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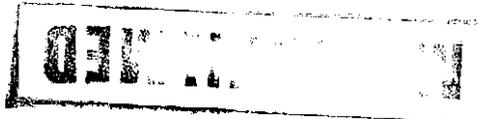
CAPRICORN MINING LTD.

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ECONOMIC GEOLOGY OF
THE LANGLOH COAL DEPOSIT
EL 27/79 - HAMILTON

PART 1



TO ACCOMPANY : APPLICATION FOR RL 891



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K.C. MORRISON

V. HOFTO

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INTRODUCTION

This report is designed to accompany a current application for the transfer to Retention Licence of that portion of EL 27/79 which covers the Langloh coal deposit.

The report summarises the findings of an exploration programme conducted at Langloh between 1981 and 1986. This work led to a definition of reserves and a mine feasibility study.

Since 1986 attempts to find a coal market large enough to justify mine development, and attempts to reach an agreement with the landowners at Langloh, have been unsuccessful.

This situation means that the Company cannot justify exploring additional targets on the licence, and given that the licence is now entering Year 10, Capricorn has resolved to apply for Retention Licence over 31 km² covering proven reserves and most likely explored extensions to the reserves. The remainder of the Exploration Licence has been submitted for relinquishment.

LOCATION AND EXPLORATION HISTORY OF EL 27/79

Exploration Licence 27/79 was granted to Capricorn Mining Ltd. on the 17 April 1980. The licence area originally covered 870km² of the middle reaches of the Derwent Valley but after several relinquishments at annual renewals, the area currently consists of two blocks totalling 221km² (Figure 1, Plan 1). The licence is owned 100% by Capricorn Mining Limited.

An intensive exploration programme was conducted on the Langloh coal deposit by Capricorn between 1981 and 1986. The results of that work are discussed in the following section of this report.

The Langloh coal seams were known since the 1850's and intermittent underground mining had occurred on the eastern edge of the deposit between the 1930's and 1963. A summary of the Langloh Coal Field, its geology and mining history (Bacon, 1985) is enclosed as Appendix 1.

No exploration has been conducted by Capricorn since the end of EL 27/79 Year 6 due to a general lack of demand for steaming coal in Tasmania and, in particular, a lack of success in developing a market for the Langloh deposit.

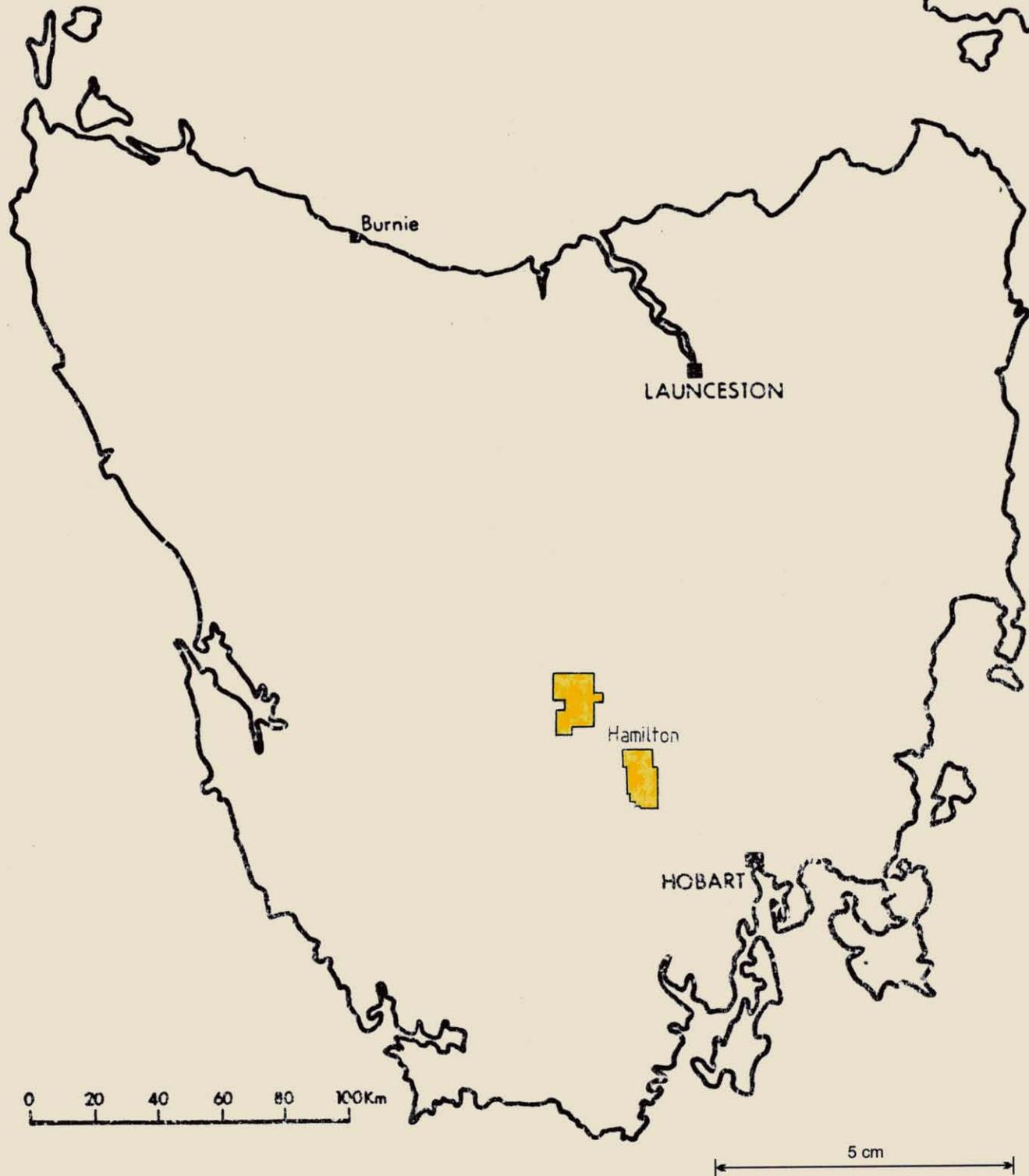
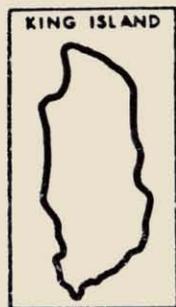


Figure 1. Location Map - EL 27/79, Hamilton

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At the current (Year 10) renewal, the Company is applying for conversion of the most prospective part of EL 27/79 to Retention Licence. If granted, the RL will cover 31km² (Plan 1) including the known and probable extensions to the Langloh deposit.

ECONOMIC GEOLOGY OF THE LANGLOH DEPOSIT

The Langloh deposit is contained in a small wedge-shaped fault block of coal bearing, upper Triassic lithic sandstone (Plan 2). The fault block is bounded on the western side by a Tertiary graben and on the eastern and southern sides by Jurassic dolerite. Drilling indicates that the dolerite forms a floor to the sandstone and this floor dips at about 4° to the west. To the north, the Triassic is overlain by a sheet of Tertiary basalt and the extent of the Triassic in the subsurface is unknown. A basalt neck on the western edge of the prospect is related to a system of faults, the largest of which defines the eastern edge of the Tertiary graben. In the southeast corner of the map area (Plan 2), Triassic quartz sandstone outcrops, and drilling confirms that this unit underlies the lithic sandstone.

A series of 3 coal seams has been located by drilling and a small deposit of moderate ash, low sulphur, sub-bituminous steaming coal, suitable for open cut mining, has been proven.

The seams are each 1-1.5 metres thick and normally have abrupt non-erosional roof and floor contacts. In some cases the roof contact at the top seam shows minor erosion with a mud pebble conglomerate filling shallow scours into the underlying coal. The coals are separated from each other by grey silty mudstone units, the upper mudstone being typically 20 cm thick and the lower 1.5 metres. Both the coal and the mudstone interburden thicken from the east to the west.

The geology of the deposit is described in more detail by Bacon (1985) and Morrison and Bacon (1986). The former paper is enclosed as Appendix 1.

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Capricorn drilled 27 diamond drill holes into the prospect, over an area of approximately 4km².

Ten fully cored intersections of the coal measures were analysed and the results, together with the stratigraphy and structure interpreted from the drilling, established two blocks of coal which were most likely to be capable of upgrading to proven reserve status after bulk testing and engineering studies had been undertaken. A correlation of all drilling at Langloh, including earlier Mines Department work, is enclosed as Plan 3. Maps of top coal structure, overburden isopachs and total coal isopachs are enclosed as Plans 4 - 6 respectively and raw coal analyses are presented in Appendix 2. The two deposits, shown on Plan 7, are defined as East Hill and West Hill. Summaries of coal quality in East Hill and West Hill are shown in Appendix 3. Full data sets for all drilling results and subsequent interpretation are presented in quarterly and annual reports for Licence Years 2, 3 and 4.

MINE FEASIBILITY AND RESERVES

During February-March 1984, a box cut was excavated into the eastern side of the West Hill deposit for the purpose of taking a bulk sample of typical coal for burning trials. Approximately 50 tonnes of unweathered coal, comprising approximately equal portions from each seam were recovered, crushed and trucked to two existing steaming coal users, APPM at Burnie and Cadbury Schweppes at Claremont. Both operators burnt the coal successfully. Their reports are enclosed as Appendix 4). Other important information gained during bulk sampling is summarised below:-

1. The depth of overburden needed to protect coal from severe oxidation varies from 5 to 10 metres on West Hill. The weathering front appears to undulate in the subsurface.
2. Coal with tolerable levels of contamination could be mined at Langloh with earth moving vehicles and without the need for subsequent washing.

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3. The excavator was able to comfortably strip up to 10 metre thicknesses of roof sandstone, without the need for blasting. As the maximum roof thickness on West Hill is approximately 20 metres, this implies that the need for blasting will be low and probably zero in the early years of the operation. This will significantly reduce the noise output of the operation.
 4. Groundwater control will be a major problem. The excavation shows that the coals are good aquifers, through fracture permeability, and the mudstone interburdens are impermeable. Water transmitted through the coal fractures is clean until it reaches the pit floor where it becomes contaminated with fines. The contaminants settle out if the water is contained for 1-2 days. It is clear that the most effective approach to groundwater control would be to de-water ahead of the mine face.

The groundwater problem was explored in January 1986 when a dewatering test was conducted on West Hill for the purposes of determining the potential for lowering the water table below the coal seams to allow dry mining (Appendix 5). Five 7" diameter holes were drilled to approximately four metres below the base of the coal. A submersible electric pump was installed in the central hole and water was drawn at a constant rate of 1200 gallons per hour for approximately six days. The water was carried by polypipe into an irrigation ditch and then into a holding dam. There was no recharging of the groundwater by leakage from the irrigation ditch. Drawdown was monitored in the four observation holes, located at distances of 4, 10, 20 and 50 metres from the pump hole. The main findings are summarised below:-

1. The coal seams are the only significant aquifers with water being transmitted entirely through fracture permeability. The interburden shales act as seals and the overburden sandstone could not be induced to flow water using airlift from the drilling rig.
2. The coal aquifers have a high-very high transmissivity, with draw-down observed in a test pit some 300 metres from the pump, and very low storage coefficients, with almost no recharge after several weeks.

3. Water quality is good, being completely free of visible sediment and readily drinkable, initially with a slightly salty taste, which diminished with time.
4. Between one and three borehole pumps would be ideal for dewatering ahead of an opencut mine and would eliminate the need to deal with dirty water in the pit and in settling ponds. Maintenance of the existing irrigation ditches and holding dams is desirable and the groundwater would be suitable for irrigation, stock water and dust suppression around the mine site.

A mine plan and costing schedule for the two blocks of coal defined by exploration were developed by Kinhill Stearns from their Adelaide branch. This work showed that the coal could be mined, crushed, sorted and transported to the Hobart region for a cost which would allow a profitable operation to be competitive with the existing coal supplier. West Hill is clearly easier and cheaper to mine than East Hill and all proposals considered by Capricorn involved the mining of West Hill first. A summary of the Kinhill Stearns work is enclosed as Appendix 6.

In November 1983 Environmental and Technical Services Pty. Ltd., Hobart, produced an environmental impact study for the proposed most likely operation. This study (Appendix 7) identified the environmental aspects of the project which required provision of further basic data and outlined the methods needed to minimise the impact of the proposed operation on the surrounding area, particularly the several houses within 2km of the site.

Reserves have been calculated using the data described above. Reserves are estimated in accordance with the June 1988 Code of the Joint Committee of the Australasian Institute of Mining and Metallurgy and the Australian Mining Industry Council. Accordingly, the East Hill deposit is categorised as a Measured Resource, and Recoverable Reserves are given for West Hill.

Table 1. Langlosh Coal Field - Measured In Situ Resources,
12 May 1983.

EAST HILL

CONSTRAINTS AND ASSUMPTIONS:

Maximum overburden 25 metres
 Minimum overburden 5 metres
 50% coal remaining in old mined area
 No mining within HEC safety zone
 No box cut mining

MEASURED RESOURCE

Coal Surface Area 205,875m²
 (including mined portion)
 Coal Volume 762,280m³
 (excluding mined portion)
 Thickness Range 3.0 to 4.2 metres
 Coal Relative Density 1.55
 Coal Mass 1,181,543 tonnes

WEST HILL

MEASURED RESOURCES

Coal Surface Area 322,500m²
 Coal Volume 1,430,531m³
 Thickness Range 4.0 - 4.8 metres
 Relative Density 1.5
 Coal Mass 2,145,796 tonnes

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Table 2. Langlooh Coal Field - Proven Reserves,
4 July 1984

WEST HILL

CONSTRAINTS/ASSUMPTIONS

Maximum Overburden	25 metres
Minimum overburden	10 metres
Coal Thickness Range	4.0 - 4.8 metres
Coal Relative Density	1.5

Mining to the fault boundary on northern end

RESERVE

Surface Area	251,250m ²
Volume of Coal	1,092,000m ³
Mass of Coal In-Situ	1,638,000 tonnes
Mineable Reserve (90% recovery)	1,474,200 tonnes
Sales Product Reserve (90% recovery)	1,326,780 tonnes

II DISCUSSION AND CONCLUSIONS

The work discussed above has demonstrated that the coal identified by exploration drilling is of saleable quality and could be mined and marketed profitably. An open cut mine on the West Hill deposit could be operated and the site rehabilitated in an environmentally acceptable and financially achievable way. The situation for the East Hill deposit is less definitive as this deposit is more environmentally difficult and less cost effective than West Hill. An in-situ resource has been measured for East Hill.

The current status of the project is that no agreement has been reached with a major coal consumer although most Tasmanian steaming coal users have expressed serious interest and one consumer has agreed to buy the Langloh coal once production starts. There is also strong interest in the use of the interburden shale for brickmaking in Hobart.

In addition to market difficulties, the Company as yet has been unable to reach an agreement with the landowners on a compensation formula which would clear the way for Mineral Lease applications.

As a consequence of these factors, the Company cannot justify exploration on new coal targets and has therefore decided to apply for a Retention Licence over the known Langloh deposits and likely deeper extensions to the north.

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REFERENCES

- BACON, C.A., 1985. The Langloh (Lawrenny) coalfield.
Dept. Mines Tasm., Unpublished Report 1985/31.
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APPen x I

UNPUBLISHED REPORT 1985/31

The Langloh (Lawrenny) coalfield

by C.A. BACON

1985/31. The Langloh (Lawrenny) coalfield

C.A. Bacon

Abstract

This coalfield, in the Middle Derwent Valley, is of limited lateral extent. The coal-bearing ground is confined to a small fault block, and part of the prospective ground is overlain by Tertiary basalt. A dolerite sill forms a floor to the fault block. Three seams, each 1.0-1.5 m thick, occur in a stratigraphic interval of 4.5-6.0 m. The top two seams were mined together in underground workings known as the Langloh Colliery from 1938-1963. A measured reserve of four million tonnes of *in situ* black coal suitable for extraction by open-cut mining has recently been defined. The coal is similar in quality and petrographic character to other Tasmanian Triassic black coals.

LOCATION AND ACCESS

The coalfield is situated in the middle reaches of the Derwent Valley, on the eastern side of the River Derwent between the townships of Hamilton and Ouse. Access is by sealed road from Hobart, a distance of 85 km. Many secondary unsealed roads service the area.

GENERAL GEOLOGY

The coal-bearing ground in the Langloh coalfield is part of a dominantly lithic sandstone sequence interbedded with minor mudstone and coal seams. The sequence is of fluviatile origin and is part of the lithic sandstone sequence of the Upper Parmeener Super-Group. Examination of the microflora from mudstone associated with the coal seams suggests that the sequence belongs to the *Craterisporites rotundus* zone and hence is Karnian in age (S.M. Forsyth, pers. comm.).

The lithic sandstone sequence is underlain by a quartzose sandstone sequence which is devoid of coal. The sandstones are confined to a wedge-shaped fault block, bounded on the west by a Tertiary graben and to the east and south by Jurassic dolerite. The geology of the area is shown in Figure 1.

Jurassic dolerite has intruded the sandstone sequence and now forms a 'floor' to the fault block, as drill holes in the coalfield have encountered dolerite at depth. The underlying dolerite sill which forms this 'floor' dips at 4° towards the west. Tertiary basalt flows cover the lithic sandstone sequence to the north and a basalt neck occurs on the western margin of the coalfield. This basalt neck or plug is related to a system of faults, the largest of which defines the eastern edge of the Tertiary graben (Morrison and Bacon, 1984).

