by. It is recommended, however, that the applicants carry out all aspects of dam construction and restoration at the plant site in cooperation with the Soil Conservation Service. Provided this aspect of the proposed mining operations is given close attention, no long term adverse impacts on Spring Gully are expected to occur.

Otherwise, it is considered that mining operations on "Menari" do not have the potential to harm the physical environment and landform of the site in the long term. The proposed operations are, of course, being carried out by and for the landowners, in whose interests it is to carry out a safe and efficient mining operation. Finally, the economic benefits of the proposed development to Inverell are not insignificant in a time of high unemployment and modest returns from farming enterprises.

APPENDIX 1 Locality Diagram

Part Inverell SH 56-5
1:250,000 Topographic





APPENDIX 2
GENERAL TOPOGRAPHIC
"MENARI" & ENVIRONS

ROSS

————— Boundary of MLA 3 Inverell
- - - - - Boundary of Portion 142

MLA 3 INVERELL

Part Elsmore 9138-2-N
1:25,000 Topographic

LN
6700
LM

APPENDIX 3
Photographs



1. SPRING MOUNTAIN ROAD AND TREATMENT PLANT SITE



2. TREATMENT PLANT



3. DAMS UNDER CONSTRUCTION



4. SPRING - SOURCE OF TREATMENT WATER



5. SPRING GULLY & DAMS UNDER CONSTRUCTION



6. EARTH EMBANKMENT & AREAS TO BE MINED



7. TYPICAL FLOW-LINE TO BE MINED - CLAIMS AREA



8. TYPICAL FLOW-LINE TO BE MINED
- EAST OF HOMESTEAD



9. MINING ON MINERAL CLAIM 162 (MARCH-APRIL 1996)



10. SLURRY DEPOSIT FROM MINING ON MINERAL CLAIM 162

APPENDIX 4

DEPARTMENTAL LETTERS

Department of Land and Water Conservation
Department of Mineral Resources
Department of Urban Affairs and Planning
Environmental Protection Authority
NSW Agriculture



Mr J.I. Noad
P O Box 349
INVERELL NSW 2360

Facsimile: (067) 66-8171

Telephone: (067) 66-6733

Ext:

Contact Name: N Foster

Our Reference:

015-284643

27th July 1995

Dear Jim

**Re: Mining Lease Application No. 3 Inverell
R. A. & R.J. Frazier, "Menari" Swanvale NSW 2370**

In response to your letter received 21/7/95, the following comments and matters to be addressed are provided to assist you in the preparation of the Environmental Impact Statement.

The Department has responsibility to ensure that any development does not detrimentally affect surface and groundwater quality and quantity, nor diminish the ecology of our river systems. Additionally we need to consider the effects on the stability of the river and possible flooding problems.

1. **LEGISLATIVE FRAMEWORK**

- (a) Under Section 3A of the Rivers and Foreshores Improvement Act a permit is required for any excavations or constructions between the banks or within 40 metres of the banks of any defined watercourse. The Department will not issue a permit for extractive industries unless Council has given Development Consent or has ruled that Existing Use Rights apply.
- (b) Extractive Industries within the riverine zone often require some tree destruction. Under Section 21D of the Soil Conservation Act an authority is required before damaging or destroying trees between the banks or within 20 metres of the banks of a prescribed stream.
- (c) A license under Part II of the Water Act may be required if the proposal involves pumping from the creek for washing or other purposes. Details to be included in the EIS should be:-
 - (i) location and size of pumps
 - (ii) details of water usage
 - (iii) estimation of water quality and,
 - (iv) details of any associated works e.g. storage and drainage
- (d) Water resource management in New South Wales is the responsibility of the Department of Water Resources. The principal legislation is the Water Administration Act, 1986. The objects of the Act are:-

- (i) to ensure that the water and related resources of the State are allocated and used in ways which are consistent with environmental requirements and provide the maximum long-term benefit for the State and for Australia; and
 - (ii) to provide water and related resources to meet the needs of water users in a commercial manner consistent with the overall water management policies of the Government.
- (e) If the proposal involves discharging 'dirty' water back into the creek an Authority under the Clean Waters Act may be required. Details of the requirements for a license should be obtained from the local office of the Environmental Protection Authority.

2. **GRAVEL EXTRACTION:**

(a) **Resource**

The EIS should state the calculated size of the resource and the percentage of this resource that is planned to be extracted. This should include an indication of the rate at which the gravel will be extracted on a monthly/yearly basis.

(b) **Method**

The EIS must contain a detailed management plan that outlines the following:-

- (i) Estimated rate of removal.
- (ii) Bed slope controls, bed-rock outcrops and the estimated particle size grading.
- (iii) A detailed surveyed plan of the site including cross sections at 50 metre intervals. These cross sections must indicate conditions before and after extraction.
- (iv) The excavations shall commence at the downstream end of the site and continue in an upstream direction at a slope no further than one part vertical in 50 parts horizontal. This same slope must also be maintained from the waters edge back to the limit of excavations, perpendicular to the flow of the creek.
- (v) The side batters of the excavation should not exceed one part vertical to 3 parts horizontal. When operations approach the upstream end of the gravel deposit, some care should be taken to minimise the risk of the remaining resource being washed away during flood events by maintaining the working face at no steeper than one part vertical to 4 parts horizontal.
- (vi) Maximum depth of excavations shall not be below the normal flow level of the creek immediately adjacent to the excavation.
- (viii) Any stockpiles of gravel and/or topsoil, both prior to and following crushing, are to be placed above the 1 in 100 year flood level and located so as to not impede or divert surface flow. The stockpiles should be protected from erosion using the Soil Conservation Service standard erosion mitigation conditions.

3. FLOODING

The EIS should provide:-

- (a) The location of the course of high and normal flow channel(s).
- (b) Description of the bed and bank stability at the site of the development as well as upstream and downstream.
- (c) Anticipated effect of the proposal on flood flows (if available).
- (d) Available floodwater levels, velocities and extent of inundation at and adjacent to the site (if available).
- (e) An assessment of the likelihood of sedimentation or siltation of the channel downstream from the site.

4. BUFFER ZONE

To protect the stability of the river and to redress the river ecology it is important to:-

- (a) Revegetate a buffer zone on the landward side of the site with a diversity of appropriate native species such as:-

Callistemon sp. (Bottlebrush), *Leptospermum* sp. (Tea tree), *Casuarina cunninghamiana* (River Oak) and locally occurring *Eucalyptus* species.

- (b) Provide a detailed revegetation plan.

5. SURFACE AND GROUNDWATER QUALITY

- (a) An assessment of the impact of the proposal on surface and groundwater quality and aquatic ecosystems and details of provisions to prevent contamination (for example fuel spillage).
- (b) Provisions to prevent any potentially turbid or contaminated runoff from the extraction site or access road being allowed to enter the creek.

6. REHABILITATION

Detail measures proposed to progressively rehabilitate the site so that the ecology of the riverine environment can re-establish. A revegetation plan should be part of this exercise.

I hope these guidelines are of assistance to you.

Yours faithfully



Neal Foster
Acting Regional Environmental Officer
Barwon Region



NSW DEPARTMENT OF MINERAL RESOURCES
1st Floor 100 Byron Street
(P.O. Box 341), Inverell, NSW 2360, Australia
Phone (067) 22 1341 Fax (067) 22 3810

J.I. Noad,
Registered Surveyor,
PO Box 349
INVERELL NSW 2360

Date: 3rd Aug 1995
Your Ref: MS 13,051dmr1
My Ref: M95/0133

Dear Sir,

Re: EIS, RA & RJ Frazier,
MINING LEASE APPLICATION 3 INVERELL

In response to your letter of 19th July 1995, the following matters are suggested to be mentioned within your EIS:

(1) Introduction stating:

- * brief description of proposal
- * the statutory titles the operation would work under and mention of the general conditions associated with these titles.

(2) Project objectives:

- * commercial goals
- * environmental objectives
- * long term objectives
- * social and economic benefits of the project

(3) Project description:

- * history
- * land title and owner
- * exploration carried out, results and rehabilitation carried out
- * geology
- * development program
- * mining phases; sites to be mined, overburden depths, topsoil and overburden dumps and return, return of tailings,
- * processing concept
- * treatment plant, type, location, foundations
- * tailings dams; number, location,
- * infrastructure; electricity, water, roads, earthmoving equipment, communications, workshop, workforce mealrooms, toilets, washing facilities, parking area, offices

(4) Environmental setting:

- * physical setting
- * surface water; catchment system, the catchment area above the area to be disturbed (incl plants site)

2.

(Environmental setting cont.)

- * fish
- * fauna
- * vegetation
- * air, noise
- * aboriginal archeology
- * land-use
- * socio-economic environment

(5) Environmental safeguards

- * Mining; area disturbed at any given time during mining, topsoil separation and replacement, rehabilitation of steep areas, erosion control, soil prone to erosion, pumping water out of excavations, diversion of gully or creek, flood control measures
- * Treatment; dam construction (1 in 3 batters, topsoil kept from dam(s) area for dam walls and other places), recycled water, seepage controls, ensuring catchment is diverted around, treatment plant drainage management, slurry control, removal and/or covering of slurry and tailings dams
- * Erosion control measures; of rehabilitated mined areas, roads, dams, tailings, and any other
- * Weed control
- * Dust, noise control (equipment and treatment plant)
- * Visual impact
- * Final rehabilitation of mined areas, roads, treatment plant site and any other disturbed areas
- * Management of all the above
- * Monitoring of all the above, including the MREMP (Mining, Rehabilitation and Environmental Management Plan) which will be part of the conditions by Dept of Mineral Resources. A copy of this MREMP will be provided every 12 months for all concerned parties (incl Mineral Resources, Council, other Govt Departments)

(6) Miscellaneous

- * Employment
- * Regional economic benefit
- * Possible future reserves
- * Other sites which have been successful ventures and their outcomes

3.

(7) Conclusions:

* Benefits, controls and management

(8) Annexures:

* Plans

* Location plan

Hope this information is of benefit to your completing the EIS.

I wish you all success with the EIS and the proposed operation.

Yours faithfully,



L.M. (Mark) Stephens,
Regional Inspector of Mines,
INVERELL



Department of Urban Affairs and Planning

J I Noad & Co
PO Box 349
INVERELL NSW 2360

Governor Macquarie Tower,
1 Farrer Place, Sydney 2000
Box 3927 G.P.O. Sydney 2001
DX 15 Sydney

Telephone : (02) 391 2000 Ext: 2077

Fax No. : (02) 391 2111

Contact : V. Thomson

Our Reference : G95/182/001

Your Reference 13051 P11

Dear Sirs,

**Proposed Sapphire Mine ("Menai", Swan Vale)
Mining Lease Application No. 3 Inverell**

Thank you for your letter of 29 June, 1995 indicating that you are consulting with the Director with regard to the preparation of an environmental impact statement (EIS) for the above development.

2. If 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, 1994, an EIS must accompany the development application to Inverell Shire Council. The EIS shall be prepared in accordance with clause 51 of the Regulation (see Attachment No. 1) and shall bear a certificate required by clause 50 of the Regulation.

3. 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.

4. In addition, pursuant to clause 52 of the Regulation, the Director requires that the following matters be specifically addressed in the EIS:

- water quality protection measures for Spring Gully downstream and Kings Creek;
- proposals for rehabilitation of site;
- results of consultation with EPA, Department of Land and Water Conservation, NSW Agriculture.

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

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

Yours sincerely,

Stephen Brown 31/7/95.

Stephen Brown
Acting Manager
Assessments and Major Hazards Branch
As Delegate for the Director



Environment
Protection
Authority
New South Wales

1st Floor NSW Government Offices
85 Faulkner Street Armidale NSW 2350
PO Box 494 Armidale NSW 2350
Tel .067. 73 7133 Fax .067. 72 2336

Mr J Noad
J I Noad & Co.
PO Box 349
INVERELL NSW 2360

Our Reference: AR 190

Your Reference: 13,051ep1

Contact: David Greenhalgh

Dear Mr Noad

Proposed Sapphire Mining at "Menari", Swanvale, NSW 2370.

This letter is in reply to your letter dated 19 July 1995 requesting the Environment Protection Authority's (EPA) requirements and comments for an Environmental Impact Study (EIS) for sapphire mining on "Menari". The following are general comments on matters that should be included and considered when preparing an EIS for sapphire mining.

Noise

All plant to be used on the site must be identified and an assessment made of the likely noise output from the site. The hours of operation need to be stated for all processes that will occur on site.

All residences within at least a 2 km radius of the operation must be identified and the likely noise impact assessed. An assessment must also be made for any others residence that may be impacted on by noise generated by operations within the pit or any transport from the site. This assessment should be carried out by a competent professional with suitable experience in noise assessments.

Should blasting be proposed a detailed assessment is required to demonstrate that the processes will meet the EPA's guidelines.

Air

Dust is the most likely air impurity to be emitted from the site during excavation and transport. The EIS must address those methods to be implemented in order to limit dust movement off site and identify those areas at risk.

Water

The EIS must detail those methods and management strategies to be implemented to prevent sediment, oils, greases and other pollutants leaving the sites or entering drainage lines or streams. This will include actions to ensure that the site is rehabilitated and the sites remain in a stable condition on completion.

Details should be provided on the transport, storage and disposal of all chemicals including fuel and oils and the maintenance of equipment. These areas would have to be bunded and located away from flood liable land.

Riparian Zone

Many river banks suffer from severe streambank and stream bed erosion. Any consideration to mine in the riparian zone must be fully investigated.

A full and detailed fluvial geomorphologic study and assessment of the proposed mining operations must be provided to substantiate claims and management strategies. Details should be set in the context of:

- a) the river catchment as a whole, including consideration of other sapphire, sand and gravel mining operations occurring in the catchment;
- b) the fluvial processes in the stream upstream and downstream of the proposed sites.

This study should provide an assessment of possible risks from the proposed mining operations. This should include risks and impacts to riparian and aquatic flora and fauna.

Full plans of site rehabilitation must be provided. Rehabilitation of the site should begin immediately after extraction of each particular area within the lease is completed. Rehabilitation strategies must be supported by the fluvial geomorphologic study.

The EIS should provide a thorough and detailed assessment of the need to extract sand or gravel from the riparian zone. A detailed assessments of various extraction methods and rehabilitation alternatives is to provided. A detailed assessment of all alternatives is also required.

Statutory

The proponent may require approval from the EPA prior to work commencing due to an obligation under the Noise Control Act 1975, the Clean Air Act 1961 and the Clean Waters Act 1970. Approval is normally conditional and would normally follow after Council's determination of the Development Consent

If mining in the riparian zone is proposed it is most likely that the proponent will also require an annual licence once regular operations commence.

General

The EIS should provide maps and plans with sufficient detail to enable the EPA to fully assess the project and its implications. We would seek for the EIS to provide a holistic approach to protection of the environment.

If you require any further information or advice regarding this matter please contact David Greenhalgh in our Armidale office on 067 737 133.

Yours faithfully



DAVID DUTAILLIS
Head Operations Northern Tablelands
for Director-General

15 August, 1995

n:\...\noadmena.let



Environment
Protection
Authority
New South Wales

1st Floor NSW Government Offices
85 Faulkner Street Armidale NSW 2350
PO Box 494 Armidale NSW 2350
Tel .067. 73 7133 Fax .067. 72 2336

Mr Jim Noad
J. I. Noad & Co
Consulting Surveyors
PO Box 349
INVERELL NSW 2360

Our Reference: AR190

Your Reference: 13,051epa2

Contact: Robert O'Hern

MLA 3 INVERELL. RA & RJ FFRAZIER "MENARI" SWANVALE

Thank you for accompanying our officer on a site visit of the area referred to above.

After inspecting the area the Environment Protection Authority (EPA) is persuaded that a fluvial geomorphologic survey is not necessary for that portion of Creek located within this mining lease. We would, however, recommend that the creek is progressively rehabilitated in accordance with the Department of Land and Water Conservations recommendations.

Please contact Robert O'Hern at our Armidale office on 067 737 133 if you wish to discuss this matter.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Simon Smith'.

SIMON SMITH
Acting Head Regional Operations
Northern Tablelands
for Director-General

22 April, 1996

[N:\WP6\CORRESP\ROH\FRAZIER.LTR]

2 August 1995



New England,
Hunter and
Metropolitan Region

NSW Agriculture

J I Noad & Co
PO Box 349
Inverell NSW 2360

35-37 Abbott Street
PO Box 546
GUNNEDAH NSW 2380

Telephone (067) 42 9277
Facsimile (067) 42 4018

Dear Sir,

MLA No. 3 Inverell, RA & RJ Frazier, "Menari", Swanvale NSW

I refer to your letter of 19 July 1995 seeking Departmental requirements for issues to be addressed in the Environmental Impact Statement for this proposal to mine sapphires near Spring Gully approximately 35 km east of Inverell.

The proposed site is located in an area of Class 3 agricultural land, suitable for improved pastures and some cultivation. The disturbance of 12-15 ha will have only a minor impact on agricultural production in the locality, and the Department is unlikely to have major concerns about the proposal provided that sound environmental management is incorporated into the project. In general the Department's concerns for such mining proposals are:

- that the disturbance of productive agricultural land is avoided or minimised and that disturbed land is rehabilitated to at least its former agricultural potential,
- that mining activities not cause undue inconvenience to rural landholders or agricultural operations, or that adverse impacts are addressed through satisfactory negotiation with affected landholders,
- that mining does not result in soil erosion or other forms of land degradation outside the mine area,
- that the quality of surface and ground water resources is not compromised, and
- that adequate control of weeds and feral pests is maintained.

The Department, through its commitment to ecologically sustainable development, would also hope that other environmental issues such as remnant and riparian native vegetation and biodiversity are also addressed.

Soil erosion, water quality and rehabilitation are the issues which will receive most attention in the final document. The opportunity to comment on the proposal is appreciated and this delayed response regretted.

Yours faithfully,

R.L.H. Browne
Agricultural Environment Officer
New England & Hunter

APPENDIX 5
SUB-CONSULTANTS REPORTS

Anaiwan Local Aboriginal Land Council
Debus, Stephen
Department of Land and Water Conservation
(Inverell Research Service Centre)
Ellis Environmental Services P.L.
Frazier, J.A.



ANAIWAN

LOCAL ABORIGINAL LAND COUNCIL

P.O. Box 651
Inverell N.S.W. 2360

Phone (067) 210 704
Fax (067) 210 705

29 April 1996

Jim Noad
J I Noad & Company
Consulting Surveyors
3/20 Otho Street
Inverell NSW 2360

Dear Jim

**RE: PROPOSED OPEN CUT SAPPHIRE MINING OPERATION AT
"GLENARA" & "MENARI" PROPERTIES**

Today, we received the survey report on the above properties from Michael Kim, Cultural and Heritage Officer in Armidale, who accompanied you on this survey. A copy of which is attached.

If our requests are agreed to, then we have no objections to MLA3 proceeding. However, could we please have your intention in writing.

Yours sincerely

Tima Kaisuva
CO-ORDINATOR

attach

"Menari"
Swanvale
via Glen Innes NSW 2370

Anaiwan Local Aboriginal Land Council
P.O. Box 651,
Inverell NSW 2360

Dear Sirs,

RE: Mining on "Menari" - MLA 3 Inverell

I refer to your letter to J.I. Noad & Co, Consulting Surveyors dated 29th April, 1996.

This is to advise that, should any Aboriginal Artefactual material be sighted (including skeletal remains) during mining operations on MLA 3 Inverell within Portion 142 Parish Ross County Gough, work at the site will cease immediately and the Anaiwan Local Aboriginal Land Council and the National Parks and Wildlife Service will be notified.

Yours faithfully,


.....
for R.A. & R.J. Frazier.,

date: 2-5-06

225868 ,

**NORTHERN TABLELANDS REGIONAL
ABORIGINAL LAND COUNCIL**

P.O. BOX 596, ARMIDALE. 2350

Phone: (067) 72 7666

Fax: (067) 72 7342

Serial No.: 0.67
Computer Ref.: C:\WP51\MKTK

Friday, 26 April 1996

Tima Kaisuva
Co-ordinator
Anaiwan Local Aboriginal
Land Council
14 May Street
INVERELL NSW 2360

Dear Tima

Re: Investigation of Aboriginal Occupation on
Properties Menari and Glenara
Inverell Shire

I refer to the above investigation that took place on
Thursday 11 April 1996, concerning any evidence of Aboriginal
Occupation on the above properties.

Summary of Results:

Property Glenara MLA 1 Inverell, ML 1142 and MLA 44

No Aboriginal Artefactual Material were identified during
the actual survey on the above areas which cover part portions
5, 25, 26, 27, 89, 53, and which were extensively disturbed
since mining operations began in the 1920's.

The archaeological potential of Aboriginal Occupation on
these portions are considered to be very low. The results of
my investigation suggest that no further Aboriginal
consultation are warranted concerning MLA 1 Inverell, ML 1142
and MLA44 Inverell.

Summary of Results:

Property Menari MLA 3

Portion 142 on MLA 3 has been extensively cleared and cultivated. This sapphire mining operation will be conducted

in manner of Four Meter wide strip that will follow the edge of a creek bed. Visibility on the ground was virtually impossible to view any Artefactual Material. About a Meter from the edge of the creek, was a crop of Milo and even in the creek bed itself was heavily grassed.

Therefore we will have to state that during the mining operations on Portion 142, if any evidence of Aboriginal Artefactual Material are viewed (this includes skeletal remains) work is to cease immediately and the Anaiwan Local Aboriginal Land Council and National Parks and Wildlife Service are to be notified.

If the above requests are agreed to, we should have no objections to MLA3 proceeding.

Yours in Unity


Michael Kim
cultural and Heritage officer

S. Debus
73 2510

25 March 1996

Mr Jim Noad
PO Box 349
INVERELL NSW 2360

Dear Jim,

Fauna: 'Glenara' and 'Menari' proposed sapphire mine sites

I am preparing a report on the fauna of 'Glenara' (Nullamanna) for Paul Broese. The purpose of this letter is to inform you that I inspected 'Menari' (Swan Vale) on the way back and discussed the site with the property owners. I understand that Mr Frazier is qualified to determine whether there are any threatened plant species on the property, therefore I have sent him a copy of the Threatened Species Conservation Act 1995, Schedules 1 and 2: Endangered Plants and Vulnerable Plants. He can determine whether provisions of the Act apply with regard to plant species on the site.

During my inspection of 'Menari' and discussion with the owners, I was able to assess the habitat subjectively and identify the following species incidentally:

Stubble Quail *Coturnix pectoralis*
Little Pied Cormorant *Phalacrocorax melanoleucos*
Straw-necked Ibis *Threskiornis spinicollis*
Crested Pigeon *Ocyphaps lophotes*
Galah *Cacatua roseicapilla*
Sulphur-crested Cockatoo *Cacatua galerita*
Rainbow Lorikeet *Trichoglossus haematodus*
Eastern Rosella *Platycercus eximius*
Noisy Miner *Manorina melanocephala*
Restless Flycatcher *Myiagra inquieta*
Magpie-lark *Grallina cyanoleuca*
Australian Magpie *Gymnorhina tibicen*
Australian Raven *Corvus coronoides*
Welcome Swallow *Hirundo neoxena*

These are all common farmland birds. It is highly unlikely that any endangered birds occur on the property. Mr John Courtney, of neighbouring 'Ashgrove', Swan Vale, advised that the endangered Regent Honeyeater *Xanthomyza phrygia* had bred on his property many years ago but has not been seen since. It appears that this bird, which requires flowering eucalypts, has long since been lost from that part of New England.

Frogs recorded at Swan Vale by Mr Courtney, a very able amateur naturalist who has confirmed the species by tape-recordings of calls, are:



Green Tree-Frog *Litoria caerulea*
Bleating Tree-Frog *Litoria dentata*
Eastern Dwarf Tree-Frog *Litoria fallax*
Peron's Tree-Frog *Litoria peronii*
Broad-palmed Frog *Litoria latopalmata*
Verreaux's Frog *Litoria verreauxii*
Plains Froglet *Crinia parinsignifera*
Common Eastern Froglet *Crinia signifera*
Eastern Banjo Frog *Limnodynastes dumerilii*
Ornate Burrowing Frog *Limnodynastes ornatus*
Barking Marsh-Frog *Limnodynastes fletcheri*
Smooth Toadlet *Uperoleia laevisgata*
Rough Toadlet *Uperoleia rugosa*

None of these is a threatened species, and no threatened frogs are expected from the site. Similarly, from fauna survey work conducted by this Department for the proposed Eastlink powerline corridor, which runs just west of Swan Vale, no endangered reptiles are expected from the 'Menari' site and habitat to be affected by the proposal.