COAL GEOLOGY

Three coal seams exist in the coalfield. The seams are 1.0-1.5 m thick and usually show abrupt, non-erosional roof and floor contacts, although in some intersections the upper seam (A) has an erosional top marked by a mud-pebble conglomerate which filled scours in the underlying peat. The three seams are separated by grey silty mudstone units. The mudstone between seams A and B is typically 200 mm thick while the mudstone between seams B and C is usually 1.0-1.5 m thick (Morrison and Bacon, 1980). The top two seams were worked together with the intervening mudstone band

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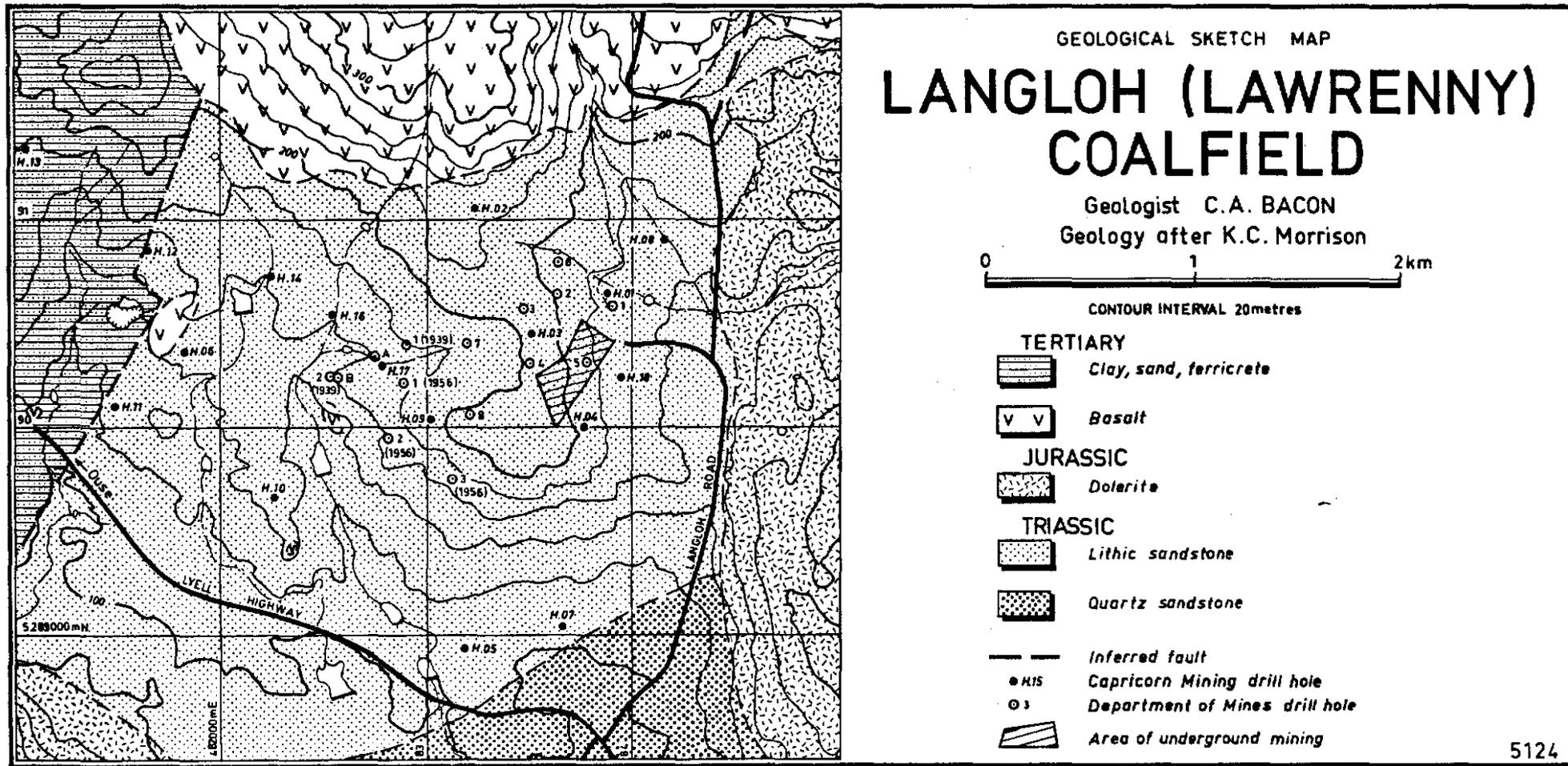


Figure 1.

5 cm

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in the old Langloh Colliery.

PREVIOUS INVESTIGATIONS

Selwyn (1855) inspected a 0.3 m thick outcrop of coal 11 km above New Norfolk (near Plenty) and commented that a seam of coal 2.5 m thick was known to crop out near Hamilton. The coal in the area was rediscovered when a well was sunk through sandstone for water near the Langloh Park homestead, and some small scale mining activity followed. Thureau (1883) recorded that the well was sunk "years ago" and whilst no mining was in progress at the time of his visit, miners who had some years previously extracted small quantities of coal for domestic and other purposes supplied the information that the seam was 1.07 m thick and 12.2 m below the ground surface. Thureau recommended that the area be drilled to determine the quality and quantity of coal available.

In 1891 the well (or shaft) was enlarged, and a quantity of coal raised and sent for analysis and practical testing by various consumers of coal, such as the railways. Four holes were drilled in the coalfield in 1892. The logs are given in Montgomery (1894) and again in Hills *et al.* (1922).

By 1922 the prospecting activity in the area consisted of two shafts. One was the old enlarged well, and the second a shaft which had been sunk near the Kimbolton homestead.

Mining was commenced in 1938 by the Langloh Coal Mining Company. The initial attempt to open a mine was by development from the shallow shafts, but this approach was quickly abandoned in favour of driving a dip tunnel into the seam. The leases, held by H.E. Brock for the Langloh Coal Mining Company, were transferred to M.E. Gorringer for the Hamilton Coal Company in December 1942. Mining was continued by the latter company until 1963.

Two diamond-drill holes were drilled in the coalfield in 1939, eight between the years 1944 and 1946, and three in the period 1955-1956 as an aid to mine planning. Analyses from these drilling programmes are given in Appendix 2.

Mining was by the bord and pillar method and the coal was used in local industry, by the railways, and as a domestic fuel.

The mine employed between four and twelve men and produced between 2000-8000 tonnes of coal per year. As the workings were fairly shallow, percolating water from the ground surface was a continual problem. The mudstone (montmorillonite-rich) roof and floor of the seam reacted with water to produce difficult mining conditions for most of the life of the mine.

COAL QUALITY

The Langloh coal is similar in quality to Triassic coals found elsewhere in Tasmania. Analyses from a variety of historical sources are listed in Appendix 2. Montgomery (1894) recorded details of various tests made on the Langloh coal and commented favourably on the results of trials of the coal in steam-raising purposes for industrial use. A recent (1985) analysis of a bulk (unwashed) coal sample from the coalfield is given below:-

Moisture (%)	4.8
Ash (%)	20.3
Volatile matter (%)	24.5
Fixed carbon (%)	50.4
Total sulphur (%)	0.3
Chlorine (%)	0.02
Phosphorous (%)	0.003
Specific energy (MJ/kg)	23.6

Tests on core from the 1939 drilling showed a yield of 2.8 gallons (12.7 litres) of crude oil per ton of coal from a sample from DDH 1 (1939) Seam No 1 (2.3 m thick). Fusibility of the ash of the coal was also determined on the 1939 core samples and found to be from 1250°C to above 1350°C.

Petrographic analysis of coal from this area shows that the environment of peat deposition was similar to that of other Tasmanian Triassic black coals. The coal is rich in inertinite with minor vitrinite and cutinite. In some parts of the coalfield the coal has been heat-affected by intrusive Jurassic dolerite and the rank of the coal raised slightly. Mean maximum vitrinite reflectance of the coal varies from 0.6-3.6% as a result of this heating. Fingal coal has a mean maximum vitrinite reflectance in the order of 0.55-0.60% (Morrison and Bacon, 1984).

RECENT EXPLORATION

An exploration programme was conducted over the coalfield from 1979 to 1984 to determine the quality and quantity of coal in the area. Over part of the coalfield a measured reserve of four million tonnes of coal suitable for extraction by open-cut mining has been determined. Additional reserves suitable for underground extraction exist in the coalfield but as yet have not been brought up to measured reserve status.

FUTURE POTENTIAL

Although of limited areal extent the coalfield has the potential to support a small scale mining operation. The measured and indicated *in situ* reserves of the coalfield are in the order of ten million tonnes. The coal is similar in quality to other Tasmanian Triassic black coals and the seam is remarkably free of dirt bands. This coalfield has considerable potential for further development.

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APPENDIX 2

AMG references of drill holes and adits in the Langloh (Lawrenny) coalfield

1894 Drilling (Department of Mines)

A	DN82759033
B	DN82579023
C	-
D	-

1939 Drilling (Department of Mines)

1	DN82909038
2	DN82579023

1944-1946 Drilling (Department of Mines)

1	DN83909057
2	DN83649064
3	DN83499056
4	DN83509030
5	DN83799030
6	DN83649079
7	DN83209039
8	DN83229006

1956 Drilling (Department of Mines)

1	DN82909022
2	DN82828995
3	DN83148975

APPENDIX 2

Coal analyses from the Langloh coalfield

Sample number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Moisture at 100°C (%)	3.02	4.0	4.7	4.1	5.3	3.5	2.11	2.94	2.04	2.30	1.8	1.91	1.96	2.36	5.2	2.64	2.04
Volatile matter (%)	24.02	235	18.0	20.5	21.2	9.9	24.32	24.36	24.90	24.78	26.65	24.86	25.76	24.94	23.2	17.26	19.1
Fixed carbon (%)	63.40	66.3	55.9	62.4	42.5	52.6	54.51	42.10	54.92	53.34	57.73	53.59	54.28	45.04	56.1	59.86	58.46
Ash (%)	9.63	6.2	21.4	13.0	31.0	34.0	19.06	30.60	18.14	19.58	13.82	19.64	18.00	27.66	15.5	20.24	20.40
Total sulphur (%)	0.61	-	-	-	-	-	0.38	0.59	0.35	0.33	0.35	0.32	0.23	0.33		0.37	0.34
Specific energy (MJ/kg)	-	-	-	-	-	-	25.9	21.4	26.6	25.8	27.9	26.0	26.3	22.9		25.7	25.5

1. Analysis of coal from shaft by W.F. Ward, Hobart, 1891 (Montgomery, 1894).
2. Analysis of coal from shaft (Montgomery, 1894).
3. Analysis of coal from No. 2 Bore, whole seam sample, Seam No. 1.
4. Analysis of coal from No. 2 Bore, whole seam sample, Seam No. 2.
5. Analysis of coal from No. 2 Bore, whole seam sample, Seam No. 3.
6. Analysis of coal from No. 2 Bore, whole seam sample, Seam No. 5.
- 7-14. Ply samples from various parts of the mine, collected in 1943 (DOM plan 621B).
15. Sample from the Main Heading (not whole seam) collected in 1959.
16. DDH 1 (1939), Seam No. 2 (1.37 m thick).
17. DDH 2 (1939), Seam No. 2 (1.29 m thick).

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LANGLOTH COAL SERIES CALCULATED SEAM ASSAY RESULTS (RAW COAL, AIR DRIED)

APPENDIX 2

COMPOSITES CALCULATED FROM WEIGHTED AVERAGES OF PLIES

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(WHERE A-B INTERBURDEN (Sh 1) \leq 15cm. SEAMS A, B+Sh1 ARE COMBINED)

HOLE	SEAM	THICKNESS (M) (DENSITY LOG)	RELATIVE DENSITY	% MOISTURE	% ASH	% VOLATILES	% FIXED CARBON	SPECIFIC ENERGY MJ/Kg	% SULPHUR
H-9*	A+Sh1+B	2.26	1.73	3.4	38.2	9.3	49.1	18.40	0.23 coal only
	C	1.16	1.55	2.7	22.5	13.7	61.1	26.28	0.29
	TOTAL	3.52	1.62	3.2	33.2	10.7	52.9	20.90	0.25
	MEAN								
H-10	A	1.52	1.60	4.4	25.5	21.3	48.8	21.72	0.26
	B	1.60	1.48	4.0	14.1	24.5	57.4	25.86	0.26
	C	1.85	1.53	3.8	20.8	26.0	49.4	23.82	0.32
	TOTAL	4.97	1.53	4.0	20.2	24.0	51.8	23.80	0.28
	MEAN								
H-14	A	1.30	1.61	3.7	29.8	16.0	50.5	21.04	0.22
	B	1.15	1.53	2.8	19.9	17.2	60.1	25.62	0.33
	C	1.30	1.58	3.4	25.3	18.2	53.1	23.74	0.34
	TOTAL	3.75	1.57	3.3	25.3	17.1	54.3	23.38	0.29
	MEAN								
H-16	A	1.42	1.65	4.3	33.0	15.9	46.8	19.76	0.22
	B	1.25	1.55	2.5	21.5	19.2	56.8	25.62	0.41
	C	0.94	1.50	1.7	18.4	21.2	58.8	25.68	0.37
	TOTAL	3.61	1.58	3.0	25.4	18.3	53.3	23.23	0.32
	MEAN								
H-17	A+Sh1+B	2.74	1.72	2.6	34.9	10.9	51.6	20.5	0.21 coal only
	C	1.32	1.55	2.0	23.3	18.2	56.5	24.68	0.32
	TOTAL	4.06	1.66	2.4	31.4	13.1	53.1	21.76	0.24
	MEAN								
H-20	A	1.56	1.58	5.0	31.7	18.6	44.7	20.50	0.25
	B	1.20	1.48	3.4	21.1	22.0	53.4	24.32	0.36
	C	1.30	1.50	3.6	23.3	22.0	51.0	24.08	0.36
	TOTAL	4.06	1.52	4.1	26.1	20.6	49.3	22.77	0.32
	MEAN								

* A-B Mudstone (Sh1) = 16cm not recovered in core, assumed at RD=2.5, % Ash=90, % Volatile, SE=zero.
 * Moisture assumed equal to coal.

LANGLOH COAL SERIES CALCULATED SEAM ASSAY RESULTS (RAW COAL, AIR DRIED)

641023

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COMPOSITES CALCULATED FROM WEIGHTED AVERAGES OF PLIES

(WHERE A-B INTERBURDEN (Sh 1) \leq 15cm SEAMS A,B+Sh1 ARE COMBINED)

HOLE	SEAM	THICKNESS (M) (DENSITY LOG)	RELATIVE DENSITY	% MOISTURE	% ASH	% VOLATILES	% FIXED CARBON	SPECIFIC ENERGY MJ/Kg	% SULPHUR
H-22	A	1.60	1.54	5.5	26.4	21.9	46.7	20.94	0.21
	B	1.47	1.48	4.9	17.2	26.2	51.7	24.44	0.33
	C	1.35	1.51	4.6	18.5	27.8	49.1	24.24	0.33
	TOTAL MEAN	4.42	1.51	5.0	21.0	25.1	48.9	23.11	0.29
H-23	A+Sh1+B	2.35	1.60	3.5	31.5	16.2	48.8	20.14	0.28
	C	1.21	1.52	2.8	18.3	19.2	59.7	26.38	0.38
	TOTAL MEAN	3.56	1.57	3.3	27.1	17.2	52.4	22.20	0.31
H-24	A	1.07	1.93	3.0	41.1	9.8	46.1	19.38	0.33
	B	0.92	1.68	2.6	25.4	9.3	62.7		
	C**								
H-28	A+Sh1+B	2.08	1.56	3.1	25.5	19.0	52.4	23.58	0.36
	C	1.36	1.50	2.7	19.2	20.6	57.5	26.42	0.36
	TOTAL MEAN	3.44	1.53	2.9	23.1	19.6	54.4	24.68	0.36

** Seam C broken incomplete

SUMMARY OF LANGLOH COAL QUALITY

WEST HILL DEPOSIT

RAW COAL / AIR DRIED ANALYSES

WEIGHTED MEAN VALUES

Relative Density	1.54 tonnes per cubic metre (in ground)
Moisture Content	3.92%
Ash Content	23.36%
Volatile Content	21.29%
Specific Energy	23.26 Megajoules per kilogram
Sulphur Content	0.30%

Values Computed from 15 full seam analyses
in Holes H-10, H-14, H-16, H-20, H-22.

SUMMARY OF LANGLOH COAL QUALITYEAST HILL AREARAW COAL / AIR DRIED ANALYSESWEIGHTED MEAN VALUES

Total Coal Thickness	3.64 metres
Relative Density	1.60 tonnes per cubic metre (in ground)
Moisture Content	2.9%
Ash Content	28.9%
Volatile Content	15.1%
Fixed Carbon Content	53.2%
Specific Energy	22.3 Megajoules per kilogram
Sulphur Content	0.29%

Values Computed from 8 full seam analyses
in Holes H-9, H-17, H-23, H-28.