No threatened mammals are known or expected from the 'Menari' site and habitat, and none is likely except for bat species. As there are no trees on the proposed mine site, any bats are likely to be using the airspace only and therefore the development is irrelevant to them.

The proposed mine workings are to be located in treeless agricultural land, some of it cultivated. Given the previous usage history of the site, it is my professional opinion that no threatened fauna species are likely to be on the proposed mine site or likely to be affected by the proposed mine workings. Therefore, a fauna survey for the purposes of the Act would not be justified. I think that mining activity would do less harm to the fauna community than would, for instance, further removal of old White Box trees elsewhere on the property.

Yours sincerely,



Stephen Debus
Dip. Natural Resources (Wildlife)
MSc (Zoology)

"MENARI"

**REPORT FOR PROPOSED MINING OPERATION
ON MLA 3 INVERELL**

**J. I. NOAD & CO
CONSULTING SURVEYS
INVERELL**

**S. McLANE
RESOURCE OFFICER
DEPARTMENT OF LAND AND WATER CONSERVATION
INVERELL RESEARCH SERVICE CENTRE
PO BOX 433
INVERELL NSW 2360**

INTRODUCTION:

The Department of Land and Water Conservation was instructed by J. I. Noad & Co to provide information on the soil(s) of MLA 3 in order to determine their suitability for mining operations.

SCOPE:

A reconnaissance survey was undertaken to ascertain the range of soils on the property with special reference to the proposed mining areas and the existing dams. Samples were collected from each dam and from a site representative of the whole property for analysis.

METHODS:

The Standard Laboratory methods of the Department of Land and Water Conservation were used.

RESULTS:

The soil type encountered is a dark brown, well-structured eucrozem which covers the property entirely.

The results are displayed in Table 1 and Figures 1 and 2.

The sites of collection are shown in Figure 2.

CONCLUSIONS:

All materials from each of the dams are aggregated (EAT 5). Material from Dam 1 has an excess of fine sand (39%) and is non-plastic; Dam 2 is coarsely graded with an excess of gravel and coarse sand and is only moderately plastic while Dam 3 appears satisfactory with a high shrink-swell potential.

All dams have been pushed as nothing more than large banks with no cut-off trenches and very little, if any, compaction. There is evidence of rill erosion in all dams, both on the upstream and downstream faces also indicating poor construction. Visibly there is indication that water does not remain above ground level with drawdown apparent. There is no spillway for the third dam. The interconnections between each structure are at such a height relative to the ground that the water level in each structure would be 2 to 3 metres above ground level before spilling into the next. As indicated, it is felt that because of the poor construction technique employed once this point is reached the structure(s) will fail.

The site should be redesigned to effectively transfer water from one structure to the next. All structures should be rebuilt using approved construction techniques *ie* the implementation of cut-off trenches, appropriate compactive effort and the utilisation of the more favourable material (dam 3) as a liner in all subsequent structures to prevent the Phreatic Line from encountering the ground surface.

The stability of the material representative of the whole is very high with 65% of the aggregates remaining unaffected by the testing. The material will remain essentially unaltered during the stripping, stockpiling and replacement processes.

Table 1.

**LAND AND WATER CONSERVATION
INVERELL RESEARCH SERVICE CENTRE**

LABORATORY DATA AND RECOMMENDATIONS

LANDHOLDER:	R.A. & R.J. FRAZIER	FILE:	EST-INV
PROPERTY:	MENARI	PURPOSE:	MINING
DISTRICT:	INVERELL	DATE:	18/12/95

LAB NUMBER	95/12/5/1	95/12/5/2	95/12/5/3			
SITE	DAM 1	DAM 2	DAM 3			
DEPTH (cm)	0-15	0-15	0-15			
% GRAVEL	4	21	0			
% COARSE SAND	12	23	11			
% FINE SAND	39	25	24			
% SILT	18	12	21			
% CLAY	27	19	44			
DISPERSION INDEX	9.6	12.8	15.4			
DISPERSION %	10.3	8.8	6.7			
TDC %	2.8	1.7	2.9			
EAT	5	5	5			
TUNNELLING SUSC.	NIL	NIL	NIL			
DILATENCY	QUICK	QUICK	QUICK			
TOUGHNESS	SLIGHT	MOD	HIGH			
DRY STRENGTH	LOW	MOD	HIGH			
USCS	ML	SC	CL			
LS %	7.4	6.5	13.1			
Ec dS/m	0.03	0.02	0.02			
pH 1:5	6.87	6.41	7.32			

All procedures are as per Soil Conservation Service of NSW Standard Procedures 1st July 1989, issued from Scone Research Service Centre.

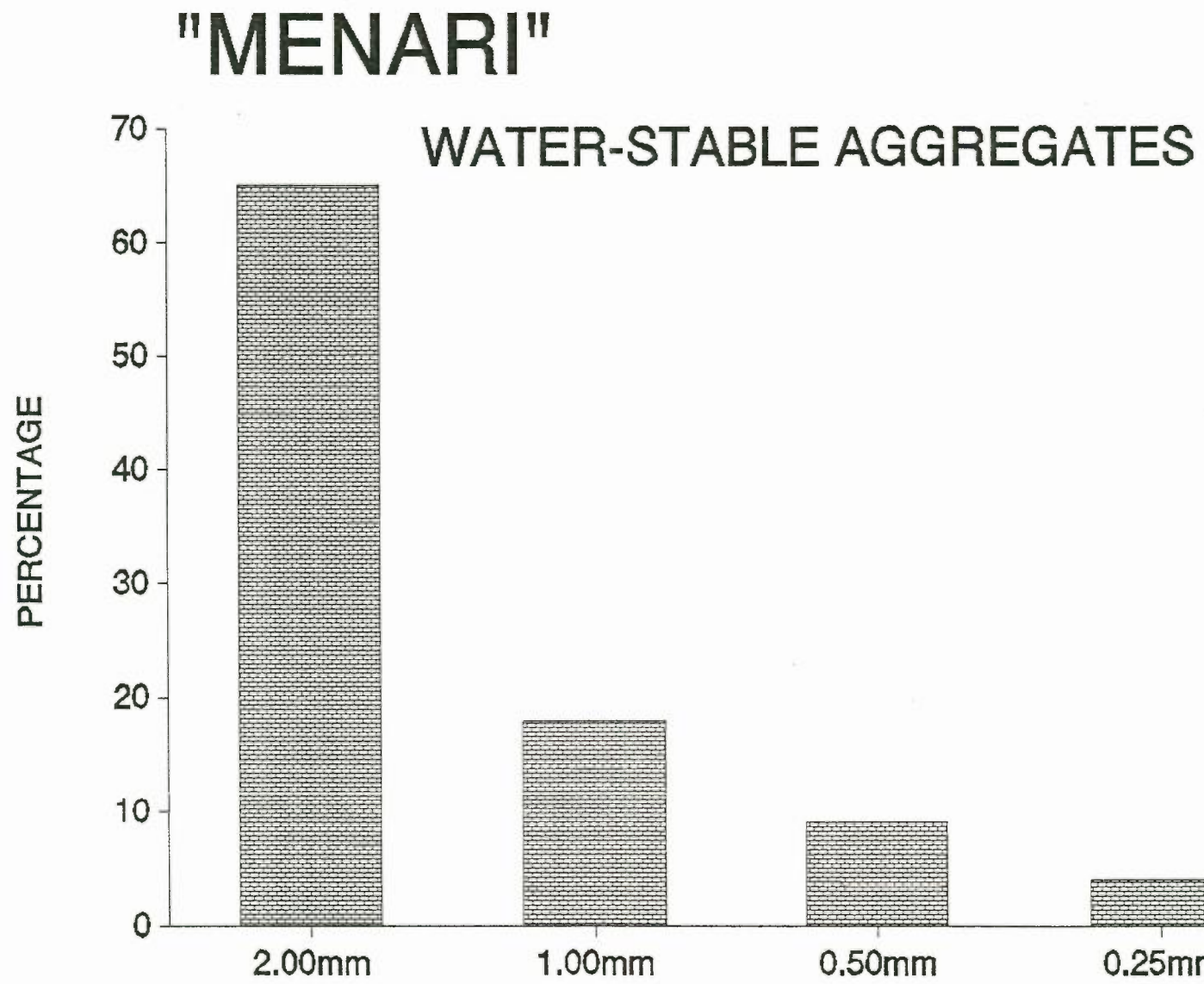
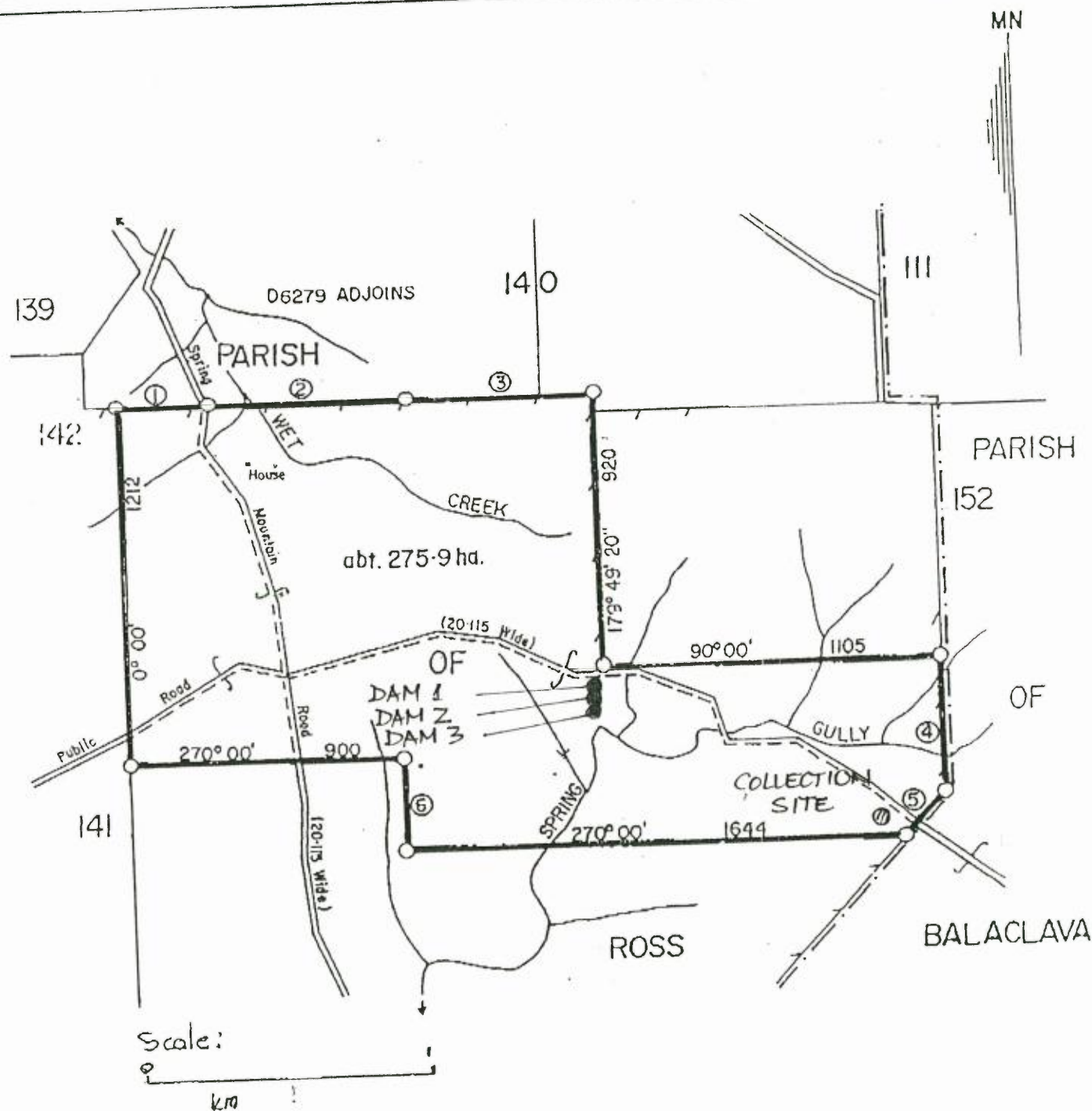


Figure 1.