Associated Pulp and Paper Mills Limited

(INC. IN VICTORIA)

BURNIE MILL

Marine Terrace, Burnie, Tas.
P.O. Box 201, Burnie 7320Telephone 31 1222 Telex 59062
Telegraphic 'Aspulpaco' Burnie

25th June, 1984

Messrs. Petrecon Australia
Pty. Ltd.,
Petroleum Exploration Consultants,
192 Macquarie Street,
HOBART, TAS. 7000

Attention:
MR. K. MORRISON

Dear Sirs,

In reply to your letter to Mr. Morgan dated June 6th, 1984, please find enclosed a copy of the report on the test-firing of Langloh coal prepared by our Steam Engineer, Mr. R. Scott-Young.

It is considered the report is self-explanatory, however, should there be parts you feel need clarification, please do not hesitate to contact us.

Please accept our apologies for the delay in forwarding the above report, however, the delay incurred was due to factors outside our control.

Yours faithfully,
ASSOCIATED PULP AND PAPER MILLS LIMITED



P. Weedon,
ENGINEERING SUPERINTENDENT

Enc:
PW/lvd

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ASSOCIATED PULP AND PAPER MILLS LIMITED
Engineering Department - Burnie

13th June, 1984

MEMORANDUM

TO: P. WEEDON

FROM: R. SCOTT-YOUNG

re: Langloh Coal Trial

Please find attached, a report on the test firing of Langloh coal.


R. Scott-Young,
STEAM ENGINEER.

c.c. JEM

BSY/mac



ASSOCIATED PULP AND PAPER MILLS LIMITED
ENGINEERING DEPARTMENT - BURNIE

MEMORANDUM:

13th June, 1984

TO: File

FROM: R.E. Scott-Young

RE: Test Firing of Langloh Coal

Approximately 30 t of coal from the Langloh mine near Hamilton in Southern Tasmania was railed to Burnie and fired in No. 038 boiler. The test was carried out on 1st March, 1984 and was observed by Messrs. K. Morrison of Petrecon and R. Scott-Young from APPM. A sample of coal was taken for analysis.

1. Description of Trial

The coal was unloaded at the unloading station and conveyed directly into the northern end of boiler 038's bunker. The southern end of the bunker contained approximately 30 t of Cornwall coal thus the boiler was fired with Langloh coal on the northern grate and Cornwall coal on the southern grate. A direct comparison could be made of the two fuels and their respective ash characteristics.

2. Comments on the Trials

2.1 Coal Preparation

Mr. Morrison stated that the coal had been dug out from an area having a minimum of overburden and had been crushed and screened in a mobile crusher. It was not washed.

The coal was well sized and contained almost nothing outside the range 3 mm to 25 mm. It was not determined whether the same sizing could be achieved from normal operation as large quantities of fines would have to be disposed of.

2.2 Dust Problem

High levels of dust were produced from unloading and conveying the coal. Action would be required to prevent this if a long term intake was contemplated. The action would have to be taken at the mine in order to prevent the unloading station filling with dust during the unloading operation. It was impossible to see in the unloading station for one to two minutes after dumping the 30 tonnes. The dust suppression system was not working at the time but it is doubtful if it would have made much of an impression.

2.3 Combustion

The coal appeared to ignite easily and good burnout was achieved. The good sizing allowed better air distribution and more even burning than was achieved with the Cornwall coal.

2.4 Ash

The ash was not as friable as that from Cornwall coal and it tended to clinker slightly. While the degree of clinkering was still acceptable in boiler 038, this may not prove to be the case in boiler 035 with its overfeed stoker.

3. Analysis

A sample of the coal was analysed by ACIRL and the results are listed in the attached table beside values for Cornwall coal received during the same period.

As may be seen, Langloh coal is very similar to Cornwall coal in every respect except for the ash. The Langloh coal is not washed but contains slightly less ash than the washed coal from Cornwall. The Langloh ash contains about 8.8% calcium oxide compared with 2.0% for Cornwall. It is believed that the additional calcium oxide would have the following significant effects

- reduced slag softening temperature
- substantially lower the sintered strength of flyash

Thus on one hand the reduced slag temperature could lead to increased slagging while on the other hand the lower strength would make the slag easier to remove if it did form.

Overseas experience has shown that it is almost impossible to predict the fouling characteristics of a coal and a three or four week trial is usually necessary to see if fouling will occur.

Experiments in the U.S. have indicated that sodium is the most important single factor affecting ash fouling. It was noted that fouling of the superheater tubes significantly increased about the time we started firing salt water contaminated bark from Tamar.

4. Conclusion & Recommendation

The trial indicated that Langloh coal can be burnt in boilers such as 037 and 038 and that its net specific energy is very similar to that of Cornwall coal.

Before any firm commitments are made, it is recommended that the dust problem be overcome and a 6 week trial be carried out to test its slagging characteristics and its behaviour in No. 035 boiler.

RSY:cjd
Att.


R.E. Scott-Young,
STEAM ENGINEER.

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ASSOCIATED PULP AND PAPER MILLS LIMITED
ENGINEERING DEPARTMENT - BURNIE

13th June, 1984

Langloh Cornwall

Proximate Analysis:

Moisture	4.8	4.8
Ash	20.3	23.6
Volatiles	24.5	24.8
Fixed Carbon	50.4	46.7
Sulphur	0.3	0.4
Chlorine	0.02	Trace
Phosphorous	0.003	.003
Gross Specific Energy (as analysed)	23.6	23.6

Ultimate Analysis:(Dry ash free)

Carbon	80.4	81.4
Hydrogen	4.45	4.49
Nitrogen	1.50	1.0
Sulphur	0.4	0.5
Oxygen	13.25	12.4

Ash Fusibility:

Deformation °C	1310	1520
----------------	------	------

Ash Analysis:

SiO ₂	54.1	61.6
Al ₂ O ₃	25.3	27.8
Fe ₂ O ₃	4.81	4.13
CaO	8.79	1.97
MgO	1.4	1.01
TiO ₂	1.01	0.96
Na ₂ O	0.18	0.21
K ₂ O	0.53	0.81
P ₂ O ₅	0.03	0.04
Mn ₃ O ₄	0.19	0.07
SO ₃	2.90	0.51

RSY:cjd

Cadbury Schweppes Pty.Ltd.

INCORPORATED IN VICTORIA

Confectionery Division

KMW/PO

Claremont, Tas. 7011.
P.O. Box 690G, Hobart 7001.
Telephone 491011.
Telegrams & Cables to Telex AA58094

2nd March, 1984.

Mr. K. Morrison,
Petrecon Australia Pty. Ltd.,
192 Macquarie Street,
HOBART,
Tasmania. 7000.

Dear Mr. Morrison,

Please find enclosed our report covering the test firing of approximately 2 tonnes of Langloh coal which were supplied to us recently.

We do thank your Company for the opportunity to conduct this test and we were pleased with the result, as the report shows.

We would be happy to discuss further trials if you should be interested. Naturally, a much larger quantity of coal would be more appropriate. Under these circumstances, we see no reason why we could not negotiate an appropriate price with you if you keep your operation viable.

We look forward to hearing further from your Company and wish you every success in your proposed venture.

Yours truly,
CADBURY SCHWEPES PTY. LTD.

K.M. Wells.

K.M.Wells, F.I.E. Aus.
Senior Engineer.

Encl.

1st March, 1984.

Appendix 4

COAL TEST FIRING CADBURY'S, CLAREMONT

Coal Sample Origin: ex Langloh Mine, Hamilton
 Open cut sample, West Hill
 (Refer to Mr. Ken Morrison, Geologist, Petrecon Aus.)

QUANTITY: Approx. 2 tonnes
 Cadbury feed system indicated 1.75 tonnes.

GRADING: Crushed and screened
 Min. 7 mm Max. 30 mm
 One sugar bag of "less than 7 mm" was
 supplied for inspection as the discharge
 from the mine screens.

This very small quantity was mixed with the
 larger sample for the test firing.

INDICATED ANALYSIS PREVIOUSLY ADVISED.

Relative density	1.54 tonnes per cubic metre (in ground)
Moisture	3.92%
Ash	23.36%
Volatiles	21.29%
Specific energy	23.26 Megajoules per kg
Sulphur	0.30%

COMMENTS ON TEST FIRING

Date: 28/2/84

Time: 0830 to 1100 hrs.

Boiler: Babcock and Wilcox W.I.F. type water tube, chain grate, nominal
 capacity 6 400 kg/hr. of steam

Coal depth on grate: 12.7 mm

Grate speed: 75% to 100% maximum speed (70 mm/min. to 90 mm/min.)
 Factory demand varied during the test which required
 adjustments to the fire to meet the changes.

This test was not of sufficient length of time to allow
 maximum capacity to be established. Thus there was not
 a "full grate" fire at any time during the test.

Output: Feedwater meter readings during the test gave an average
 rate of approximately 3 700 kg/hr. (58% of nominal maximum).

Quality of
 fire: More open than the coal normally used. This may well have
 been due to the lesser quantity of fines in the sample than
 normally received. The size range was good, allowing
 excellent air passage without any blow holes or dead patches.

Ignition

The coal ignited without oil boost at grate speed of 70 mm/min.

At 90 mm/min. the fire gradually moved away from the ignition arch and a very small quantity of oil was needed occasionally. 2 kg to 4 kg of oil at a rate of 4 kg per 10 minutes every 30 minutes seemed to be the order of need. This represents an approximate oil to coal ratio of 1 : 150 (by weight). This is considered very good at maximum firing rate.

Burn out:

There was no difficulty in achieving complete combustion under normal fire conditions.

Ash:

No problems with clinkering at all. A good friable ash with no dust carryover occurred.

CONCLUSIONS

1. A larger sample to allow, say, at least 2 days operation would be more desirable. That is approximately 20 tonnes, if this could be negotiated.
2. This coal is at least as good as our present supply and may be slightly better.
3. We could consider a modification to the particle size range subject to appropriate tests.

K.M. Wells.

K.M. Wells
Senior Engineer

Consulting Geologists and Log Analysts

Surveying Consultants :

CROMER AND CERUTTY PTY LTD

Authorised Surveyors

Office and postal address :

192 MACQUARIE STREET, HOBART, TAS. 7000

TELEPHONE (002) 31 0656 - 27 8970 (A.H.)

APPENDIX 5

31 January, 1986

Memo. to J.K. Davidson,
Petrecon (Aust.) Pty. Ltd.,
192 Macquarie St.

Re: Langloh Coal Mine; Pump Test results.

Ken Morrison has details of pump size, bore hole depths and logs, and pump rate. Copies of pump test results are attached, but basically the bore was pumped at a constant 1200 galls/hr (130m³/day) for 8878 mins. (6.2 days) during which time drawdowns were also measured in four observation bores at 4,10,20 and 50m from the pump hole.

RESULTS.

Maximum drawdown in the pumped bore was 2.285m; minimum drawdown was 1.720m in the furthest observation bore. Drawdowns in all observation bores approached a similar amount, indicating that the cone of depression was large and shallow, extending at least over the proposed mining area. Fig.1 Shows drawdown vs. time for the pumped and furthest observation bore plotted on log-log paper. (Drawdowns for the other observation bores plot within this envelope).

The aquifer (principally coal beds with some contribution from the overlying fractured sandstone) has a transmissivity of 60m²/day, and a typical confined aquifer storage co-efficient of 1x10⁻⁴.

In Fig.1 long term drawdown for the pumped and neighbouring observation bores is about 7.5-8m after 100,000 mins. (70 days) pumping at 130m³/day. For an approximate drawdown of 12m needed to dewater the coal beds, about 250,000-300,000 mins. (174-208 days) is needed. These are probably maximum figures and assume no boundary effects alter the drawdown curve.

Drawdown in confined aquifers is directly proportional to pump rate, so that 12m dewatering at (say) 260m³/day could be accomplished in about 100 days. Individual bores could probably sustain this pump rate, although higher rates may locally dewater the aquifer near the pump bore and produce air.

ENGINEERING GEOLOGY :

Site investigations — drilling — sampling — testing — dam sites — excavation geology — landslip evaluation — geophysical surveys — septic tanks — drainage conditions

LOG ANALYSIS :

Oil, Coal, Water bores — on-site, quick look analysis — detailed interpretation

GROUNDWATER :

Surveys — advice, design of domestic, irrigation and municipal water bores — pump design — groundwater quality — design of farm dams and irrigation systems — groundwater monitoring — mine dewatering

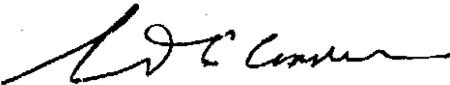
SURVEYING :

Subdivision surveys — engineering surveys — land use planning — volume estimations — hydrographic

CONCLUSIONS.

1. It is possible to lower the regional water table over the proposed mine area below the excavation depth by pumping from the existing bores.
2. The present pump rate of 130m³/day may be too low to be cost efficient.
3. Higher groundwater extraction rates can be accomplished either by,
 - (i) Installing a larger pump in the existing bore, or
 - (ii) Installing extra pumps in the adjacent observation bores.
4. Option 3 (ii) is probably the most flexible and efficient. By pumping at 500m³/day from two observation bores a 12m dewatering effect throughout the mine could be achieved in about 50 days.
5. These conclusions are based on a preliminary assessment of data, and should be regarded as approximate. Nethertheless they demonstrate the possibility of mine dewatering from a small number of bores pumped continuously at low rates. Enough data are available to predict the dewatering effect of any number of configurations of bores pumping at various pump rates.

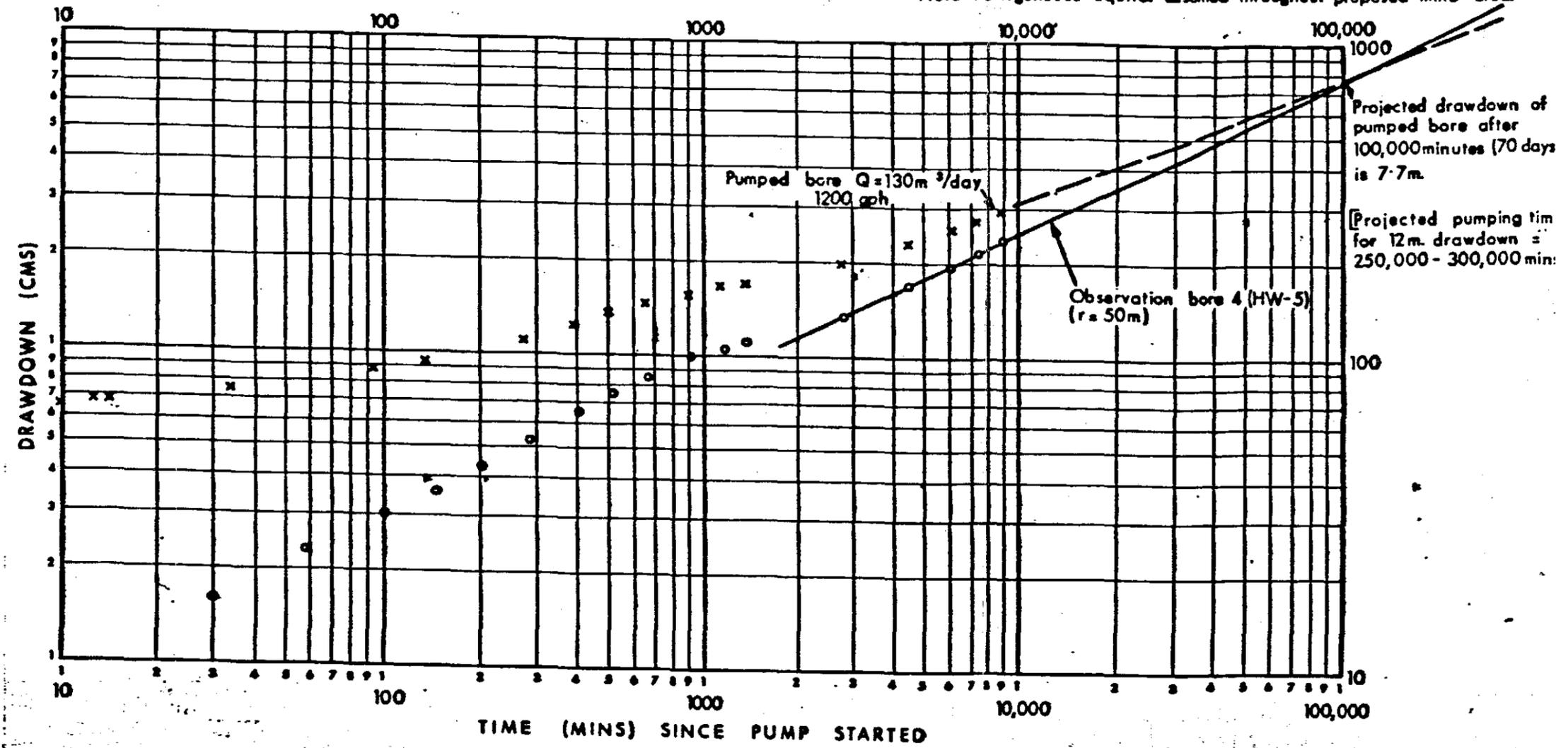
W.C.Cromer.



Time-Drawdown Plot, Langloh Mine

TRANSMISSIVITY = $60 \text{ m}^2/\text{day}$ (4000 gpd/ft)
 STORAGE COEFFICIENT = 10^{-6}

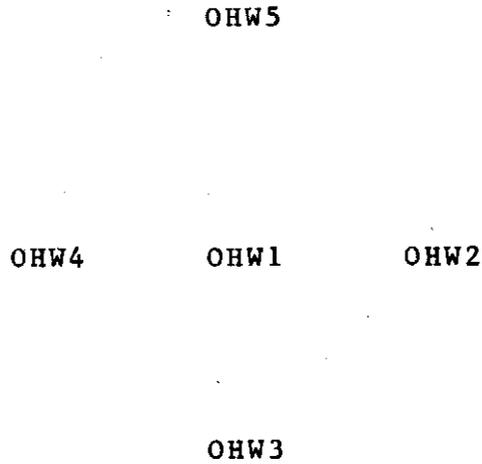
Note: homogeneous aquifer assumed throughout proposed mine area.



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LANGLOH DEWATERING TEST

TO: = 10.30AM 12/1/86



- HW1 - HW2 = 4 mts
- HW1 - HW3 = 10 mts
- HW1 - HW4 = 20 mts
- HW1 - HW5 = 50 mts

	HW1	HW2	HW3	HW4	HW5
True Water Depth in Holes	11.125	11.380	11.200	10.075	9.950 mts

Time (mins)	HW1	HW2	HW3	HW4	HW5
	Drawdown (cms)	Time Drawdown	Time Drawdown	Time Drawdown	Time Drawdown
1	54.5				
2	57.5				
3	59.5				
4	60.5				
5	62.5				
6	62.5				
7	63.5				
8	63.5				
9	64.5				
10	65.5				
11	65.5				
12	67.0				

HW1		HW2		HW3		HW4		HW5	
Time (mins)	Drawdown (cms)	Time	Drawdown	Time	Drawdown	Time	Drawdown	Time	Drawdown
13	67.5								
14	67.5	23	26	25	16	26	145	30	16
34	72.5	36	29	38	20	40	19.5	58	23
96	86.5	96	40	98	31	99	30.5	101	30
138	91.5	140	46	141	38	144	36.5	147	36
193	98.5	194	52	197	45	198	44	201	43.5
279	109.5	282	72	28	54	285	62.5	287	52.5
398	121.5	399	75	401	67	403	65.5	406	65
516	133.5	518	86.5	519	77	520	76.5	522	75
658	143.5	659	97	660	88	661	87	665	84
926	136.5	928	110	931	101	931	99.5	934	97.5
1185	164	1186	118	1189	108	1190	108.5	1194	105.5
1395	168.5	1396	122	1399	113	1400	112.5	1403	110
2820	197.5	2821	152	2824	141	2826	141.5	2828	139
4453	228.5	4455	185	4457	176	4460	175.5	4463	172
6090	255.5	6092	210	6094	202	6096	201.5	6098	198
7409	274.5	7414	230	74.7	221	7419	218.5	7422	217
8878	296.5	8880	252	8882	247	8883	240.5	8884	240

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Appendix 6

SPECIFICATION FOR THE PROVISION OF
QUARRYING SERVICES
FOR A PROPOSED COAL MINE AT LANGLOH FOR
PETRECON AUSTRALIA PTY LTD
HOBART, TASMANIA

Prepared by:

Kinhill Stearns
200 East Terrace
Adelaide, SA 5000

March 1986
A85393/1

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A Maps showing coal seams A, B and C and overburden isopachs. Contour and detail plan	A-1
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1

INTRODUCTION

Exploration by Petrecon (Australia) Pty Ltd on behalf of Capricorn Mining Pty Ltd, the holders of the Exploration Licence for the region, has identified two separate coal locations referred to the East Hill and West Hill deposits.

Underground mining for the recovery of coal from the East Hill deposit took place until the early 1950s and relics of the workings remain on site.

Exploration drilling by Petrecon in 1981 and 1982 identified the West Hill deposit and geological mapping has proceeded to a stage where coal, interburden and overburden isopachs have been prepared. A box-cut has been made into the eastern face of the West Hill site, and a bulk sample of approximately 60 t of coal has been extracted and prepared for combustion trials.

The coal reserves for the bulk sample were under an 11 m sandstone overburden, with three seams of coal each about 1.5 m thick. The bulk sample has been processed by crushing and screening prior to submission to potential clients for combustion trials.

The development of an open cut coal mine at the West Hill Langloh coal deposit near Hamilton in the Derwent Valley, Tasmania is to proceed, and this specification has been compiled to establish the cost for a Quarrying Services Operator (QSO) at the West Hill mine on the basis of an annual coal production of 20,000 t/y with the flexibility to upgrade the annual coal production to 100,000 t/y on a 'as needs' basis.

Discussions with the landholders concerning Royalty payments and land use matters have been undertaken by Petrecon.

The QSO is required to commence quarry operations by May 1986.

2 LOCATION**2.1 GEOGRAPHIC**

The geographical location of the proposed open cut mine development is north-east of the Kimbolton Homestead, near Hamilton in southern Tasmania and is shown on Drawing No. A85393.25.05.001.

The initial development of the pit is to commence on Australian Metric Grid 52975 N and 482400 E at nominal ground level RL 145 m.

The exact location will be surveyed and identified by others.

2.2 CLIMATE

Very limited specific data about the region's climate is available and it is anticipated that the Quarry Operator will familiarize himself with actual site conditions.

During summer, temperatures at the mine site can be expected to average 22°C, while minimum temperatures will be in the region of 10°C. Winter maximum temperatures are expected to be 11°C with minimum temperatures around 2°C.

Data available from nearby Hamilton for the past 86 years show that the average annual rainfall for the region is 493 mm.

2.3 HEC - LINE

A major Hydro Electric Commission (HEC) easement passes along the northern boundary of West Hill and intrudes across the East Hill Deposit. The HEC wayleave easement is 137 m, but HEC engineers have recommended a no blasting safety zone of 150 m each side of the pylon alignment.

2.4 MAPS

The following maps are included in Appendix A of the specification document:

- . Petrecon (Australia) Pty Ltd map - Tasmania Basin (Capricorn Mining Ltd) 83/3 showing top coal structure map.
- . E. Barrie Valentine maps for Capricorn Ltd showing contour and detail plan (Reference No. 82037/1 and 82037/2).
- . Petrecon (Australia) Pty Ltd map (Capricorn Mining Ltd) E.L.27/29-83/5 Langloh coal project showing total coal isopach map.
- . Petrecon (Australia) Pty Ltd map (Capricorn Mining Ltd) E.L.27/79-83/4 Langloh coal project showing coal overburden isopach to top Seam 'A'.

- . Australian Groundwater Consultants Pty Ltd map Figure 3 showing groundwater contour map.
- . Petrecon (Australia) Pty Ltd maps (Capricorn Mining Ltd) E.L. 27/79-83/19 Langloh coal project showing total overburden isopach for Seam 'B' and Seam 'C'.
- . Petrecon (Australia) Pty Ltd map (Capricorn Mining Ltd) E.L.27/79-83/6 Langloh coal project showing Seam 'A' isopach map.
- . Petrecon (Australia) Pty Ltd map (Capricorn Mining Ltd) E.L.27/79-83/7 Langloh coal project showing Seam 'B' isopach map.
- . Petrecon (Australia) Pty Ltd map (Capricorn Mining Ltd) E.L.27/79-83/8 Langloh coal project showing Seams 'C' and 'D' isopach map.

3 PROPOSED MINE PLAN

3.1 GENERAL

The QSO is required to generally mine the coal in accordance with the mine plan contained in this specification which is based on the following parameters:

- . production rate - 20,000 t/y (clean coal);
- . initial development point - southern tip of the West Hill deposit;
- . minimum upfront prestripping;
- . capability to expand rapidly to an annual output of 100,000 t/y.

3.2 PIT DEVELOPMENT

Details of the initial development of the pit are illustrated in Figures 3.1 to 3.5. It is stressed that widths of access roads and berms are minimum widths and therefore some variations may be necessary depending upon the actual size of equipment used by the QSO. The responsibility for providing adequate access and berms remain with the QSO.

The following initial development details are illustrated on Figures 3.1 to 3.5:

- . the initial overburden removal excavation to expose an area of the top of the coal seam;
- . initial coal removal down to the first parting;
- . completed coal initial access cut;
- . development of overburden and coal faces along the weathered-unweathered contact away from the initial access cut;
- . pit after production of approximately 22,000 t of raw coal;
- . approximate position of coal and overburden faces at six monthly intervals and general trend of mining faces after development.

It is not necessary to exactly follow this pattern of development and the QSO may vary it to suit his equipment, but must advise Petrecon of proposed deviations who will ensure that the long-term development of the pit is not adversely affected by the short-term developments.

The suggested pattern, however, is designed to offer maximum development of mining face length for ease of output expansion coupled with minimization of overburden removal.

The exact point of initial development is not critical provided it is in the general area as shown on Drawing No. A85393.25.05.0001. The QSO will obtain agreement with Petrecon on the exact location of initial development prior to proceeding.

3.3 OVERBURDEN REMOVAL AND WASTE DUMP LOCATION

The 8 m overburden contour has been selected as the outer limit of mineable coal and overburden removal is necessary to this contour.

The overburden removal comprises of the following:

- . ramp down to the top of coal at the 8 m overburden contour over sufficient width to allow for two overburden roads (northside and southside) and an access road to the level of the coal bottom;
- . the coal access road;
- . stripping of sufficient area of coal to permit coal mining operation to commence concurrent with the continued overburden removal.

The above quantity is estimated as a minimum of 21,400 m³.

The following mining operations will follow in sequence:

- . overburden removal
- . upper coal removal
- . parting removal (if present)
- . lower coal removal.

On completion of the initial development the coal and overburden faces will advance westwards along the West Hill deposit.

The overburden and shale quantities are summarized in Table 1.

Table 1 Overburden and shale quantities

Year	Sandstone overburden (m ³)	Shale and coal losses (m ³)
Premining	21,400	-
1	52,273	11,990
2	55,150	10,300
3	48,700	9,050
4	44,000	8,300
5	40,600	7,500
Total	262,123	47,140

Until sufficient room is developed within the pit it will be necessary to dump excavated overburden outside of the open cut to the south of the mine excavation.

Dumping of the overburden should proceed from the proposed southern limit so that no impact results on the existing irrigation channels at the site.

The overburden dump shall be positioned in such a manner that the distance between the closest toe of the dump and the existing irrigation channels is not closer than 5 m.

The general area is shown on Drawing No. A85393.25.05.0001

Surface topsoil should be removed and stored separately for use in recovering and revegetation.

Prior to dumping on any area of land the topsoil is to be removed and stockpiled for later use in covering the completed waste dump.

The overburden dump is to be built up in a series of lifts or layers not exceeding 5 m thickness with the southern most side completed first.

As soon as a section of final dump wall is completed it is to be smoothed to a stable angle, compacted and covered with topsoil and then revegetated.

The final height of the dump shall not exceed the original height of the existing southern section of the West Hill.

At the proposed production rate of 20,000 t/y of clean coal in pit dumping of overburden and waste can commence in the fifth year of operation with only limited external dumping of waste thereafter.

Dumping should proceed that on completion of settlement and recovering the original contours of the hill will be restored.

3.4 FACILITIES

The proposed mine is a small operation and will require simple facilities on site. Provision shall be made for an office in the form of a transportable building to be positioned adjacent to the coal processing and despatch area.

The building shall consist of facilities for a Manager's office, a general office room, and a meeting room.

Toilet facilities shall be provided.

Allowance shall be made for providing potable water (salinity of less than 1,000 mg/L) for the following requirements:

- . domestic supply (administration area)
- . industrial area (washdown)

. spoil pile irrigation.

Potable water shall be obtained from a nearby E&WS Department supply main.

In addition to satisfying the demands for potable water, water is required for dust suppression.

Potable water is not required for these tasks and it is intended to use water from the mine water disposal system for this purpose.

The general office area shall contain telex, photocopying, telephone and filing equipment and shall be designed to be operated by one full time staff member.

The mine Manager's office shall provide simple facilities suited to the Manager's specific and supporting role.

The office shall be set on a prepared hard stand with provision for car parking and shall have easy access to the coal despatch area and to the mine equipment servicing facility.

Access from the Lyell Highway shall be by a heavy duty unsealed road, and a weighbridge facility shall be incorporated in the main access road.

A fenced stores compound complete with a lube and fuel store facility shall be provided.

Servicing facilities shall be provided at the mine for the QSO equipment such as hydraulic excavators, trucks, bulldozers and graders as required.

3.5 CRUSHING AND SCREENING PLANT

The carefully and selectively mined coal shall be delivered to an on-site mobile crushing and screening plant.

The QSO shall provide an on-site coal crushing and screening plant, details of which are to be provided to Petrecon for approval with the QSO's tender for this project.

The crushing and screening plant is to be carefully designed and its equipment selected to minimize the production of non-saleable (-1 mm) fines from the product. Details of how this is to be achieved is to be provided by the QSO at the time of tender. Petrecon will inspect all aspects of the coal crushing and screening operation at not more than 5 day working intervals during the preparation of the coal.

The plant shall be located on an area established during the premining period behind a hill to the west side of West Hill away from the Lyell Highway. The actual site shall be agreed between the QSO and Petrecon at a site meeting prior to tender.

The indicated mobile plant location is shown on Drawing No. A85393-25.05.0001.

The mobile crushing and screening plant shall be capable of reducing ROM coal to a final product size of 100% minus 25 mm with minus 1 mm fines rejected.

Operation of the mobile processing plant may be on a discontinuous or continuous basis for an initial production of 20,000 t/y of coal to specification (i.e. the plant can be used in one short burst to produce one years' supply or it may be used on an as-needs basis to produce finished coal as required).

Access to the mobile processing plant shall be by formed roads using locally won material.

The general area of the proposed plant as shown on the Drawing shall be taken as diagrammatic only and all measurements and other information required to carry out the work under this Contract shall be obtained by the QSO on site.

3.6

STOCKPILES

The QSO shall establish a coal stockpile adjacent to the mobile crushing and screening plant to provide a surge capacity of one year's production.

The QSO shall construct a drainage channel to provide for runoff into settling ponds and to prevent pollution of the existing irrigation system.

In addition to the coal stockpile, the QSO shall establish a clean shale and a separate contaminated shale stockpile at the north-western end of the waste dump area adjacent to the main mine access road in order to minimize interference with daily mining operations.

The indicated coal and shale stockpile location is shown on Drawing No. A85393.25.05.001. The actual site shall be agreed between the QSO and Petrecon at a site meeting prior to tender.

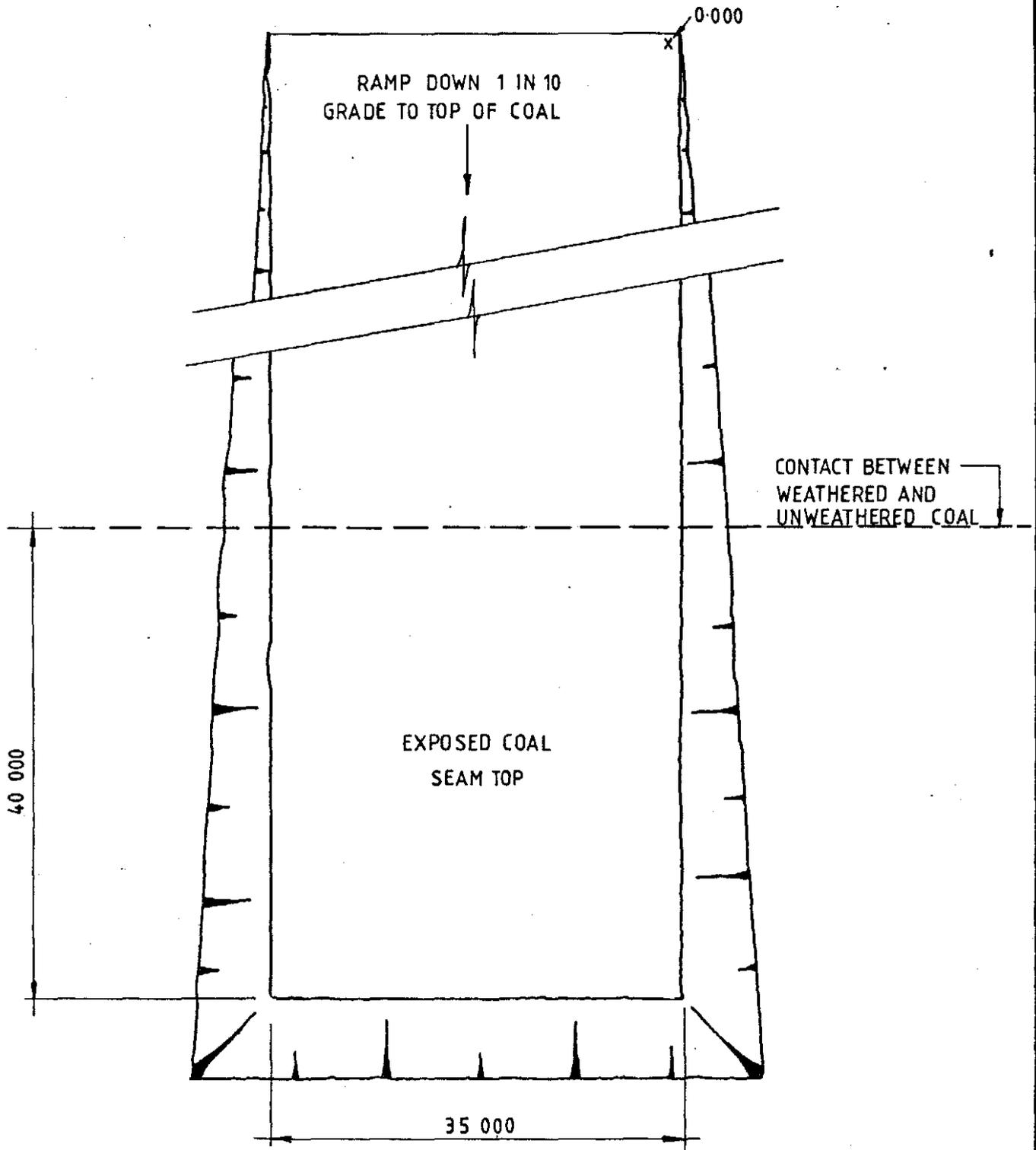
3.7

DRAWING SCHEDULE

The Drawings included in and forming part of the Specifications are listed in Table 2 below.