Appn No. <u>470</u> Mining Division <u>INVERELL</u>	State _____
Applicant <u>R.A. & R.J. FRAZIER</u>	Marked out by <u>K. McCUSKER</u> 6-11-87
Appn Date <u>12-3-87</u>	Prepared by <u>P. Hinde</u> 5-7-89
Parish <u>ROSS</u>	Examined and
County <u>GOUGH</u>	Approved by <u>S. Bayly</u> 7-7-89
1:25 000 Map <u>9138-2-N</u>	Reduction Ratio 1: <u>20,000</u> Lengths are in metres
L. No. _____ (Act 1973)	



DEPTH RESTRICTION: EMBRACES THE SURFACE AND SOIL BELOW THEREOF TO A DEPTH OF 30m.

Reference to Traverse

No	Bearing	Distance
1	89° 53' 40"	290.5
2	90° 04' 30"	657
3	89° 49' 20"	620.5
4	180° 00' 30"	454.5
5	222° 28' 20"	195
6	0° 00'	305

**AN ASSESSMENT OF THE NOISE IMPACT OF A
PROPOSED SAPPHIRE MINING AND PROCESSING
OPERATION AT "MENARI", SPRING MOUNTAIN ROAD,
ELSMORE VIA INVERELL, BY R & R and J. FRAZIER**

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Introduction

Ellis Environmental Services were approached by J. I. Noad & Co. of Inverell to carry out a noise impact assessment on a proposal to establish a sapphire mining and processing operation on an area of land on the property "Menari", Spring Mountain Road, Elsmore Via Inverell. The proponents own the subject land under freehold title and operate the remainder of the property as a grazing and cropping farming enterprise. This Noise Impact Statement is to form part of an Environmental Impact Statement to accompany a Development Application to be made to the Inverell Shire Council.

Sapphire mining has been carried out in the area in the past and some operations are presently being worked on land adjoining the property owned by the proponents.

The scale of the operations proposed are small when compared to other larger sapphire mining operations. The mining is to act as an complementary operation with the farming enterprises.

The general area is best described as rural with the country being undulating. The sapphire bearing wash is located in prior creek beds. The overburden on the wash is removed and placed sequentially in the hole created from the previous area worked. The area worked at any one time is small, the entire disturbed area being less than one hectare. Topsoil from the new area is stockpiled and placed back over the previous area worked. Topsoil removal and emplacement is accomplished using a front end/backhoe and the mining operation is carried out using the same front end loader/backhoe.

The wash is loaded into tip trucks and transported via internal haul roads to the processing plant. At the plant the material is processed with the bulk of the wash being returned to the extraction site.

The Site

A map of the location of the site is included at the end of this report.

The actual site of the processing and mining is located some 1.75 kilometres from the Menari homestead on the eastern spur of the Spring Mountain Road near a point where it crosses the Spring Gully Creek. The surrounding country is undulating to hilly. No residential premises have line of sight contact with the proposed site of the processing plant or mining area.

Methodology

Normally a sapphire mining operation is looked at as being undertaken as three distinct steps. In this case however because of the small scale of the operations the entire area can be considered as one unit. Accordingly measurements were taken of the processing plant operating and measurements of other similar units of equipment will be used in the assessment.

Winning

The topsoil from the area to be mined is removed using a front end loader/backhoe.

Noise levels have been previously taken of a Ford backhoe/front end loader working at full load and a reading of 82 dB(A) was recorded at 10 metres from the unit. The unit was operating under full power at the time the readings were taken.

Once the topsoil has been removed and stockpiled for emplacement into the old workings, the new material is won using the backhoe.

The overburden is placed into the previous workings.

Transport of Wash and Process Reject Material

The truck to be used is a conventional road going vehicle. Typically these vehicles have a noise levels of 78 dB(A) at 10 metres. These values have been previously measured for the type of truck commonly used.

Processing Plant

The scale of the processing plant proposed for this site is small. Readings which have been taken at other sapphire processing plants are not appropriate in this case due to the major difference in the scale of operations.

An octave band analysis of the sapphire processing plant was carried out and this indicated that the noise is broad band in nature with no prominent tones nor impulsive components.

A $L_{A10(15)}$ reading of 74 dB was recorded 7 metres from the plant.

The major noise sources at the actual processing plant consist of Honda 5 HP petrol motors. A pump motor is located some distance from the processing plant (35 metres), this is effectively silenced.

Overall Noise Generated

On the basis of the measurements taken on site and others collected previously, the noise level is predicted to be 80 dB(A) at the site, this is considered a very liberal figure.

Hours of Operation

It is proposed that the site will operate from 0700 to 1700 hours Monday to Friday. These hours of operation are not likely to be a cause of any concern.

Blasting

No blasting is carried out during the process.

Proximity to Residential Premises

The nearest residence appears to be the residence on the property "Kokoda", some 2.5 kilometres distance from the site. There is marginal line of site between the processing plant (from the boundary near the site and the road at least) and this residence. The residence will be taken as the nearest residence. Noise impact assessment will be done using this property.

Noise Measurements

Measurements were undertaken on the 26 September 1995. Weather conditions were fine with winds at a peak of 10 kph and temperature maximum during the measurement period of 20°C.

All measurements were done using a Bruel & Kjaer, Type 2215, Precision Sound Level Meter with Octave Analyser.

The unit was calibrated using a Bruel & Kjaer Type 4230 Calibrator both before and after each measurement session.

Noise levels were taken from 1400 hrs to 1530 hrs at the site of the processing plant. The processing plant was run empty for a period to obtain the level readings.

The descriptor to be used for background noise level in this case will be L_{90} . In this instance the level is $L_{A90(30)}$ of 38.6 the $L_{A10(30)}$ was 43.

Background level is assumed to be 39 dB(A).

Noise Impact Prediction

The following noise impact prediction is based on the readings taken on the 26 September 1995 and the fact that the hours of operation will be from 0700 to 1630 hours on a 5 day per week basis.

Operational Noise

As noted previously the noise generated by the operation is predicted to be 80 dB(A) when measured at 10 metres from the plant operating. The nearest affected residence is situated some 2500 metres from the proposed site. Using a distance attenuation figure of 6 dB(A) per doubling of distance and an acceptable level of 44 dB(A) [arrived at by taking the $L_{A90(60)}$ figure of 39 dB(A) and adding 5 dB(A)], the acceptable level is reached at a point approximately 640 metres from the site. The background level would be reached at 1280 metres from the site.

The site is very remote from residential development and this together with the small scale of the operations proposed ensure that noise will not be a problem at any residential receiver.

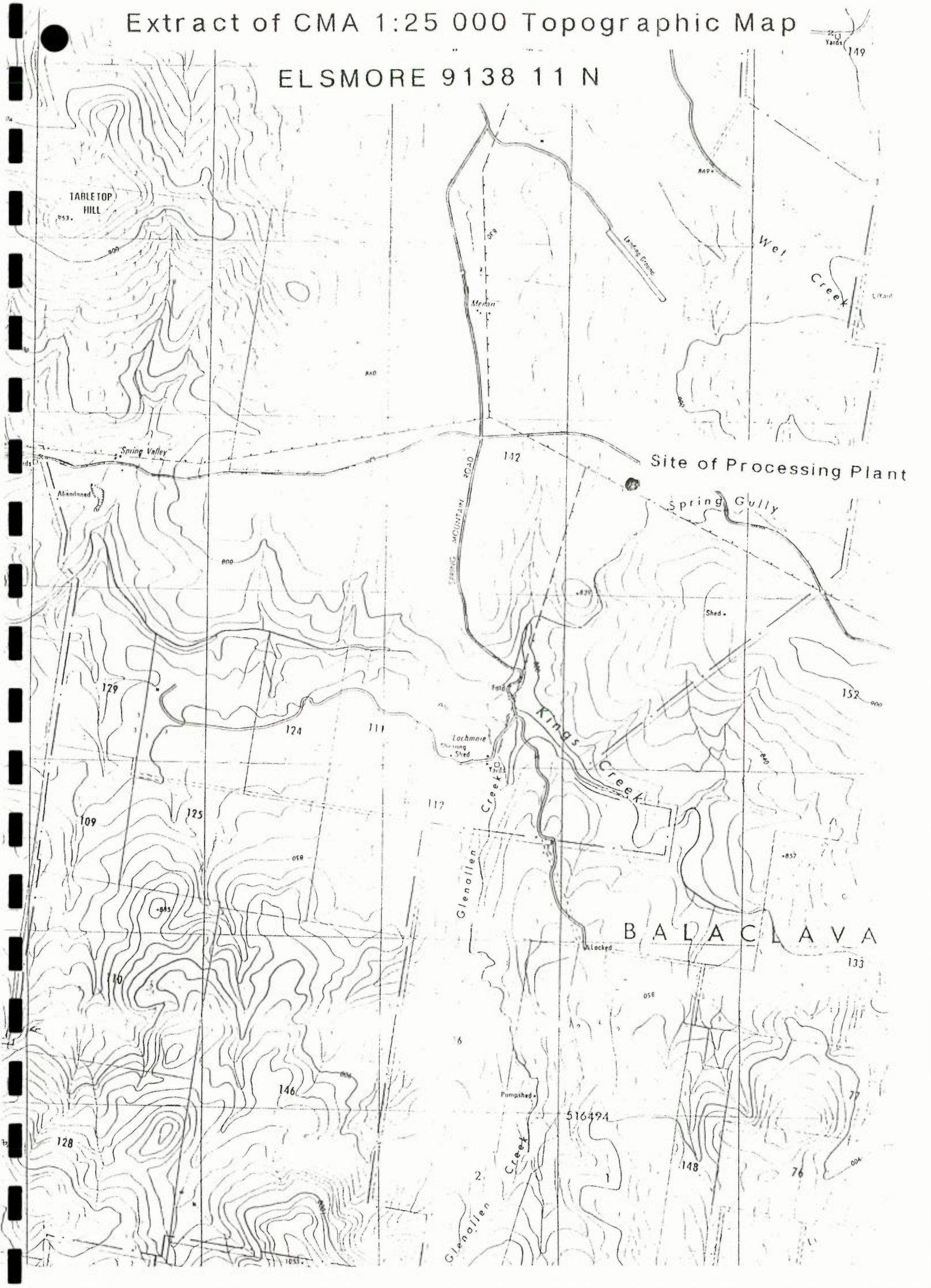
Conclusion

The proposal as outlined to me and the noise level readings I have taken indicate that providing the development is as was explained to me, offensive noise will be not be apparent at any residential premises.



C. T. Ellis, BSc. (Hons.), Dip. Agric.
12 October 1995

ELSMORE 9138 11 N



FLORA SURVEY
FOR A PROPOSED
OPEN-CUT SAPPHIRE MINE
ON
"MENARI" - SWANVALE
INVERELL SHIRE

Prepared for
J.I. NOAD & CO
Consulting Surveyors

By
John Alexander Frazier
B. App. Sc. Rural Tech. (Agronomy)
University of QLD (Gatton)

4th July, 1996

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Executive Summary

The vegetation community found in the mining lease area has been altered extensively from a natural system to a agricultural system whereby the dominant vegetation found is of introduced plant species.

Scattered native grasses and tree species will not be affected by the proposed sapphire mining operations.

It could be considered that this area has a low natural flora conservation value as native flora communities do not exist with in the area in question. Details of flora species which do exist are discussed.

Background Information

Landowners, R.A. And R.J. Frazier of "Menari", Swanvale propose to mine that part of Portion 142 Parish Ross County Gough that is within MLA 3 Inverell, for sapphires, by open-cut mining operations. Both Portion 142 and MLA 3 Inverell are held by them. The proposed mining operations are described in the Environmental Impact Statement prepared by J.I. Noad, Registered Surveyor, of which this Flora Study forms part.

The EIS is being prepared to gain development consent to mine from Inverell Shire Council.

"Menari" has a history of agricultural land use of a grazing and cropping nature.