Table 2

Drawing number	Title
A85393-25.05.0001	Mining Block Schedule
A85393-25.05.0002	Mine Operation Diagram



COAL PIT PREPARATION

INITIAL WASTE REMOVAL EXCAVATION
TOTAL EXCAVATION 18,700 m³ APPROX

FIGURE 3.1

© KINHILL STEARNS

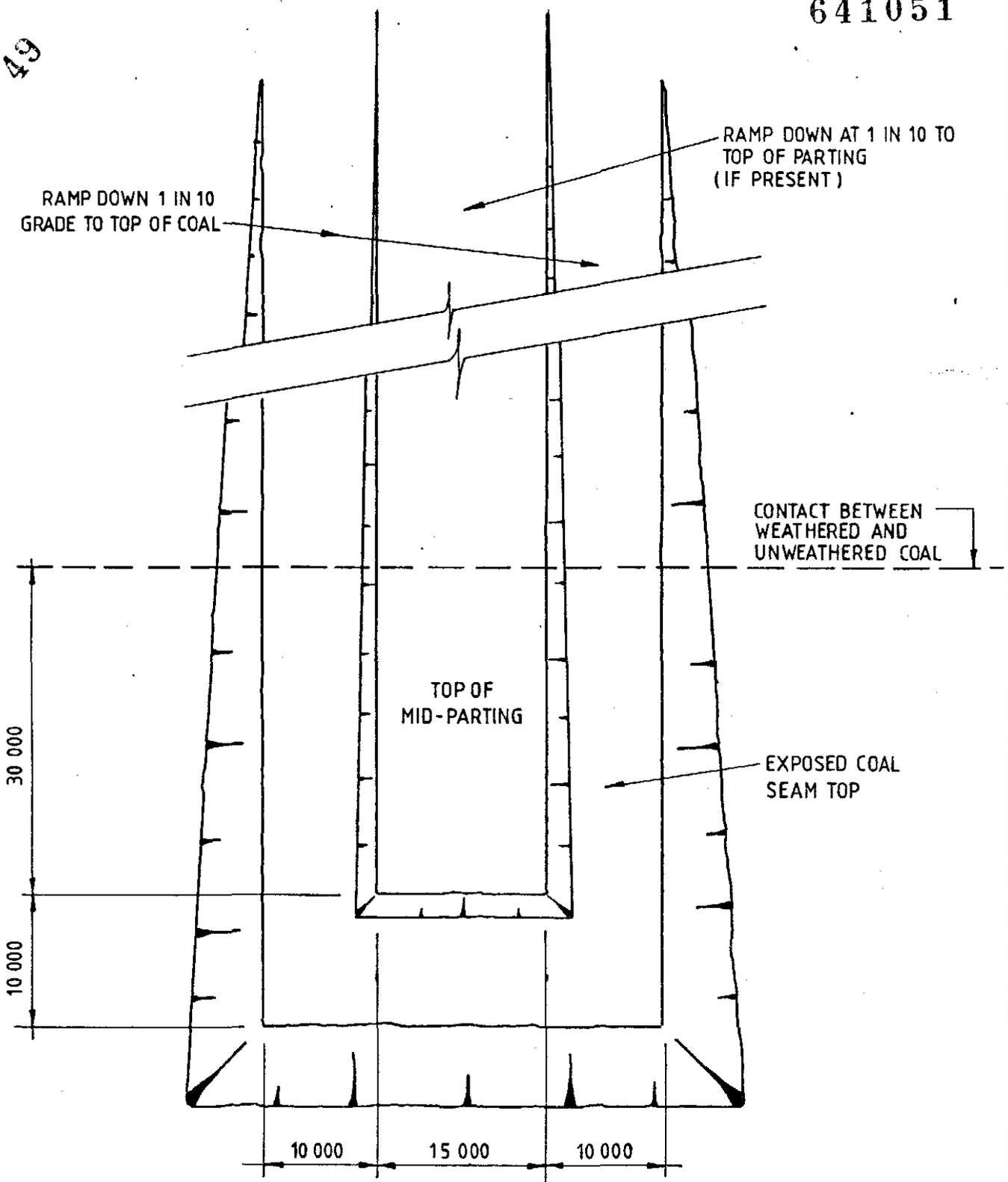
CAPRICORN MINING LTD
LANGLOH COAL PROJECT

Scale N.T.S.	Date 3 FEB 86	Drawing Number A85393
Drawn R.J.E.	Approved <i>Atkinson/Kooper</i>	25.05.0001

INITIAL WASTE REMOVAL
EXCAVATION

KINHILL STEARNS

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COAL PIT PREPARATION

INITIAL COAL REMOVAL DOWN TO TOP OF PARTING IF PRESENT
 PROBABLE RAW COAL PRODUCED - 1500 tonnes
 TOTAL EXCAVATION ————— 21500 m³ APPROX

FIGURE 3.2

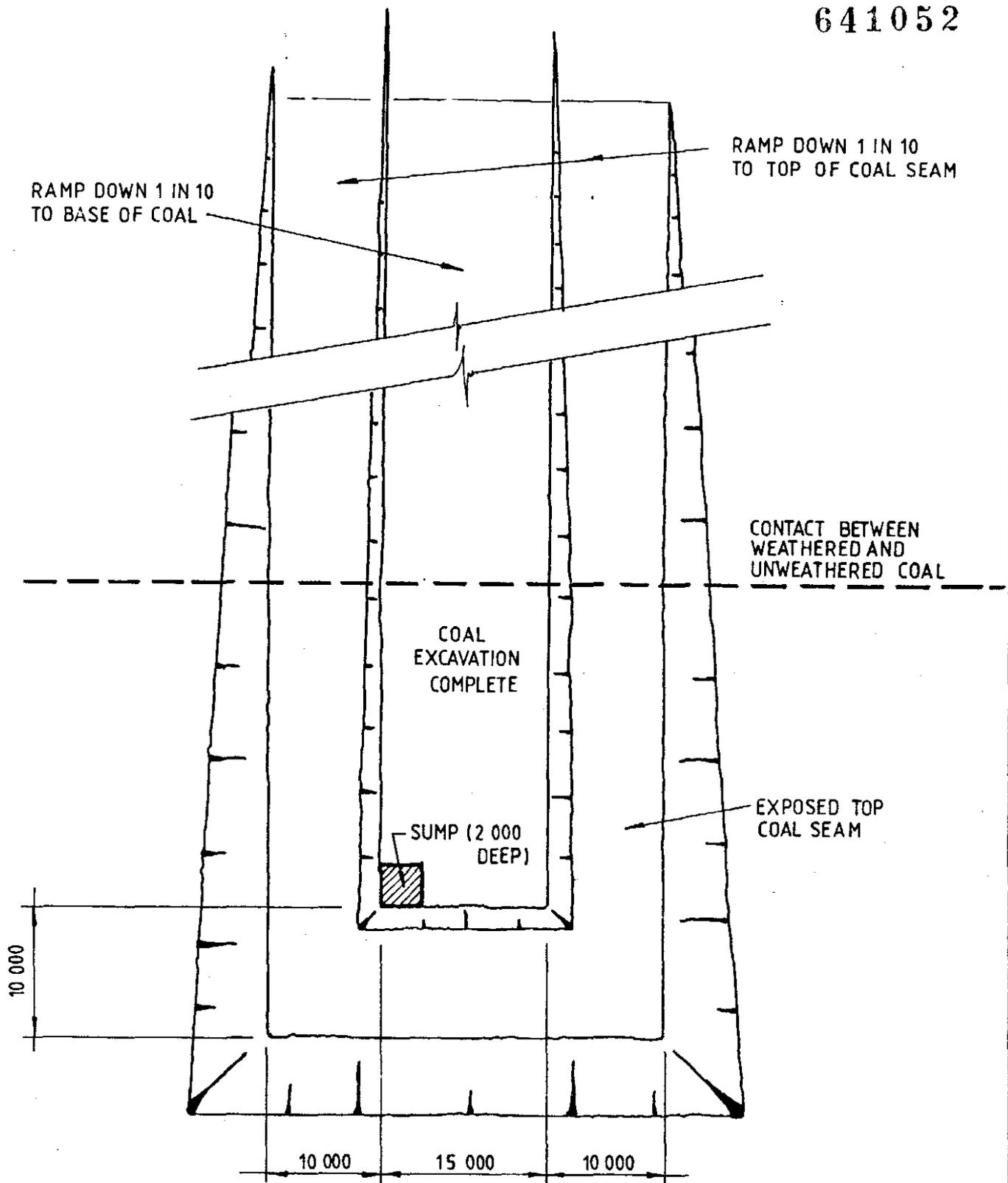
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CAPRICORN MINING LTD
LANGLOH COAL PROJECT

INITIAL COAL REMOVAL

Scale N.T.S.	Date 3 FEB 86	Drawing Number A85393
Drawn R.J.E.	Approved <i>Atwood/Hoppe</i>	25.05.0002

KINHILL STEARNS



COAL PIT PREPARATION

INITIAL COAL ACCESS CUT COMPLETE
 ASSUMING COAL THICKNESS OF 4-500 RAW COAL PRODUCED = 3040 tonnes
 APPROX TOTAL EXCAVATION — 27 900 m³

FIGURE 3.3

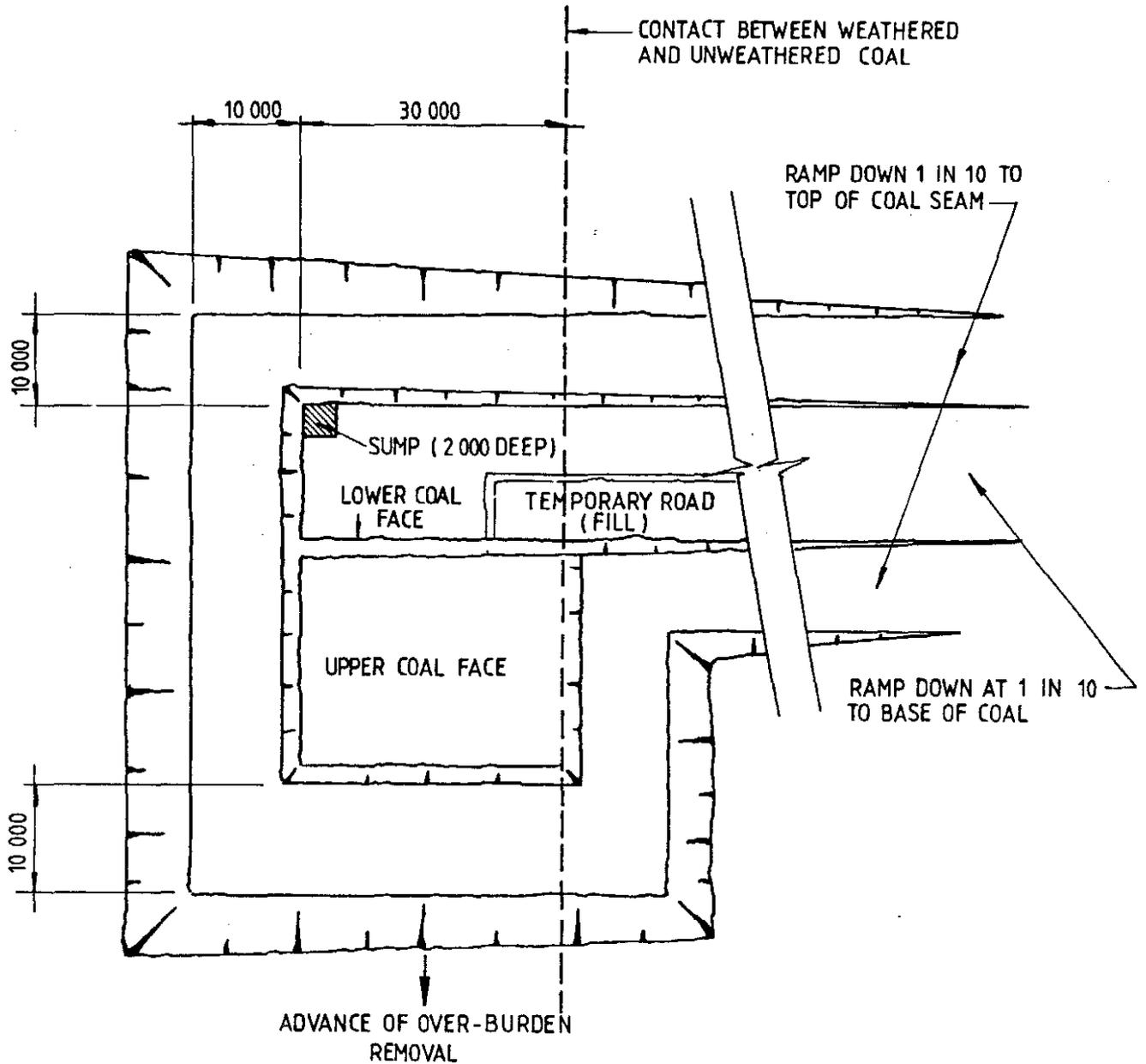
© KINHILL STEARNS

CAPRICORN MINING LTD
 LANGLOH COAL PROJECT

INITIAL COAL ACCESS CUT
 COMPLETE

Scale N.T.S.	Date 3 FEB 86	Drawing Number A 85393
Drawn R.J.E.	Approved <i>Atwood/Hooper</i>	25.05.0003

KINHILL STEARNS



COAL PIT DEVELOPMENT (PARTING PRESENT)

ADVANCE OF COAL AND OVER BURDEN FACES AWAY FROM INITIAL ACCESS EXCAVATION

RAW COAL 4,800 tonnes APPROX
TOTAL EXCAVATION 37 000 m³ APPROX

FIGURE 3.4

© KINHILL STEARNS

CAPRICORN MINING LTD
LANGLOH COAL PROJECT

COAL PIT DEVELOPMENT

Scale N.T.S.

Date 3 FEB 86

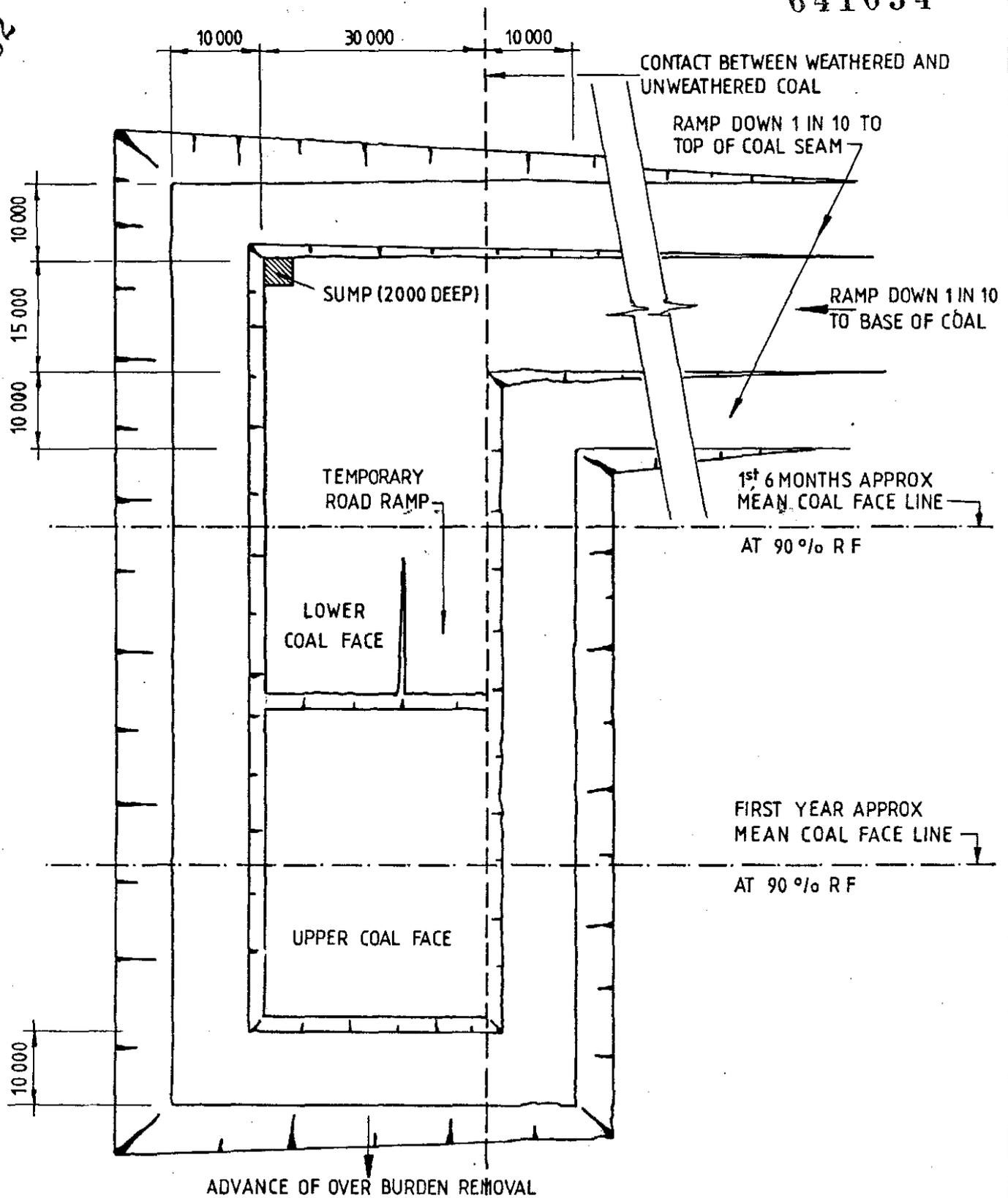
Drawing Number A85393

Drawn R. J. E.