The natural vegetation communities have been altered extensively and now exist with a mixture of exotic pasture and agricultural weed species.

Introduction

Existing flora in the lease area consists of native and introduced plant species.

The objective of this study is to identify all flora species within the mining lease area and to describe the environment and likely impacts of the mining on the flora within that area.

Method

The plant identification method used was observation of plant specimens, specifically their fruits and or flower structures, then botanical classification of individual flora using family and genus groups to identify plants into scientific and common names eg grasses *Poaceae* (family group) Genus identified by a latin noun i.e. *Hordeum*, the barley genus. Within the genus are a number of individual species identified by the addition of a latin adjective to the name of the genus eg *Hordeum distichon*, malting barley, and *Hordeum leporinum*, barley grass - an agricultural weed.

In assessing plant densities and spatial patterning of the flora in the area, the method employed was a latin square design of the area whereby the area was transected into 400x400m (approx) squares, each with an identifying number (refer Appendix III).

Plant density and patterning data was recorded and tabulated, also data relating to plant species, native/exotic population dominance percentage was also recorded. Vegetation patterning of flora communities within the mining lease area may be made by cross referencing Appendix II and Appendix III. Each square in Appendix III represents a 400m (or smaller) square. A representative sample of one metre square was taken within each larger

square and data relating to Appendix II obtained eg Square 1 is mostly cultivation with the land being prepared for sowing.

Results

From each area a number of plant species were identified (see Appendix I).

Plates 7. & 8. in Appendix 3 to the EIS illustrate the current integrity and condition of the flora on "Menari". Parts of "Menari" are also either under cultivation, fallow, or being prepared for cultivation, dependant upon the time of year and farming programme.

Vegetation Integrity And Historical Vegetation Disturbances

Vegetation integrity

The land use now consists of largely the whole area involved in a agricultural grazing and cropping system. The vegetation community is dominated by introduced plant species with native plant species previously identified in the area being only of a sparsely scattered nature.

The vegetation communities located in the area are found in:

- * Waterways
- * Stock thoroughfares
- * Steep slopes unsuitable for cropping activities
- * Top of water diversion banks
- * Cultivation head lands

The native species found within the area are considered to be species common to the North West Slopes and Plains area and are found extensively in agricultural areas and local National Parks and Wildlife Reserves throughout the region.

Historical Vegetation disturbances

Vegetation disturbances previously noted are:

- | | |
|--------|---|
| 1960 | Land clearing of native trees, land used as grazing country. |
| 1970's | Land cultivated for grain and forage crops and pasture improvement of areas unsuitable for cropping activities. |

Vegetation Description prior to Agricultural Land Use

Original vegetation was most probably that of open woodland consisting of eucalyptus species (White/Yellow Box) with some wild Apple and Stringybark evident.

Drainage and Siltation Impacts on Flora

The Natural drainage and siltation courses have been altered by way of soil conservation water diversion banks and farm storage dams thus creating an artificial system whereby most of the runoff water is diverted and stored in the area. Therefore impacts are of a historical nature only in regards to a natural system being affected.

Rare or Threatened Australian Plants (ROTAP)

No threatened or endangered plants listed on the National Parks and Wildlife Services list (ROTAP), are evident on "Menari".

Hydrology

Hydrology of the area is inconsequential to the dynamics of the present vegetation community.

Impacts at Site and Regional scale

Based on the locations of the mineral deposits and the limited amount of soil disturbance expected at one time, minimal impact to existing vegetation is expected.

No regional impacts are likely as operations are confined to MLA 3 Inverell and there is no toxic or environmentally damaging waste material created from mining operation which could be a potential threat to the surrounding region.

Discussion

Minimal floral disturbance is expected from this operation due to a number of factors including:

- * Mineral deposits occur often on cropping designated areas.
- * Concentration bands are limited in width with well defined margins.
- * A rehabilitation programme is commenced early in conjunction with mining operations.
- * Mineral deposits are not found near any existing trees within the area.

The natural species found in the area, both tree and grasses, are found extensively in nearby areas and are recognised as hardy types quite resistant to farm animal grazing pressures as well as cultivation activities. Other less robust or 'undesirable' native plant species have possibly disappeared from this area as this particular area of land has been developed for agricultural land uses over a long period of time.

Conclusion

From the data and observations correlated it could be considered that virtually all of the flora community on "Menari" has been altered from a native undisturbed condition to an agricultural land use whereby native plant species have been removed completely or largely replaced by introduced vegetation associated with current land use pursuits.

John Alexander Frazier
B..App Sc. Rural Tech. (Agronomy)
University of QLD (Gatton)
4th July, 1996



References

Burbridge, Nancy T. (1984). *Australian Grasses* (Angus and Robertson Sydney).

Lodge, G.M. and Whalley, R.D.B. (1989).
Native and Natural Pastures on the Northern Slopes and Tablelands of New South Wales.

Wheeler, D.J.B., Jacobs, S.W.L. and Norton B.E. (1982).
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Auld, B.A. and Medd, R.W. (1987) *Weeds: An Illustrated Botanical Guide to the Weeds of Australia.*

The assistance of the following is acknowledged:

- * Dept of Agriculture of New South Wales
- * Dept of Land and Water Conservation Service
- * National Parks and Wildlife Service Western Zone
- * Royal Botanical Gardens (Gardens Advisory Service)

PLANT LIST

Native Grasses

<i>Common Name</i>	<i>Scientific Name</i>
Danthonia grass (Wallaby grass)	<i>Danthonia linkii</i>
Danthonia (white top)	<i>Danthonia racemosa</i>
Wire grass	<i>Aristida ramosa</i>
Windmill grass	<i>Chloris truncata</i>

Native Trees

<i>Common Name</i>	<i>Scientific Name</i>
White box	<i>Eucalyptus albens</i>
Yellow box	<i>Eucalyptus melliodora</i>
Rough barked appletree	<i>Eucalyptus angophora</i>

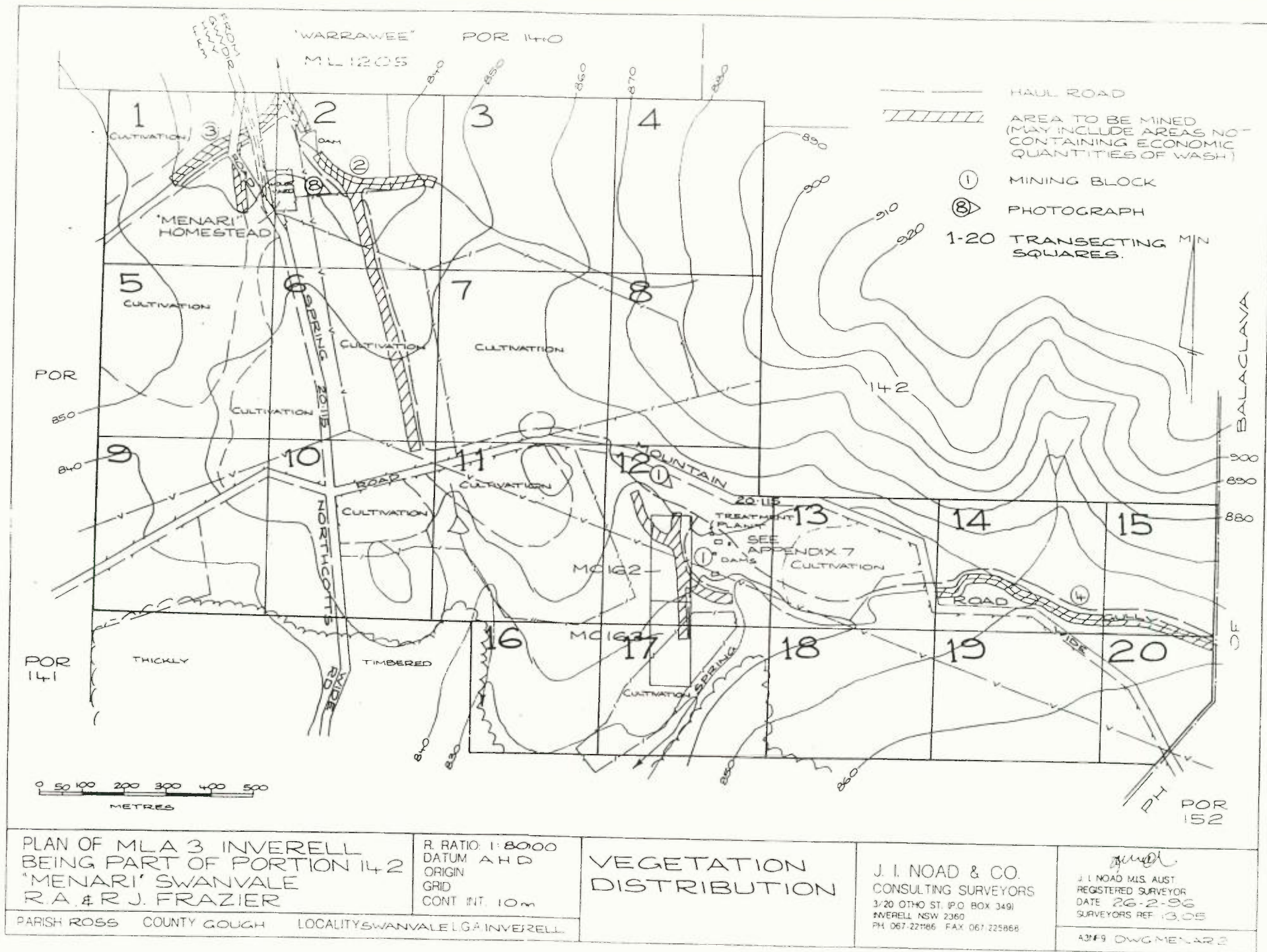
Exotic (Introduced) Species

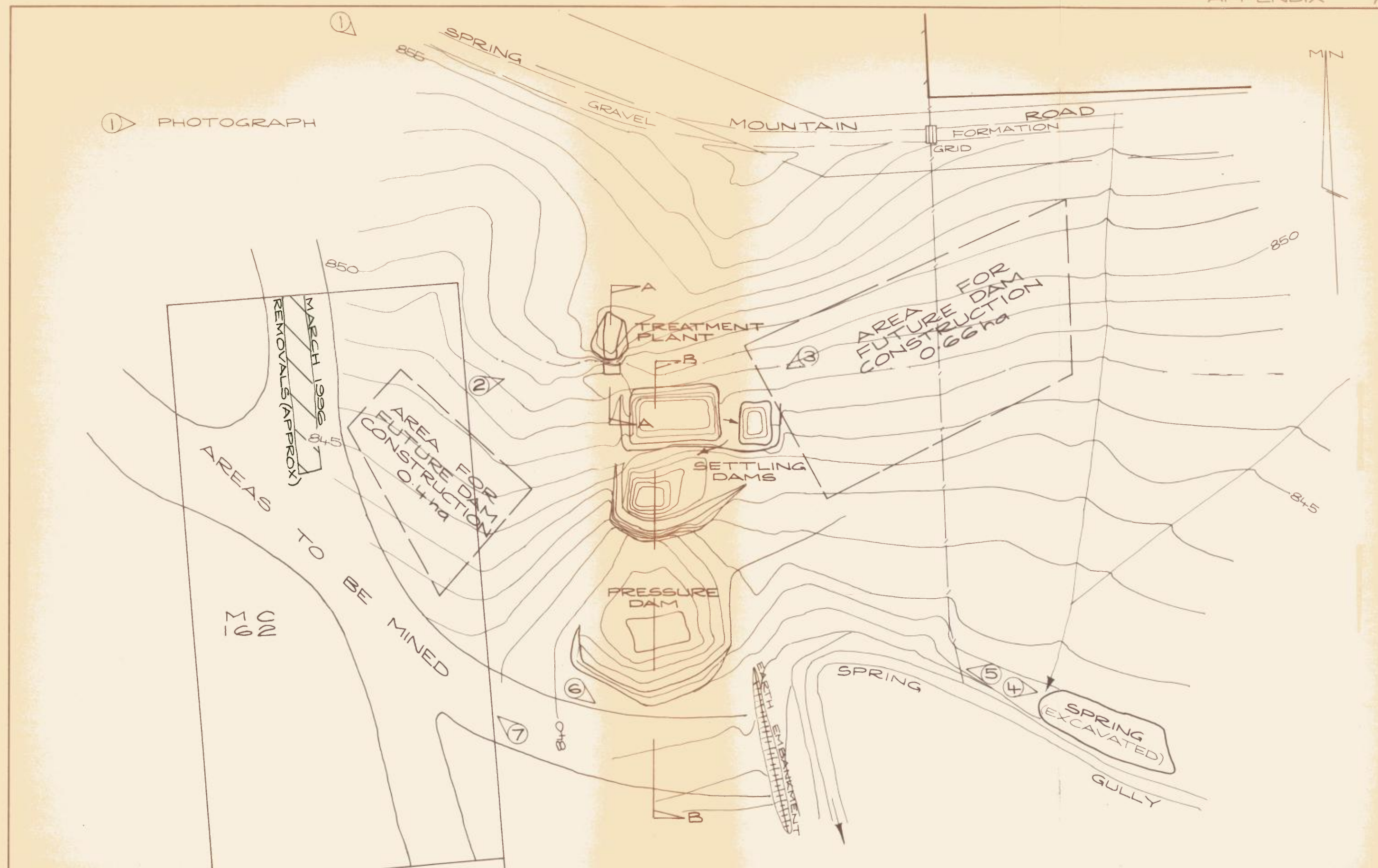
<i>Common Name</i>	<i>Scientific Name</i>	<i>Country of Origin</i>
Kikyu	<i>Pennisetum clandestinum</i>	Africa
Bathurst Burr	<i>Xanthium spinosum</i> L.	South Africa
Black thistle	<i>Cirium vulgre</i>	Europe
White clover	<i>Trifolium repens</i>	Australian bred hybrid
Phlaris	<i>Phalaris equatica</i>	Australian bred hybrid
Sweet briar	<i>Rosa rubiginosa</i> L.	Europe and Western Asia
Malting barley	<i>Hordeum distichon</i>	Australian bred hybrid