Approved *Atkinson/Cooper*

25 05 0004

KINHILL STEARNS



COAL OPEN PIT AT END OF FIRST YEAR

RAW COAL PRODUCED ——— 22,000 tonnes (APPROX)
 TOTAL MINED ——— 91,000 m³ (APPROX)

FIGURE 3.5

© KINHILL STEARNS

CAPRICORN MINING LTD
 LANGLOH COAL PROJECT

**COAL OPEN PIT AT END OF
 FIRST YEAR**

Scale N.T.S.	Date 3 FEB 86	Drawing Number A85393
Drawn R.J.E.	Approved <i>Arthur Cooper</i>	25.05.0005

KINHILL STEARNS

4 MINE SCHEDULES AND PRODUCT DELIVERIES

4.1 GENERAL

The initial development point of the pit has been selected on the eastern side of the West Hill deposit.

The axiom that mining should commence where the cost of recovery is least shows that mining should commence at the southern tip of the deposit and on completion of the initial development the coal and overburden faces will advance northwards along the West Hill deposit.

West Hill deposit (within 8 m contour 'O/B')

Total 'in situ' coal	1,638,000 t
Total saleable coal	1,310,000 t
Annual sale rate	20,000 t/y
Coal losses - to waste	2,500 t/y
- to fines	2,500 t/y
Total annual 'in situ' coal	25,000 t
Total overburden	8,262,450 t (assumed RD of 2.5 t/m ³)
Interburden (estimated)	1,364,500 t (assumed RD of 2.4 t/m ³)

4.2 ANNUAL SCHEDULES

The first five years of anticipated material quantities to be mined during that period are shown in Table 3.

Table 3 Annual mining programme

Year	Overburden (m ³)	Interburden plus coal waste (m ³)	Total waste mined (m ³)	Coal in situ (t)	Coal saleable (t)
Premining	21,400	-	21,400	-	
1	52,273	11,990	64,263	25,000	20,000
2	55,150	10,300	65,450	25,000	20,000
3	48,700	9,050	57,750	25,000	20,000
4	44,000	8,300	52,300	25,000	20,000
5	40,600	7,500	48,100	25,000	20,000
Total	262,123	47,140	309,263	125,000	100,000
Balance	3,042,857	521,402	2,564,259	1,513,000	1,210,000

Coal 'in situ' density = 1.5 t/m³
 overburden density = 2.4-2.6 t/m³
 interburden density = 2.3-2.5 t/m³.

The annual coal recovery of 25,000 t allows for 20% waste and fines losses during preparation to produce 20,000 t/y of product.

4.3 MINING PERIOD AND CUSTOMERS

Mining operations in order to extract a years production of coal will be for a short period each summer and the coal shall then be stockpiled for continuous crushing and screening during the year.

Note: If the QSO so wishes the annual coal production can be completely prepared in one continuous activity with the coal winning. If this is undertaken then the QSO may be required to rescreen the coal prior to delivery if the material has, in the opinion of Petrecon, degraded to a non-conforming level of specification.

Cartage of coal to various customers in Tasmania will continue all the year round.

A list of most likely customers is shown below:

- . Cadbury, Hobart
- . Cascade Brewery, Hobart
- . Royal Hobart Hospital, Hobart
- . other potential clients exist in Hobart and New Norfolk.

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5 **OPERATION AND PRODUCT REQUIREMENTS**

5.1 **GENERAL**

There are three seams of coal on West Hill with mudstone interburden seams of variable thickness.

There is clear visual discrimination between the sandstone overburden and the top coal seam. However, the interburden to coal separation is visually more difficult to identify.

Before the coal can be mined it is necessary to expose the coal seam by stripping off the overburden or interburden material.

5.1.1 **Extent of overburden and interburden removal**

A thin layer of coal shall be stripped during the overburden and interburden removal, and a thin layer of coal shall be left on top of the interburden in order to ensure a clean product. Daily inspections must be carried out by the QSO and weekly or fortnightly inspections will be carried out by Petrecon.

The coal seams shall be carefully and selectively mined in thin layers in order to ensure that no mixing between coal and interburden/overburden takes place during the mining operation.

5.2 **OPEN PIT MINING EQUIPMENT**

The coal can be mined either by hydraulic excavator or alternatively by a surface miner.

5.2.1 **Hydraulic excavator**

The excavator required for this application should be smaller than that required for overburden removal. Provision should be made for a dozer to be involved in the mining operation. This item of equipment is capable of undertaking some ripping operations in advance of the hydraulic excavators should this be necessary.

5.2.2 **Surface miner**

The 'Wirtgen 2600' surface miner is an ideal machine for selective mining. By excavating layer after layer, the valuable coal and the less valuable coal can be mined separately resulting in a maximum recovery of clean coal.

The surface miner guarantees the removal of partings between coal seams to very accurate tolerances.

The surface miner continuously mines material to a size which is suitable for conveyor belt haulage, thus considerable capital and operating costs can be saved.

Loading by wheel loaders or shovels leave behind a surface requiring corrective treatment by a grader or dozer.

The surface miner, however, in the course of the milling process, continuously produces a perfect trafficable mine floor for all vehicles.

Wirtgen surface mining machines are suitable for the exploitation of all coal types, irrespective of their hardness. They have already proved themselves in lignite and bituminous coal operations.

Capcoal Pty Ltd conducted a trial with a 'Wirtgen 3000' surface miner at their German Creek mine in Queensland and the general consensus was that the surface miner had performed well and certainly above expectations.

5.3 PRODUCT

The QSO is to ensure that the processing plant performs the required operations satisfactorily and safely in accordance with all relevant codes and standards.

The following product requirements shall be met:

Material

Coal Lump size - max. 25 mm
- min. 1 mm

Quantity	20,000 t/y (initially)
	100,000 t/y (maximum)

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6 DEVELOPMENT REQUIREMENTS**6.1 ACCESS**

As a consequence of the location of the mine with respect to the local transportation network, it is intended that access to the mine shall be obtained from the Lyell Highway.

The proposed route of the main access road is shown on Drawing No. A85393.25.05.0001.

The Contractor shall provide a heavy duty unsealed main access road to the mine facilities, incorporating a digital readout weighbridge with a printed document output facility.

The access road to the mobile crushing and screening plant can follow the existing track location for much of its length; however, these tracks will need to be upgraded using sandstone overburden taken from the quarry site.

Formed roads shall be provided within the mine area to provide access to the various facilities and operations.

It is anticipated that it will be necessary to provide some dust control on these roads during summer months and to provide containment dams for runoff water containing coal dust.

Trafficability for the trucks on site should be excellent, with the sandstone won from the overburden removal exercise forming a good road base material.

Provision shall be made for a grader to be available on the site which, in association with the water cart, will ensure that the mine roads are kept in good condition with small liberation of surface dust. In general, the summer months are expected to represent the worst dust problem, however, regular application of water to the mine roads will contain the problems.

6.2 SIGNAGE

In order to ensure the successful operation and the safety of traffic at the mine access road junction with the Lyell Highway, the highway drivers should not be required to make a sudden decision under normal driving conditions. Therefore signs provided shall be located well in advance of the decision point.

Advance exit warning signs shall be erected along the approach to the mine exit road to alert drivers to the existence of the mine access road.

These signs shall show the destination of the cross road and the distance from the sign to the junction.

Since the exit road is located on a high speed rural highway, countdown markers shall be used in advance of the exit road to allow drivers to assess their location and speed accurately, when approaching the junction.

They shall be located at a distance of 300 m, 200 m and 100 m from the junction.

An exit direction sign shall be erected immediately in advance of the exit road.

For the purpose of road safety it will be necessary to impose a speed restriction zone. The speed restriction sign shall indicate by numerals the maximum speed in kilometres per hour at which vehicles may be driven between the sign and the next speed control sign ahead.

The following signs shall be erected on the mine access road leading to the Lyell Highway:

- . Intersection direction guide signs indicating the direction to be taken at the junction with the Lyell Highway.
- . A stop sign shall be used at the junction to ensure caution before entering the intersection.

The stop sign shall be located on the left side of the mine road, facing approaching traffic, or as close as practicable to, the point where approaching vehicles are required to stop.

A stop line shall be used in addition to the stop sign to indicate the required stopping point more precisely.

- . A speed restriction sign indicating the maximum speed in kilometres per hour at which vehicles may be driven on the mine access road.
- . A T-junction sign shall be used in advance of the intersection on the mine access road forming the stem of the T.
- . A blasting stop await signal shall be used at the entrance to the mining area.

This sign shall only be placed at a point where an official is in attendance to advise when it is safe to proceed.

To ensure that the sign is only displayed when vehicles are required to stop, the sign shall be fixed permanently to a barrier board which is placed across the approach road before blasting commences, and removed after blasting to allow vehicles to proceed.

6.3 DUST AND NOISE SUPPRESSION

The use of haul trucks and the existence of the mobile crushing and screening plant together with the coal and interburden stockpiles will mean that dust and noise will be generated and therefore water is required for coal fire suppression and dust suppression.

Potable quality water is not required for these tasks and it is recommended to use water from the mine water disposal system for this purpose.

The mobile coal preparation plant shall be provided with dust suppression sprays at each point of dust generation.

The exposed surface of the coal stockpile shall be dampened during hot, dry weather to prevent the accumulation of surface dust to avoid the potential for spontaneous combustion.

The fire suppression water shall be applied by way of a sprinkler system consisting of high capacity half circle sprinklers sufficiently spaced along both sides of the stockpile.

It is anticipated that the interburden stockpiles and the overburden waste dump will not require dust suppression; however, it is the QSOs responsibility to provide an adequate dust control system should the need arise.

In order to minimize the generation of noise, the mobile crushing and screening plant shall be completely shielded from the Lyell Highway by the construction of an overburden embankment around the southern perimeter of the plant.

The height of the overburden embankment shall be equal or greater than the height of the mobile crushing and screening plant.

6.4 BLASTING

Preliminary assessment indicates that, although a proportion of overburden is weathered, particularly around the perimeter of the hill, there is a presence of substantial amounts of massive unweathered material which will require drilling and blasting.

Blast operations shall be carried out by conventional compressed air operated track mounted rock drills.

Hole size will be determined largely by the equipment available but probably will be in the order of 100 mm.

A typical blasting pattern will be 2.5 x 2.5 m which is somewhat closer centred than would perhaps normally have been expected. However, this degree of blasting will result in less wear and tear on the overburden removal equipment.

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Assuming a drill hole diameter of 100 mm and a 2.5 x 2.5 m pattern, 31.3 t of sandstone would be broken per metre drilling.

No data on drill penetration rates is available, but it is assumed that this will be within the capacity of a single Gardner Denver Air-Trac or equivalent.

Where ground conditions are dry, explosives used shall be conventional ANFO initiated with booster charges and detonating cord.

Where ground conditions are wet water-resistant packaged explosives will be necessary.

Before commencing blasting, the QSO shall carry out a series of vibration and noise measurement tests related to charges of different sizes and blasting pattern in order to determine maximum permissible hole loadings.

Since it is likely that the weathered overburden around the perimeter will be removed by non-explosive removal techniques, suitable ground, in which to carry out these tests, will only be exposed after mining operations have commenced.

The holes shall be fired in groups by using a sequential blasting pattern in order to minimize ground vibration and noise effects.

The QSO shall ensure that all blasting operations are carried out in compliance with the relevant local and governmental regulations under the Mines and Works Inspection Act and under the Explosives Act.

6.5

DEWATERING

Drilling and dewatering of the aquifer will be undertaken by Petrecon Pty Ltd and does not form part of this Contract.

It is the sole responsibility of Petrecon to drill boreholes and install submersible slim line electric pumps ahead of the mine cut in order to suppress the watertable beneath the aquifer and thereby ensure dry mining operation throughout the Contract Period.

The bore water will be pumped into existing holding dams for re-use in the present irrigation system.

Petrecon is to ensure that there is enough storage capacity in the holding dams for the required coal fire suppression and dust suppression system.

The supply of the required water to the mobile crushing and screening plant and the stockpile area for these tasks shall be the responsibility of the QSO.

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PROGRAMME FOR IMPLEMENTATION

The QSO shall submit with his tender a detailed programme for implementation of the proposed mine operation.

This programme shall include full details for the following periods:

- . approvals
- . layouts
- . site establishment
- . services
- . fencing
- . advice to locals.

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ENGINEERING REQUIREMENTS

The QSO shall submit a comprehensive and detailed description of the following engineering requirements:

- . performance - rates of production
 - hours of operation
 - labour requirements
- . compaction
- . stockpiles
- . hardstand
- . mobile crushing and screening plant
- . roads
- . fencing
- . noise emission.

This description shall include information together with drawings and illustrations in sufficient detail to enable the plant offered to be fully considered in regard to design and performance.

REHABILITATION

Rehabilitation shall form an integral part of the mining operation and shall result in the majority of the mining area being returned to agricultural uses after the mine is exhausted.

Overburden material will initially be dumped at an outside location to the south of West Hill and must be consolidated and profiled as required to form a useful agricultural feature.

After the spoil piles have been smoothed and contoured, the stockpiled topsoil shall be spread over the spoil and the area seeded for grazing purposes.

For security and safety reasons the mining operation shall be provided with a continuous man-proof fence suited for the purpose.

Areas outside the direct mining and overburden dumping operations shall be surrounded by a stock-proof fence.

On completion of the mining operation the groundwater will substantially re-establish its original profile and no long-term deliterious effects from the mine are anticipated.

10 COMMERCIAL**10.1 GENERAL**

The QSO shall be deemed to have carefully examined the whole of the specification and to have removed all doubts he may have had as to the meaning of any portion of the specification and in addition to have fully informed himself as to the site and local conditions affecting the carrying out of the Contract and to have made due allowance in his price.

10.2 TERMS OF PAYMENT

On completion of the initial establishment of the quarry site, the QSO shall be entitled to request a Lump Sum payment to cover the initial establishment costs.

The Lump Sum payment shall be for a nominal amount of \$110,000, which is subject to agreement between the QSO and Petrecon at a meeting prior to tender.

The QSO is requested to provide prices, on a per tonne basis, for the following:

- . to act as a QSO to produce 20,000 t/y of clean coal;
- . to road freight the final product to customers in the Hobart, New Norfolk region.

The schedule of prices must be duly completed and returned with the tender.

10.3 CONDITIONS OF CONTRACT

The QSO is required to establish and operate the proposed open cut coal mine at Langloh under the following conditions:

- . The QSO will own (lease) all mining and processing plant equipment.
- . The QSO shall operate the open cut coal mine and the mobile crushing and screening plant.
- . The QSO shall truck the coal to customers in Hobart and New Norfolk region.

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Petrecon Australia Pty Ltd
Hobart, Tasmania
Specification A85393/1

Schedule I Tender prices

To act as a QSO to produce 20,000 t/y of clean coal by conventional method (hydraulic excavator)	\$/t of product loaded on to truck
To act as a QSO to produce 20,000 t/y of clean coal by surface miner	\$/t of product loaded on to truck
To road freight the final product to customers in the Hobart, New Norfolk region	\$/t-FIS customers plant Hobart. \$/t-FIS customers plant New Norfolk

The QSO shall rule through the words not applicable:

- . The prices quoted are not subject to CPI adjustment.
- . The prices quoted are subject to CPI adjustment.

If the contract prices are subject to CPI adjustment, the QSO shall set out below or annex to this sheet, details of the portions of the price which are subject to adjustment and the formulae for calculating the adjustment for each portion.

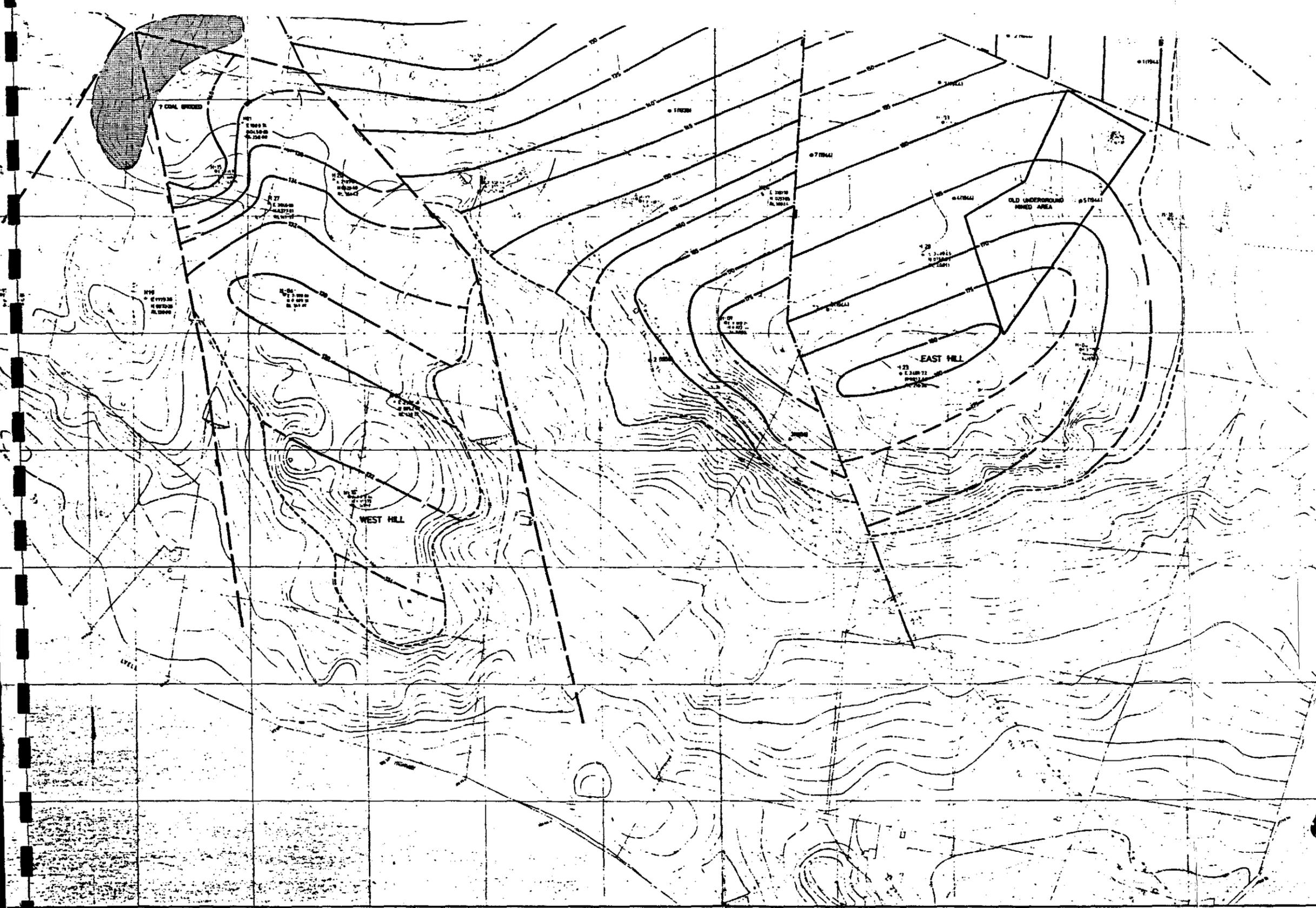
Signature of Tenderer

Date

APPENDIX A

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APPENDIX A

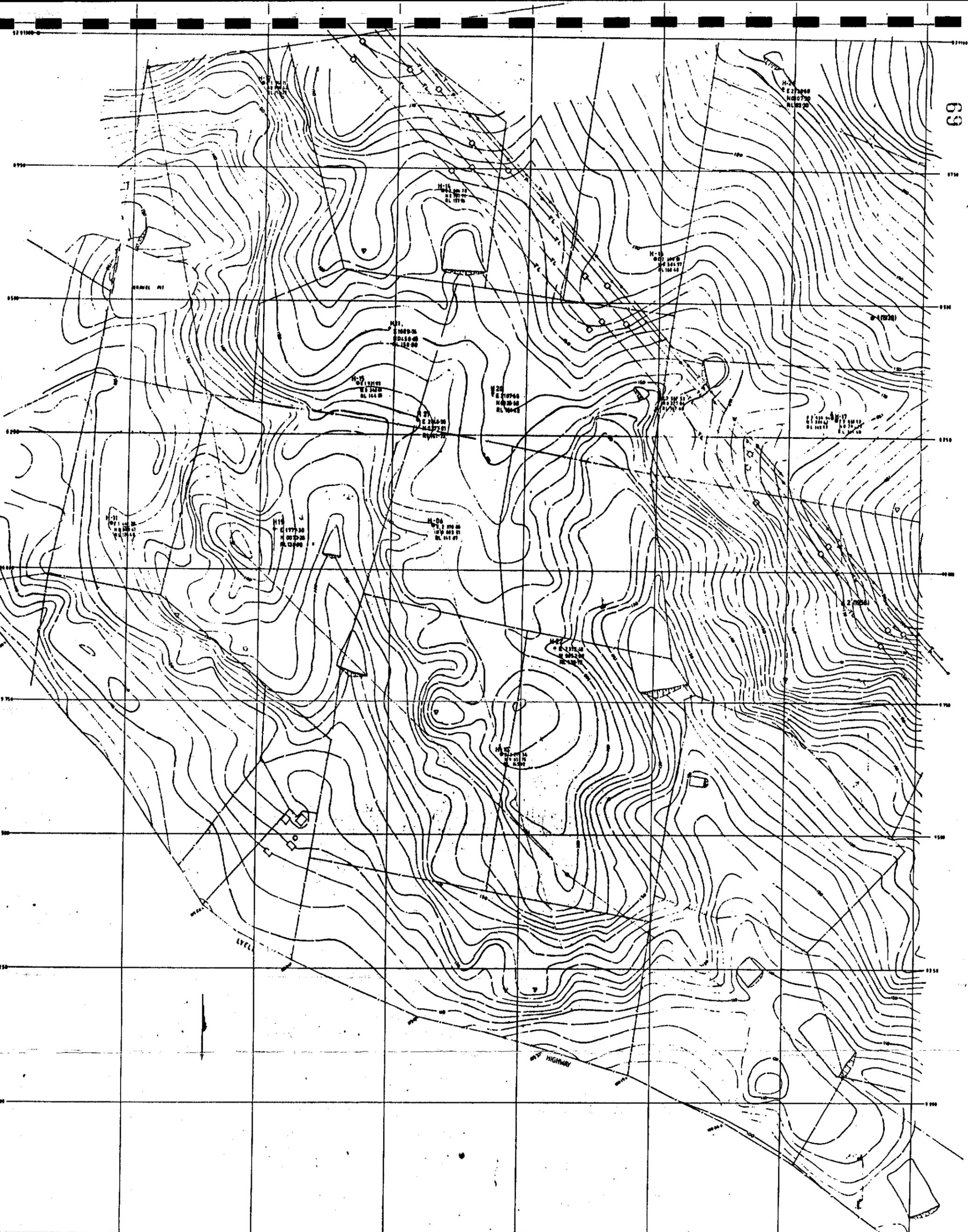
- . Petrecon (Australia) Pty Ltd map - Tasmania Basin (Capricorn Mining Ltd) 83/3 showing top coal structure map.
- . E. Barrie Valentine maps for Capricorn Ltd showing contour and detail plan (Reference No. 82037/1 and 82037/2).
- . Petrecon (Australia) Pty Ltd map (Capricorn Mining Ltd) E.L.27/29-83/5 Langloh coal project showing total coal isopach map.
- . Petrecon (Australia) Pty Ltd map (Capricorn Mining Ltd) E.L.27/79-83/4 Langloh coal project showing coal overburden isopach to top Seam 'A'.
- . Australian Groundwater Consultants Pty Ltd map Figure 3 showing groundwater contour map.
- . Petrecon (Australia) Pty Ltd maps (Capricorn Mining Ltd) E.L. 27/79-83/19 Langloh coal project showing total overburden isopach for Seam 'B' and Seam 'C'.
- . Petrecon (Australia) Pty Ltd map (Capricorn Mining Ltd) E.L.27/79-83/6 Langloh coal project showing Seam 'A' isopach map.
- . Petrecon (Australia) Pty Ltd map (Capricorn Mining Ltd) E.L.27/79-83/7 Langloh coal project showing Seam 'B' isopach map.
- . Petrecon (Australia) Pty Ltd map (Capricorn Mining Ltd) E.L.27/79-83/8 Langloh coal project showing Seams 'C' and 'D' isopach map.



5 cm

- LEGEND**
- TOP COAL LEVEL, 5 METRE CONTOUR INTERVAL
 - - - - - PROVEN FAULTS (DIRECTION INDICATED)
 - - - - - PROBABLE FAULTS (DIRECTION INDICATED)
 - - - - - STRUCTURAL DISCONTINUITIES (UNPROVEN FAULTS)
 - - - - - OUTLINE OF TOP SEAM A
 - ▨ BASALT PLUG (TERTIARY AGE)

PETROCHE AUSTRALIA PTY LTD	
TASAMAMBA BASIN	
(CAPRICORN MINING LTD)	
EL. 27/79	
LANGLOCH COAL PROJECT	
TOP COAL STRUCTURE MAP	
83/3	Scale 1:2500

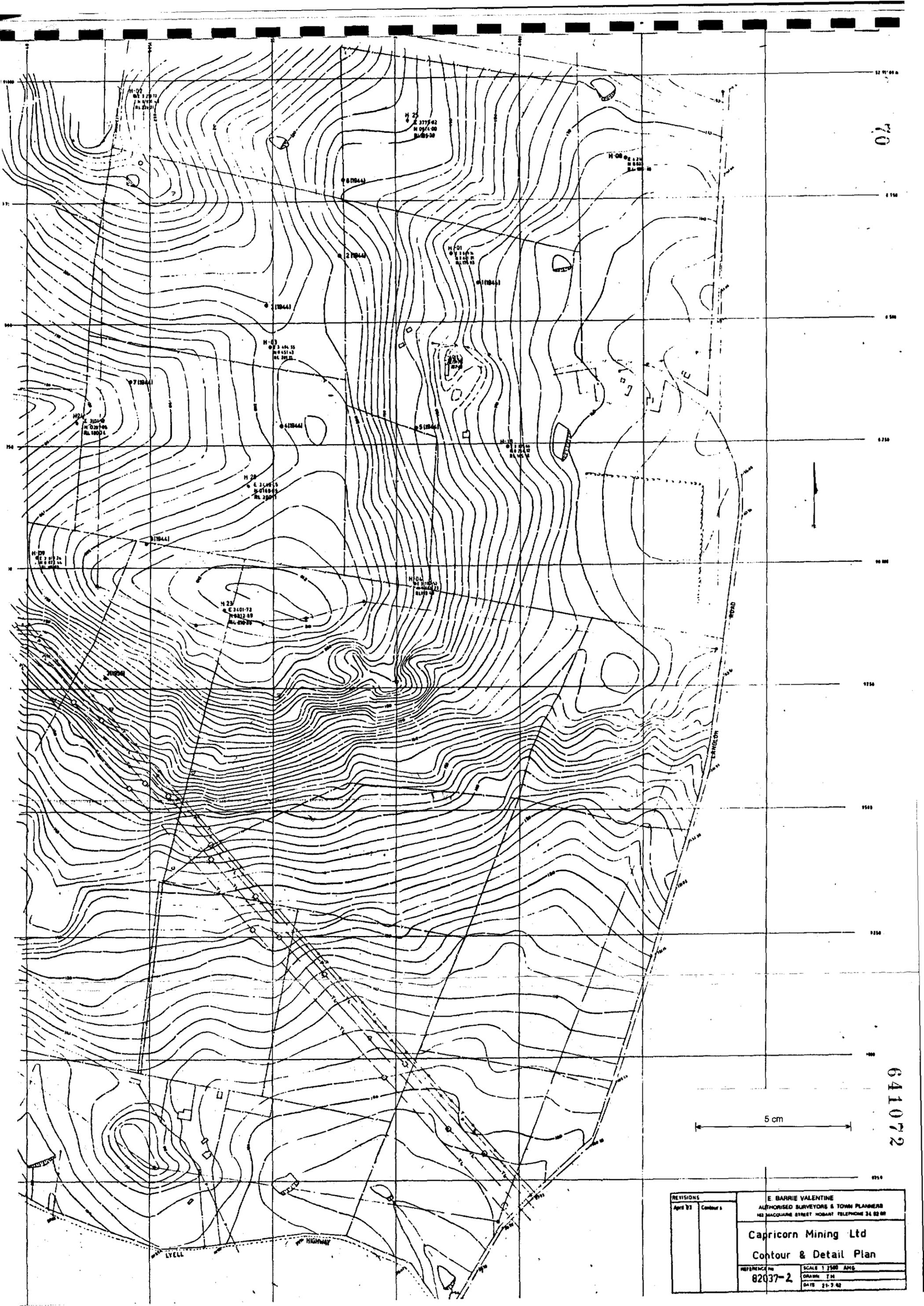


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<p>E. BARRIE VALENTINE AUTHORISED SURVEYORS & TOWN PLANNERS 180 MACQUARIE STREET, HOBART TELEPHONE 34 82 88</p>		<p>REVISIONS APR 82 Contours</p>
<p>Capricorn Mining Ltd Contour & Detail Plan</p>		
<p>REFERENCE No 82037-1</p>	<p>SCALE 1:7500 A.M.S. DRAWN T.M. DATE 21.1.82</p>	

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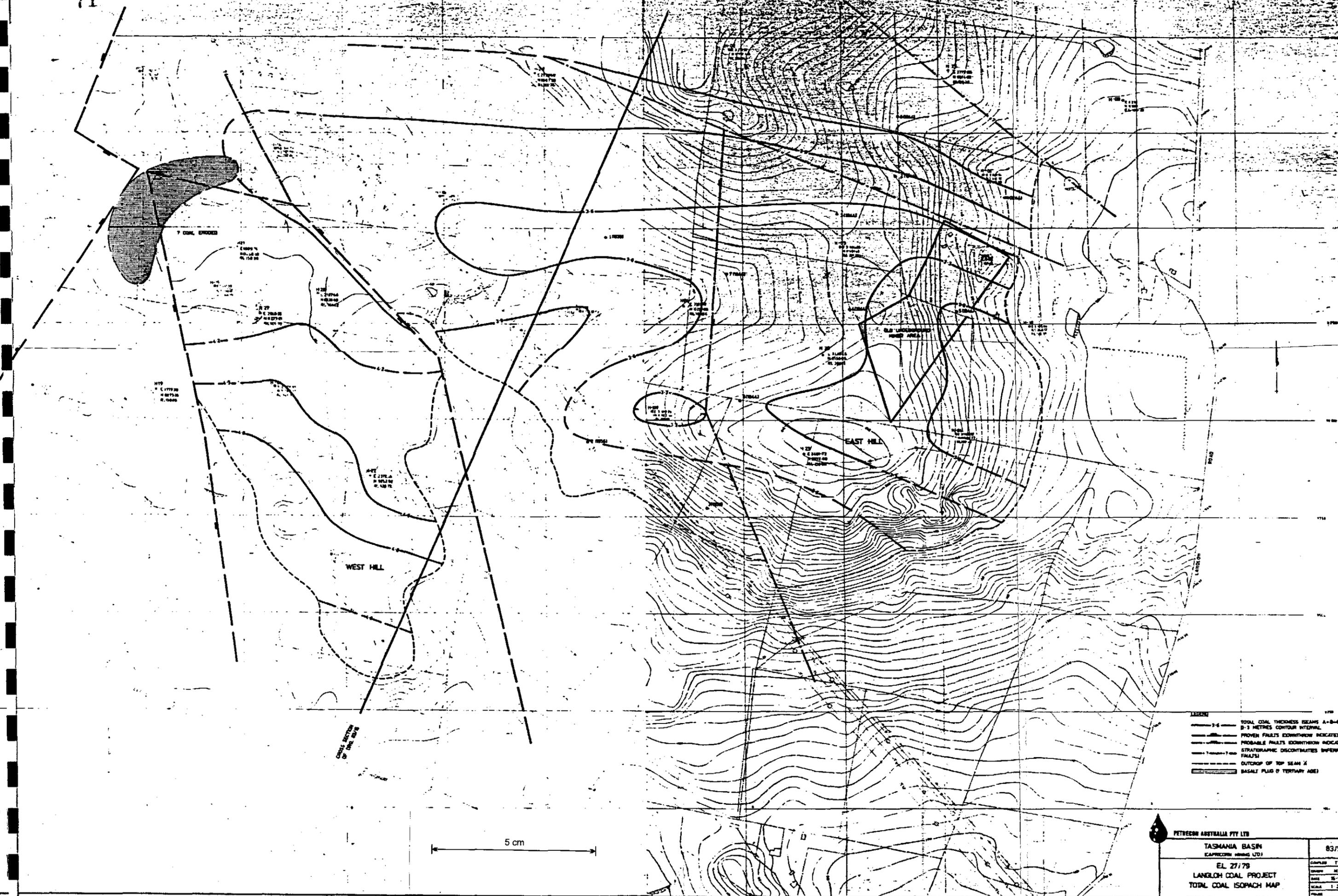


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REVISIONS		E BARRIE VALENTINE AUTHORISED SURVEYORS & TOWN PLANNERS 42 MACQUARIE STREET HOBART TELEPHONE 34 82 87	
April 72	Contours	Capricorn Mining Ltd	
		Contour & Detail Plan	
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82037-2	GRAPH 1 M		
		DATE 25-7-62	