APPENDIX II

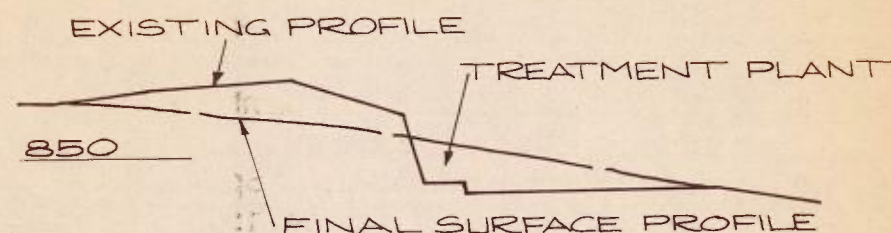
PLANT DENSITY
(Vegetation Patterning Data)

<i>IDENTIFYING SQUARE</i>	<i>PLANT DENSITY (/m2)</i>	<i>NATIVES %</i>	<i>INTRODUCED/ EXOTIC %</i>
1	0	0	100
2	75	11	89
3	0	0	100
4	0	0	100
5	0	0	100
6	0	0	100
7	5	2	98
8	0	0	100
9	70	10	80
10	0	0	100
11	0	0	100
12	20	6	94
13	0	0	100
14	10	2	98
15	10	5	95
16	0	0	100
17	0	0	100
18	0	0	100
19	0	0	100
20	0	0	100



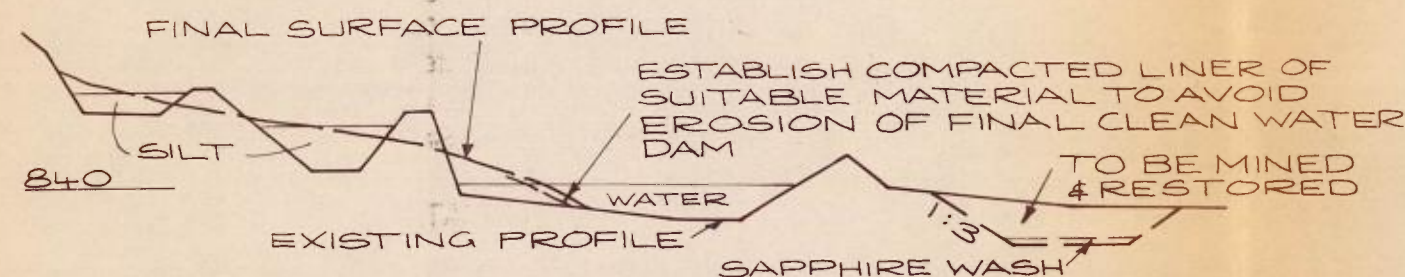


PLAN OF MLA 3 INVERELL BEING PART OF PORTION 142 "MENARI" SWANVALE R.A. & R.J. FRAZIER	R. RATIO: 1:1250 DATUM AHD ORIGIN GRID CONT. INT. 1m	PLANT SITE AREA	J. I. NOAD & CO. CONSULTING SURVEYORS 3/20 OTHO ST. (P.O. BOX 349) INVERELL NSW 2360 PH. 067-221186 FAX 067-225868	<i>J. I. Noad</i> J. I. NOAD M.S. AUST. REGISTERED SURVEYOR DATE 26-2-96 SURVEYORS REF: 13,051
PARISH ROSS COUNTY GOUGH LOCALITY SWANVALE L.G.A. INVERELL			A3NF9 DWG MENAR 1	



SECTION 'A-A'

1:500 H
1:500 V



SECTION 'B-B'

1:1000 H
1:500 V

MINE MANAGEMENT NOTES

1. Estimated rate of removal is 400 bank cubic metres of sapphire bearing wash per month.
2. All oversize material from the treatment plant process to be returned to the cut.
3. All silt from the treatment plant process to be deposited in settling dams or returned to the cut.
4. Excavations in the vicinity of Spring Gully to proceed upstream at a longitudinal slope of less than 1:50. This slope to be maintained away from the creek to maximum expected flood level or near, then to follow the lower level of the sapphire bearing wash.
5. Side batters to be no greater than 1 vertical in 3 horizontal within maximum expected flood level and 1 in 4 in the vicinity of the upstream end of the cut.
6. Maximum depth of the cut not to be below normal flow level in the vicinity of the creek immediately adjacent to the excavation.
7. Any stockpiles of top soil or over-burden to be maintained above maximum expected flood level.
8. All stockpiles and cuts to be protected by contour banks or silt traps with suitable soil conservation techniques applied to preclude runoff from these areas entering Spring Gully in a turbid state.
9. Finished surface levels to be those existing prior to mining. Previously disturbed areas to be rehabilitated.
10. All rehabilitation works at the dam sites to be carried out with the advices and assistance of the Soil Conservation Service.

REVEGETATION NOTES

1. Topsoil to be stockpiled and re-spread over restored areas.
2. After final surface grading spread Di-ammonium-sulphate (DAP) at the rate of 20kg/hectare to restored areas with a mixture in equal proportions of inoculated White Clover and Phalaris at the rate of 0.5 kilo/hectare or as required by the landowner.
3. Plantings of similar species to be made at similar densities to any trees removed, to the satisfaction of the Regional Inspector of Mines.
4. Revegetated areas to be maintained for a sufficient period to ensure establishment of pastures.

PLAN OF MLA 3 INVERELL
BEING PART OF PORTION 142
"MENARI" SWANVALE
R.A. & R.J. FRAZIER

R. RATIO: SEE ABOVE
DATUM AHD
ORIGIN
GRID
CONT. INT.

CROSS-SECTIONS
MINING
MANAGEMENT &
VEGETATION NOTES

J. I. NOAD & CO.
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J. I. NOAD M.S. AUST.
REGISTERED SURVEYOR
DATE 26-2-96
SURVEYORS REF: 13,051

PARISH ROSS COUNTY GOUGH LOCALITY SWANVALE L.G.A. INVERELL

A3NF9 DWG MENAR 3

CONDITIONS OF AUTHORITY (ML) (1993)

Notice to Owners and Occupiers

1. Within a period of three months from the date of this lease or within such further time as the Minister may allow, the lease holder must serve on each owner or occupier of private land and on each occupier of the Crown Land held under a pastoral lease within the subject area a notice in writing indicating that this lease has been granted and whether the lease includes the surface. The notice must be accompanied by an adequate plan and description of the subject area.

If there are ten or more owners or occupiers affected, the lease holder may serve the notice by publication in a newspaper circulating in the region where the subject area is situated. The notice must indicate that this lease has been granted; state whether the lease includes the surface and must contain an adequate plan and description of the subject area.

- ~~2. Within a period of three months from the date of this Instrument of~~
Renewal or within such further time as the Minister may allow, the lease holder must serve on each owner or occupier of private land and on each occupier of the Crown land held under a pastoral lease within the subject area a notice in writing indicating that this lease has been renewed and whether the lease includes the surface. The notice must be accompanied by an adequate plan and description of the subject area.

If there are ten or more owners or occupiers affected, the lease holder may serve the notice by publication in a newspaper circulating in the region where the subject area is situated. The notice must indicate that this lease has been renewed; state whether the lease includes the surface and must contain an adequate plan and description of the subject area.

Plan of Management

3. (1) Mining operations must be conducted in accordance with a plan of management approved by the Director-General.
- (2) An application for approval of the proposed plan of management must be accompanied by a copy of the proposed plan and must be lodged with the Director-General:
 - (a) within months of the grant of this lease; or
 - (b) within such further period of time as the Director-General may allow.
- (3) A plan of management:

(a) must describe the means by which it is proposed that the environment is to be protected in the course of the conduct of mining operations in relation to:

- * the disposal of tailings and other waste products (including toxic wastes) arising from the conduct of mining operations
- * the minimisation of pollution of air and water
- * the minimisation of noise pollution
- * the prevention of soil erosion
- * the rehabilitation of any land on which mining operations are conducted

(b) must contain the following particulars in relation to the land on which mining operations are to be conducted:

- * the approximate depth of the topsoil
- * the nature of the vegetation
- * the contours of the land as they were immediately before the conduct of mining operations was begun
- * the manner in which it is proposed to remove, store and replace the topsoil
- * plans and sections of the land indicating the location of the minerals to be mined
- * a site plan of the land indicating the location of any mine workings, mine processing plant and other ancillary works on the surface of the land
- * the methods to be used in the course of the conduct of mining operations
- * the order in which mining operations are to be conducted on the various parts of the land
- * plans and sections indicating the location of minerals that are not to be mined
- * the nature of the vegetation proposed to be planted in the course of the rehabilitation of the land
- * the contours of the land as they are proposed to be after rehabilitation of the land has been completed.

(4) The Director-General may require a proposed plan of management:

- (a) to be amended in such manner, or in relation to such matter, as the Director-General may require; and
 - (b) to be resubmitted to the Director-General within such time as the Director-General may allow.
- (5) After considering an application for approval of a proposed plan of management, the Director-General:
- (a) may approve the plan; or
 - (b) may refuse the application.
- (6)
- (a) A management plan is to be reviewed within 12 months of the date on which it was last approved and at such other times as the Regional Inspector of Mines may direct.
 - (b) The results of the review, including any amendments to the management plan arising out of the review, are to be lodged with the Director-General.
 - (c) The review must indicate the nature and extent of any mining or rehabilitation work carried out in the previous 12 months and the nature and extent of any mining or rehabilitation work proposed to be carried out during the period of 12 months following the review.
 - (d) The review must also indicate the extent (if any) to which it has become impracticable for mining operations to comply with the plan of management and the reason why that is so.

Mining Methods

4. The lease holder must restrict mining operations on the subject area to and must not adopt any other method of mining without the prior written approval of the Minister and subject to any conditions he may stipulate.

Excavations and Shafts

5. No more than one hectare of the surface must be opened up at any one time without the prior written approval of the Minister and subject to any conditions he may stipulate.

- ~~6. No more than two shafts/adits must be opened up at one time without the prior written approval of the Minister and subject to any conditions he may stipulate.~~

Drilling

7. If the lease holder proposes to drill a drill hole he must ensure:
- (a) all cored holes are accurately surveyed and permanently marked so that their location can be readily ascertained;

- (b) all holes whether cored or otherwise are sealed so as to prevent collapse of the surrounding surface;
 - (c) all flowing drill holes are permanently sealed with cement plugs to prevent surface discharge of groundwaters;
 - (d) that where any drill hole encounters natural or noxious gases it is plugged or sealed so as to prevent their escape;
 - (e) that where any drill hole encounters an artesian or sub-artesian flow that it is sealed effectively to prevent contamination of aquifers.
8. As soon as any drill hole ceases to be used it must be filled or plugged to the satisfaction of the Regional Inspector of Mines and the land in its immediate vicinity left in a clean, tidy and stable condition.

~~Blasting~~

- ~~9. The lease holder must ensure that the ground vibration peak particle velocity generated by any blasting within the area of the subject lease does not exceed 10mm/second and does not exceed 5mm/second in more than 5% of the blasts at any dwelling or occupied premises outside the said area, unless approval has been granted by the Regional Inspector of Mines to exceed the said particle velocity or as otherwise determined by the Environment Protection Authority under the provisions of the Noise Control Act 1975.~~
10. The lease holder must ensure that the blast overpressure noise level generated by any blasting within the area of the subject lease does not exceed 120 dB (linear) and does not exceed 115 dB (linear) in more than 5% of blasts, outside the said area, at any dwelling or occupied premises, as the case may be unless approval has been granted to exceed such levels by the Regional Inspector of Mines or as otherwise determined by the Environment Protection Authority under the provisions of the Noise Control Act 1975.

Safety

11. Operations must not be carried out in a manner that endangers the safety of any persons and stock in the vicinity of the operations. In particular, all shafts and excavations are to be appropriately protected, to the satisfaction of the Regional Inspector of Mines, to ensure that access to them by persons and stock is restricted. Abandoned shafts and excavations opened up or used by the lease holder are to be filled in or otherwise rendered safe to a standard acceptable to the Regional Inspector of Mines.

Topsoil replacement and Rehabilitation

12. (a) Any topsoil that is removed in the course of operations is to be set aside for replacement at a later date. Other soil, rock and residues are to be used to fill abandoned shafts and excavations and are to be covered by the topsoil previously removed.

(b) The land over which the operations have been carried on:

- (i) is to be appropriately restored and landscaped, to the satisfaction of the Regional Inspector of Mines, to ensure that the land is properly drained and protected from soil erosion; and
- (ii) is to be planted with vegetation appropriate to the area and at a density acceptable to the Regional Inspector of Mines. Where the agreed final land use is to include native vegetation, indigenous species must be used in all revegetation programs, unless otherwise directed.

13. The lease holder must comply with any direction given by the Regional Inspector of Mines regarding the stabilisation and revegetation of any mine residue, tailings or overburden dumps situated on the subject area.

~~14.~~ The lease holder must plant all worked areas and other areas within the external boundaries of the subject area used in connection with or disturbed by the operations conducted with grasses, plants, shrubs and/or trees only of the same species as were growing prior to the commencement of the operations and the lease holder must maintain and care for the same during the currency of this lease to the satisfaction of the Minister provided that exotic species of grasses, plants, shrubs and/or trees may be planted to help to establish the primary stages of regeneration but such species must be restricted to those approved by and must not be planted without the approval of the Minister. Exotic species must not remain at the completion of rehabilitation.

15. On completion of operations or if so directed by the Minister during the course of such operations, the lease holder must rehabilitate all worked areas as far as may be practicable to their original slopes and contours to the satisfaction of the Minister.

16. On completion of operations the lease holder must rehabilitate all areas disturbed as a result of operations having been carried out within the subject area and must ensure that such areas are adequately maintained for such a period as is necessary to satisfy the Minister that long term rehabilitation standards and environmental safeguards have been fulfilled.

Power and Telephone Lines, Fences, Gates

17. Operations must not interfere with or impair the stability or efficiency of any telephone or power transmission line traversing the subject area without the prior written approval of the Minister and subject to any conditions he may stipulate.

18. Fences on or adjacent to the subject area must not be interfered with without the prior written approval of the owner thereof or the Minister and subject to any conditions the Minister may stipulate.

19. Any gates within the subject area or any other gates used by the lease holder must be closed or left open in accordance with the requirements of the owner or occupier.

Dogs

20. Dogs must not be kept by the lease holder on the subject area unless the area is securely fenced. If the area is securely fenced a dog may be kept but it must be chained up or kept under effective control.

Firearms

21. Firearms must not be brought onto the subject area without the prior written approval of the Minister and subject to any conditions he may stipulate.

Roads and Tracks

22. (a) Excavations must not be made within 15 metres of the boundaries of any road without the prior written approval of the Minister and subject to any conditions he may stipulate.
- (b) Operations must not be carried out under any road at a depth less than twenty metres from the surface without the prior written approval of the Minister and subject to any conditions he may stipulate.
- (c) Notwithstanding that the lease holder shall have complied with this condition the lease holder must pay to the local Council, the Director-General, Department of Land and Water Conservation, the Commissioner for Western Lands or the Chief Executive Roads and Traffic Authority the cost incurred by such Council or Department or Commission or Chief Executive of making good any damage to any road caused by operations carried on by or under the authority of the lease holder or any person claiming through or under the lease holder.
- (d) AND THE LEASE HOLDER HEREBY COVENANTS with the said Council that the lease holder will pay to the said Council the cost incurred by the Council of making good any such damage caused as aforesaid and the lease holder hereby covenants with the said Director-General/Commissioner/Chief Executive that the registered holder will pay to the said Director-General/Commissioner/Chief Executive the cost incurred by the said Director-General/Commissioner/Chief Executive of making good any such damage caused as aforesaid.

AND IT IS HEREBY AGREED AND DECLARED that the amount to be paid by the lease holder under the provisions of this clause shall include in addition to the cost of all necessary labour and materials all costs and expenses reasonably incurred in and about the making of surveys and preparation of plans and specifications and estimates the supervision and inspection of the works and all administrative and overhead costs and expenses of the Council or the Department of Land and Water Conservation or the Commissioner for Western Lands or the Chief Executive Roads and Traffic Authority as the case may be related or attributable to the works undertaken to make good any damage caused to any road. A certificate under the hand of the Town or Shire Clerk of the local Council or the Director-General for Land and Water Conservation or the Commissioner for Western Lands or the Chief Executive Roads and Traffic Authority or the person for the time being acting as such Clerk, Director-General, Commissioner or Chief Executive as to the amount of the cost of making good any damage to any road shall in all respects and for all purposes be conclusive evidence of the amount of such cost and of the due determination thereof.

23. Access tracks must be kept to a minimum and be positioned so as not to cause any unnecessary damage to the land. Temporary access tracks must be ripped, topsoiled and revegetated as soon as possible after they cease to be required for mining operations. The design and construction of access tracks must be in accordance with specifications fixed by the Department of Land and Water Conservation.
24. Operations must be carried out in a manner that does not interfere with or impede the use of any track on the subject area or endanger its stability.
- ~~25. In the event of operations being conducted on the surface of any road or track within the subject area or causing any interference to such road or track the lease holder must provide suitable alternative access at his own expense and must allow free and uninterrupted access along such alternative access at all times and if required so to do by the Minister the lease holder must restore the surface of the road or track to its original position and condition on the completion of operations or whenever so directed.~~
26. During wet weather the use by the lease holder of any road or track must be restricted to prevent damage to such road or track.

Trees and Vegetation

27. (a) The lease holder must not fell trees, strip bark or cut timber on any private land, or Crown land held under a pastoral lease within the subject area, otherwise than in accordance with the consent of the owner or occupier of the land or, if the owner or occupier refuses consent or attaches unreasonable conditions to the consent, with the approval of a warden.

- (b) The lease holder must not destroy or injure any tree, sapling, shrub or scrub on any protected land, as determined by the Soil Conservation Act, 1938, except in accordance with an authority issued by the Department of Land and Water Conservation under Section 21D of that Act.
 - (c) The lease holder must not cut, destroy, ringbark or remove any timber or other vegetative cover on any other land subject of this lease except such as directly obstructs or prevents the carrying on of the operations.
 - (d) The lease holder must obtain any necessary licence from the Forestry Commission of New South Wales before taking timber from any Crown land within the subject area.
28. All trees, shrubs and undergrowth which the lease holder cuts down, removes or damages for the purpose of the operations must be disposed of by the lease holder as directed by and to the satisfaction of the Director-General.
29. The lease holder must observe any instructions given by any responsible authority with a view to the eradication of noxious weeds. The lease holder must make all reasonable efforts to prevent the introduction and establishment of noxious weeds.

~~State Forests~~

- ~~30.~~ (a) This lease does not confer the power to cut or remove any timber within except such as directly obstructs or prevents the carrying on of the operations and the lease holder must obtain authority under the provisions of the Forestry Act, 1916 as amended, or any Act amending the same and the Regulations thereunder before making use of the timber so cut for other than in connection with the operations. The sanction of the District Forester or his deputy must be obtained before proceeding to cut any other timber within the said forest/s.
- (b) The lease holder must take all precautions against causing outbreak of fire on the said forest/s and must not burn off any grass dry herbage or surface litter except with the approval of the District Forester and must under the direction and control of the local Forest Officer stack and burn the heads of any trees destroyed during the course of the operations and the lease holder must not permit any fireplace to be constructed unless protected by stone wallings and fires lit therein must not be left unattended.
- (c) This lease is issued subject to any conditions and/or restrictions which may be prescribed in accordance with the provisions of the Forestry Act, 1916, as amended, or any Act amending the same and the Regulations thereunder and the Regulations under the Bush Fires Act, 1949.

- ~~(d)~~ Any necessary clearing must be done only with the prior permission of the District Forester or his deputy and compensation must be paid for any mature trees or semi-mature trees damaged or destroyed at the rate fixed by the Forestry Commission and such compensation must be payable on demand at the end of each calendar month.
- (e) The lease holder must not operate a crawler tractor on the subject area.
- (f) The lease holder must not cause damage to forest roads or tracks by operating vehicles on the subject area during wet weather.
- (g) The Minister reserves the right to suspend operations immediately if weather conditions and/or the operations are causing unnecessary damage to any assets of the Forestry Commission.
- (h) On completion of operations the lease holder must restore consolidate and make trafficable to the satisfaction of the Minister all roads and fire-breaks at present existing and which may be affected by the operations.
- (i) In the event of operations encroaching on or within 3 metres of any constructed road or fire-break the lease holder must provide a suitable deviation to the same standard as the previous road or fire-break and on the completion of operations lease holder must restore the road or fire-break to its original position and condition to the satisfaction of the Minister.

Settling Dams

- 31. Settling dams or other dams constructed on the subject area must be constructed, maintained and sealed to the satisfaction of the Regional Inspector of Mines.
- 32. The lease holder must provide and maintain efficient means to prevent contaminated waters discharging or escaping from the subject area onto surrounding areas.

Prevention of Soil Erosion

- 33. Operations must be carried out in a manner that does not cause or aggravate soil erosion or stream sedimentation. The lease holder must observe and perform any instructions given by the Director-General in this regard.
- 34. Run off from any worked area including the overflow from any depression or ponded area must be discharged in a manner that does not cause erosion or stream sedimentation.

~~Use of Cyanide~~

- ~~35. The lease holder must not use cyanide or any solution containing cyanide on the subject area without the prior written approval of the Minister and subject to any conditions he may stipulate.~~

- ~~36.~~ The use of cyanide on the subject area must be in accordance with the ~~Mines Inspection Act, 1901.~~

Catchment Areas and Watercourses

37. (a) Operations must be carried out in a manner which avoids pollution of the Catchment Area.
- (b) If the lease holder is using or about to use any process which the Minister believes is likely to pollute the waters of the said Catchment Area the lease holder must refrain from using or cease using such process within twenty-four (24) hours of the receipt by the lease holder of a notice in writing requiring the lease holder so to do.
- (c) The lease holder must comply with any regulations in force for the protection from pollution of the said Catchment Area.
- ~~38.~~ Operations must be conducted in a manner that does not interfere with or cause damage to the assets of the Broken Hill Water Board situated on or around the subject area.
- ~~39.~~ (a) The lease holder must carry out all operations in a manner that conforms strictly to all provisions of the Water Board Act, 1987 and the by-laws thereunder applying to the prevention of pollution of the Catchment Area for the preservation of the purity of the water supply provided thereby or derived therefrom or for the protection of the property of the Board on the Catchment Area and also to all requirements of the said Board from time to time under the said Act or any of the by-laws for the time being in force.
- (b) If the lease holder is using or about to use any process which the Water Board believes is likely to pollute the Catchment Area or the water supply or to endanger any property of the said Board on the Catchment Area the lease holder upon service of a notice in writing under the hand of the Director-General so to do shall (i) discontinue the use of such process within twenty-four (24) hours or (ii) thereafter refrain from adopting such process.
- (c) The lease holder must make such provisions for sanitation as may be directed by the Director-General and must at all times observe and perform any requirements of the Director-General respecting sanitation.
- (d) The lease holder must not establish any camps or habitations within any areas under the control of the Water Board without the prior written approval of the Minister and subject to any conditions he may stipulate.

~~(e) The lease holder hereby covenants with Us Our Heirs and Successors and as a separate covenant the lease holder hereby covenants with the Water Board and its Successors that the lease holder shall at all times hereafter save harmless and keep Us and the said Board and Our Heirs and Successors and the Successors of the said Board indemnified from payment of compensation and from and against all actions proceedings claims and demands in respect of any injury loss or damage arising out of or in any way connected with any interference with or deprivation or loss of access to the land and premises of this lease which may occur by reason of any works or operations undertaken or carried out by the said Board or arising out of or in any way connected with any discontinuance or alteration of any process consequent upon the service of a notice in pursuance of the provisions of sub-clause (b) of this clause or arising out of or in any way connected with the operation of any by-laws relating to a Catchment Area in force at the date hereof or made by the said Board at any time hereafter and the lease holder hereby agrees that for the purpose of this sub-clause the said Board shall be deemed to be a party to this lease.~~

40. Operations must be carried out in a manner that avoids the pollution or siltation of any watercourse or waterbody.
41. The lease holder must not interfere with the flow of water in any stream or watercourse, except for the purpose of obtaining water for the operation of a treatment plant.
42. Operations must not be carried out in or adjacent to any waters that are closed to fishing pursuant to the Fisheries and Oyster Farms Act, 1935, unless at least 7 days' notice of the commencement of those operations have been given to the Director of NSW Fisheries.

Aboriginal Place or Relic

43. The lease holder must not knowingly destroy deface or damage any aboriginal place or relic within the subject area except in accordance with an authority issued under the National Parks and Wildlife Act, 1974, and must take every precaution in drilling, excavating or disturbing the land against any such destruction, defacement or damage.

~~Travelling Stock Reserves~~

- ~~44. The lease holder must permit the free and uninterrupted passage of stock through that part of the subject area covered by Travelling Stock Reserve and must conduct operations in a manner that does not cause danger to travelling stock.~~

~~Operations for Rutile Zircon and Associated Minerals~~

- ~~57. If so directed by the Minister the lease holder must provide and maintain a secure fence to the satisfaction of the Minister around each dredge pool or other excavation opened up or used by the lease holder and must observe any instructions given in this regard by the Minister.~~
58. The lease holder must spread fertilizer of such type and in such quantity as may be directed over the rehabilitated area to assist the growth of such grasses plants shrubs and/or trees as may have been planted in accordance with the conditions of the lease.
- ~~59. If so directed by the Minister the lease holder must enclose the subject area with a secure stockproof fence and such fencing must be erected and maintained in a manner satisfactory to the Minister.~~
60. The lease holder must observe any instructions given by the Director-General with a view of minimising or preventing public inconvenience or damage to public or private property.
61. The lease holder must during rehabilitation of the subject area or any part thereof remove all domestic animals from such area as may trespass thereon and must take all such action as is necessary to prevent them from depasturing thereon and must observe and perform any instructions given by the Director-General with a view to minimising or preventing damage to such area or the rehabilitation thereof by the depasturing of any animal thereon.
62. The lease holder must conduct operations in a manner that does not create any danger from floods or storms and must observe and perform any instructions given by the Director-General with a view of minimising or preventing any flood or storm damage.
63. The lease holder must conduct operations in a manner that causes as little interference as possible with the public use and enjoyment of the beach for fishing and recreation and must permit free and uninterrupted access by the public to the beach at all times.
64. The lease holder must not interfere, without the prior written approval of the Minister, with any life-saver's sheds and apparatus now or at any time erected or installed and must conduct operations within the vicinity of the part or parts of the beach or beaches used by bathers that the same shall not cause any danger or obstruction to such bathers.
65. (a) Within a period of three months of the commencement of operations the lease holder must establish a nursery for the propagation of a sufficient number and variety of plants, shrubs and trees which in the opinion of the Director-General is adequate for the purposes of satisfaction rehabilitation in the secondary and tertiary stages.
(b) Provided that in the event of:
 - (i) an adequate nursery having been established by the lease holder in the vicinity of the subject area; or

- (ii) satisfactory evidence being furnished that the lease holder has made suitable arrangements for adequate quantities of plants, shrubs and trees to be provided and maintained:

the Director-General may dispense with the requirements of the foregoing clause (a).

Resource Utilisation

- 66. (A) The lease holder must when required by the Regional Inspector of Mines to do so furnish such information relating to the responsible utilisation of the mineral resources of the subject area as the Regional Inspector of Mines may specify.
- (B) Where the Minister is satisfied on a report of the Regional Inspector of Mines that the method or system of working or processing employed in the development of or in any subsequent operations in any mine is such as to result in failure to recover minerals that would otherwise be economically recoverable at the time he may give notice in writing to the lease holder:-
 - (i) stating the particulars in which it is considered the method or system of working or processing tends to such failure to recover minerals; and
 - (ii) requiring that such method or system of working or processing be abandoned or so modified as to remedy such failure to recover minerals;

Provided that:-

- (a) no such report shall be submitted to the Minister until it has been thoroughly discussed with and has incorporated the views of the lease holder;
- (b) the notice must not specify the modification of the mining or processing method to be adopted by the lease holder.
- (C) The lease holder may object to any notice issued under this condition and on receipt of such an objection the Minister shall refer the objection to a Warden for inquiry and report under Section 334 of the Mining Act, 1992.
- (D) On receipt of the Warden's report the Minister shall determine the objection in accordance with the findings of such report and the lease holder must comply with the determination so made.

Control of Operations

- 67. (a) If a Regional Inspector of Mines believes that the lease holder is not complying with any provision of the Mining Act 1992 or any condition of this lease relating to the working of the subject area, he may, direct the lease holder to cease working the subject area and to rectify the situation.

- (b) The lease holder must comply with any direction given.

Working Requirement

68. The lease holder must:-

- (a) ensure that at least competent people are efficiently employed on the subject area on each week day except Saturday or any week day that is a public holiday,

OR

- (b) expend on operations carried out in the course of prospecting or mining the subject area, an amount of not less than \$ during each year of the term of this lease.

Costs or expenses incurred which are not, in the opinion of the Minister, directly associated with the prospecting or mining operations shall not be accounted expenditure for the purposes of this condition. The Minister, may at any time or times after a period of 2 years from the date on which this lease or any renewal thereof has effect, by instrument in writing served on the holder of the lease, increase or decrease the number of people to be employed or the amount of expenditure to be expended under this condition provided that not more than one variation shall be made in any period of two years.

Reports

69. The lease holder shall provide, within a period of twenty-eight days after each anniversary of the date this lease has effect or at such other date as the Director-General may stipulate, of each year, a progress report(s) to the satisfaction of the Director-General containing the following:-

- (a) Full particulars, including results, interpretation and conclusions, of all exploration conducted during the twelve months period;
- (b) Details of expenditure incurred in conducting that exploration;
- (c) A summary of all geological findings acquired through mining or development evaluation activities;
- (d) Particulars of exploration proposed to be conducted in the next twelve months period;
- (e) All plans, maps, sections and other data necessary to satisfactorily interpret the report(s).

70. (1) Licence to Use Reports

- (a) In respect of reports prepared and to be prepared by or on behalf of the lease holder, and submitted to the Director-General pursuant to condition number 69 of this lease, the lease holder hereby grants to the Minister, by way of a non-exclusive licence, the right in copyright herein, to publish, print, adapt and reproduce the work in any form and for the full duration of copyright, subject to a period of confidentiality as outlined in sub-clause (2).
- (b) The non-exclusive licence to do acts comprised in the copyright granted hereunder will operate as a consent to disclosure for the purposes of section 365 of the Mining Act 1992.

(2) Confidentiality

- (a) All exploration reports submitted in accordance with the conditions of this lease will be kept confidential while the lease is in force, except in cases where:
 - (i) The lease holder has agreed that specified reports may be made non-confidential.
 - (ii) Reports deal with exploration conducted exclusively on areas that have ceased to be part of the lease.
- (b) Confidentiality of reports will be continued beyond the termination of a lease in cases where an application for a flow-on title was lodged during the currency of the lease. The confidentiality will last until that flow-on title or any subsequent flow-on title, has terminated.
- (c) The Director-General may extend the period of confidentiality in respect of reports beyond the time(s) stipulated in sub-clauses (a) and (b) hereof.

(3) Terms of the non-exclusive licence

The terms of the non-exclusive copyright licence granted under sub-clause (1)(a) are:

- (a) The Minister may sub-licence others to publish, print, adapt and reproduce but not on-licence reports.
- (b) The Minister and any sub- licensee will acknowledge the lease holder's and any identifiable consultant's ownership of copyright in reports in any reproduction of reports, including storage of reports onto an electronic database.
- (c) The lease holder does not warrant ownership of all copyright works in any report and, the lease holder will use best endeavours to identify those parts of the report for which the lease holder owns the copyright.
- (d) There is no royalty payable by the Minister for the licence.
- (e) If the lease holder has reasonable grounds to believe that the Minister has exercised his rights under the non-exclusive copyright licence in a manner which adversely affects the operations of the lease holder, that licence is revocable on the giving of a period of not less than three months notice.

Miscellaneous

- 71. Operations must be carried out in a manner that interferes as little as possible with the natural flora or fauna.

72. The lease holder must take all precautions against causing an outbreak of fire and must comply with the provisions of and regulations under the Bush Fires Act, 1949, as amended and must not burn off any grass, foliage or herbage without the consent of the owner or occupier and the local fire authority.
73. The lease holder must not deposit any refuse except in properly constructed containers which must be regularly removed by the lease holder from the subject area and the lease holder must maintain the area in a clean and tidy condition at all times.
74. Machinery and buildings must be removed from the subject area on the expiry or earlier termination of the lease and the area left in a clean, tidy and stable condition to the satisfaction of the Director-General.

Security

75. (a) A security in the sum of \$ must be lodged with the Minister by the lease holder for the purpose of ensuring the fulfilment by the lease holder of his obligations under this lease. If the lease holder fails to fulfil any one or more of such obligations the said sum may be applied at the discretion of the Minister towards the cost of fulfilling such obligations. For the purpose of this clause the lease holder shall be deemed to have failed to fulfil the obligations of this lease if he fails to comply with any condition or provision hereof, any provision of the Act or regulations made thereunder or any condition or direction imposed or given pursuant to a condition or provision hereof or of any provision of the Act or regulations made thereunder.
- (b) The lease holder must provide the security required by sub-clause (a) hereof in one of the following forms:-
 - (i) cash,
 - (ii) a banker's certificate or bond in such form and given by such surety as may from time to time be approved by the Minister.
- (c) The Minister may at any time or times hereafter vary either the amount or form or both the amount and form of the security required under sub-clauses (a) and (b). Where he has so varied the security he shall serve on the lease holder an instrument in writing requiring him, within a time specified in the instrument, to lodge a further security in such form as is specified in the instrument. After receipt of a further security the Minister shall release any security held in excess of that required.

Cancellation of Rehabilitated Areas

76. The lease holder if so required by the Minister must make application pursuant to Section 125(1)(a) of the Mining Act 1992, for cancellation of this lease as to any part or parts of the subject area which has or have been worked and rehabilitated in accordance with the conditions of this lease.

Cancellation Report

77. Upon cancellation (in part or in full) or upon expiry the lease holder must lodge:-
- (i) Plans and sections showing the extent of workings on the area cancelled or subject of expiry;
 - (ii) Records of tonnage and grade mined and treated;
 - (iii) Records of concentrate and/or finished product produced;
 - (iv) Geological information including details of any remaining mineralisation.