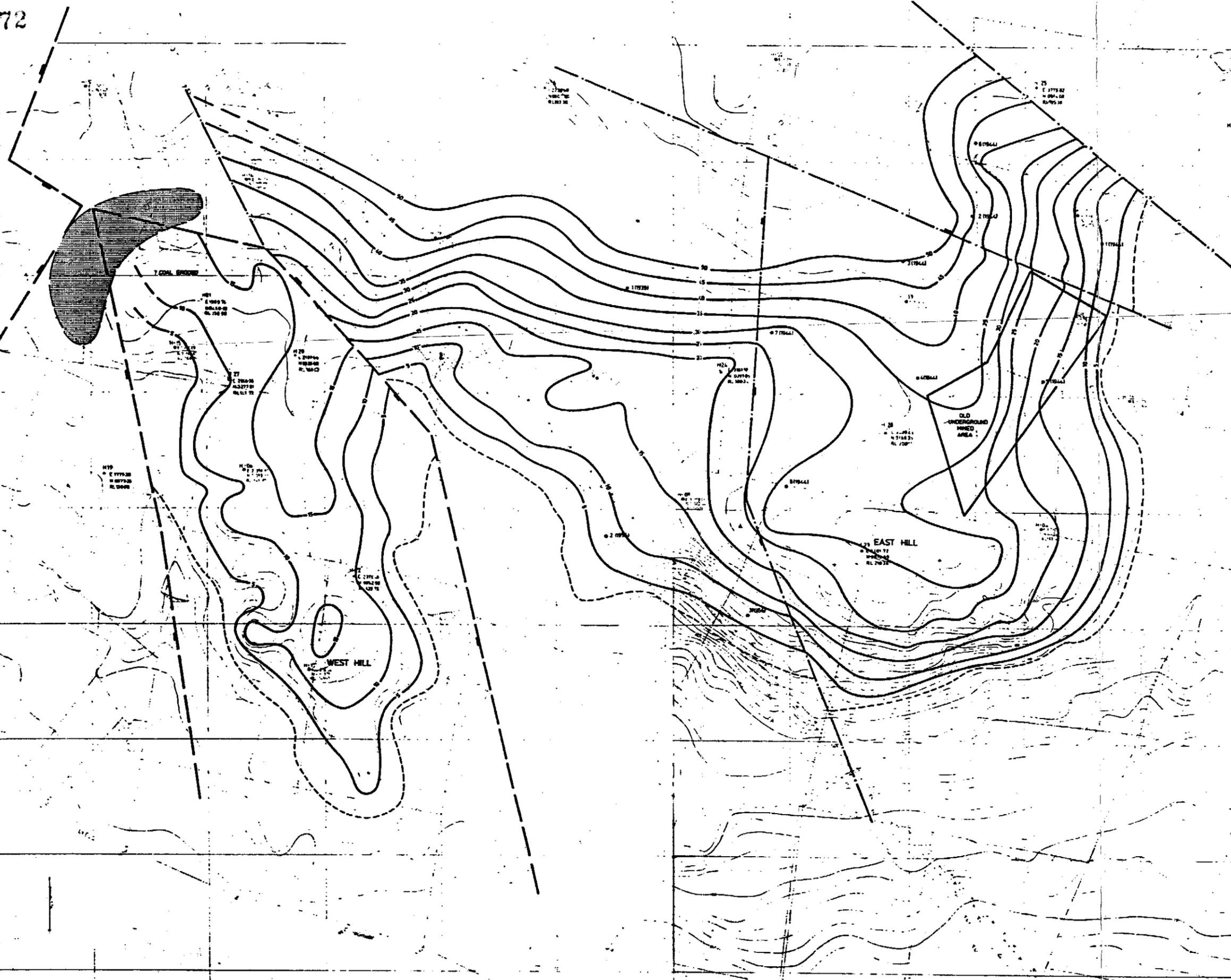


- LEGEND
- 3-6 — TOTAL COAL THICKNESS ISOPACHS A-B-C-DE
 - 0-1 METRES CONTOUR INTERVAL
 - PROVEN FAULTS DOWNTHROW INDICATED
 - PROBABLE FAULTS DOWNTHROW INDICATED
 - STRATIGRAPHIC DISCONTINUITIES IMPERFECT FAULTS
 - OUTCROP OF TOP SEAM X
 - BASALT PLUG OF TERTIARY AGE

5 cm

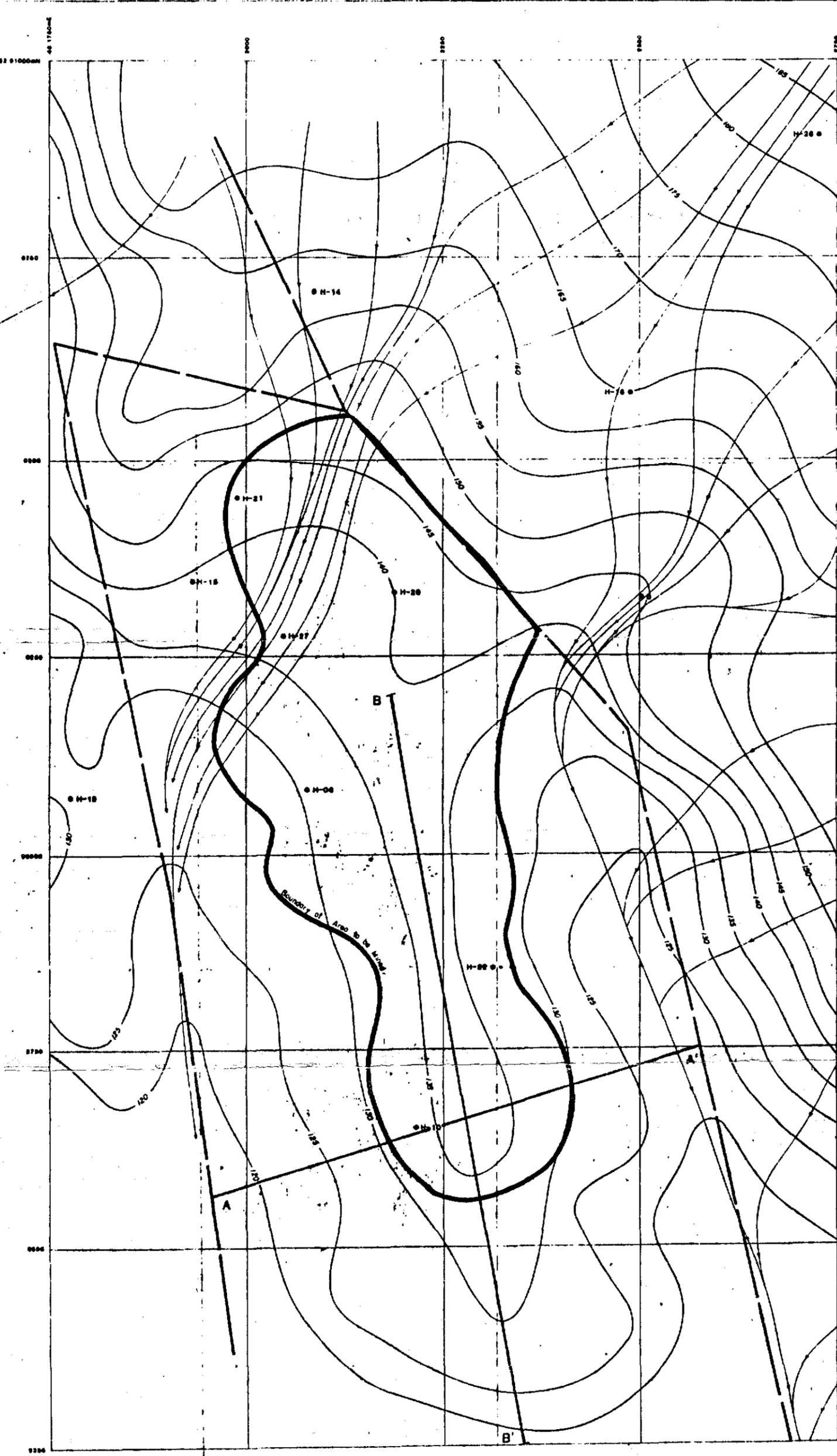
PETROBRAS AUSTRALIA PTY LTD

TASMANIA BASIN CAPRICORN SHELF LTD	83/5
EL 27/79 LANGLOH COAL PROJECT TOTAL COAL ISOPACH MAP	DRAWN T.C.S. CHECK M.R.B. DATE 15-5-82 SCALE 1:25000 PLAN



5 cm

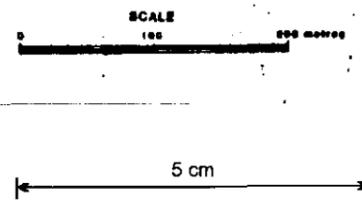
- LEGEND
- 20 — OVERBURDEN THICKNESS, 5 METRE CENTRE INTERVAL
 - PROVEN FAULTS (DOWNTHROW INDICATED)
 - PROBABLE FAULTS (DOWNTHROW INDICATED)
 - STRATIGRAPHIC DISCONTINUITIES (IMPERFECT FAULTS)
 - CLUTCH OF TOP SEAM (C)
 - BASALT PLUG (TERTIARY AGE)



LEGEND

- H-28 Cored bore
- /—/— Groundwater surface contour
- Groundwater flow line
- Fault
- Section line

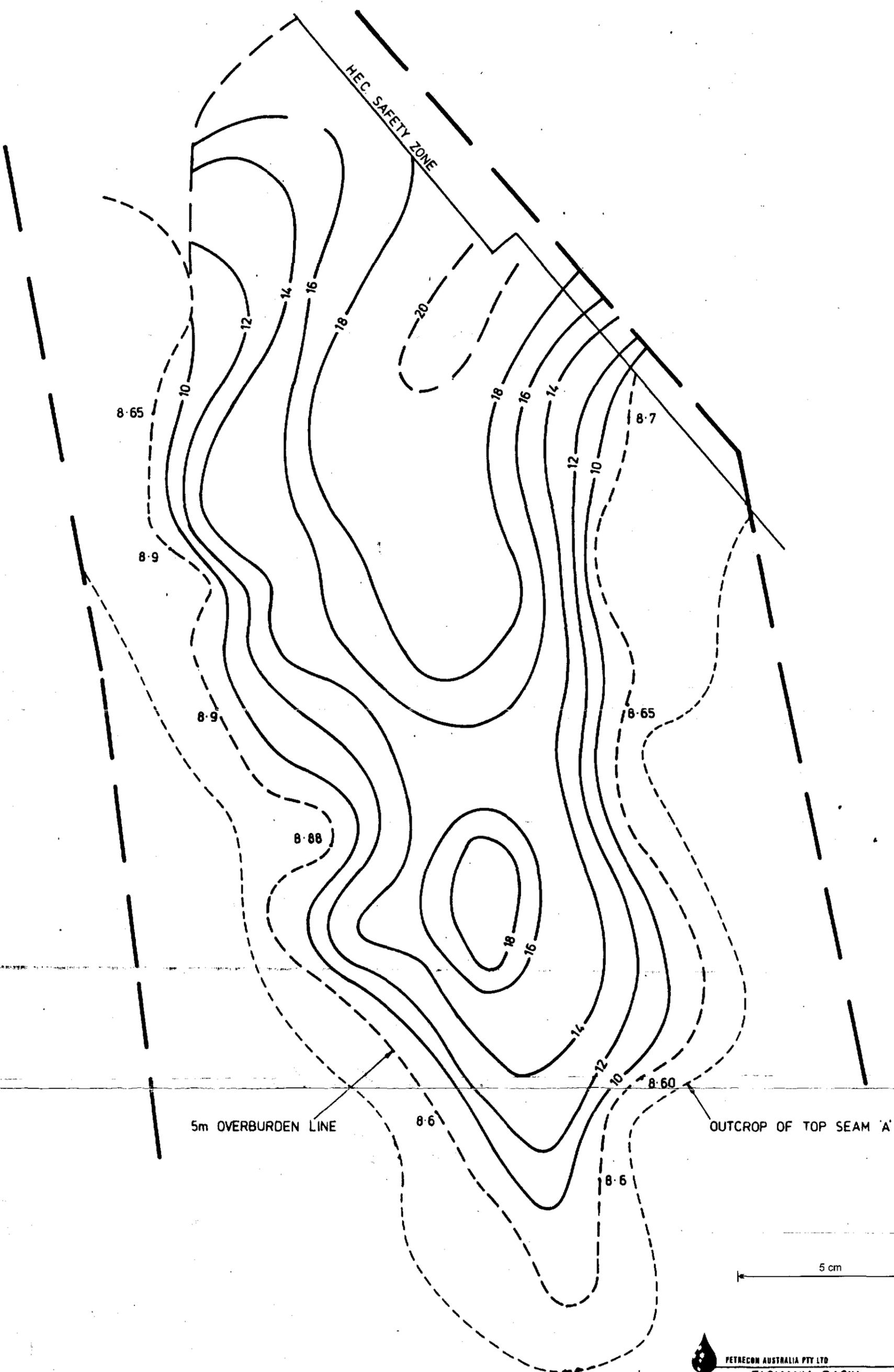
Contour interval is 5 metres



PETRECON AUSTRALIA PTY. LIMITED

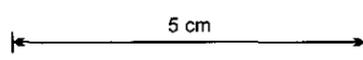
LANGLOH OPEN CUT
INITIAL DEWATERING STUDIES

GROUNDWATER CONTOUR MAP
641075



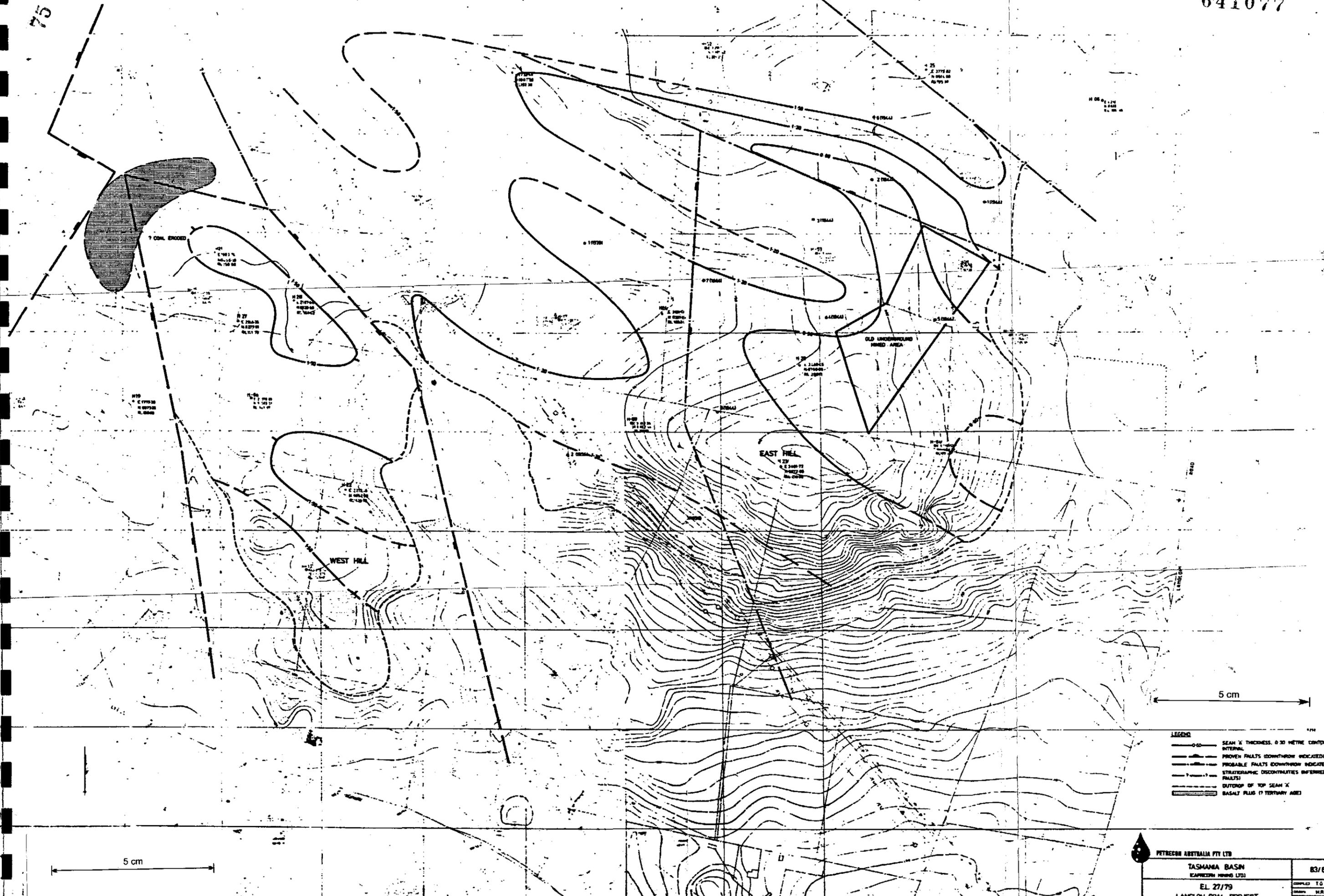
5m OVERBURDEN LINE

OUTCROP OF TOP SEAM 'A'



641076

PETRECON AUSTRALIA PTY LTD	
TASMANIA BASIN (CAPRICORN MINING LTD)	83/19
EL. 2779 LANGLOH COAL PROJ.	KCM
WEST HILL DEPOSIT	M.R.D.
TOTAL OVERBURDEN ISOPACH FOR SEAM 'B' & SEAM 'C'	27.6.83 1:2500



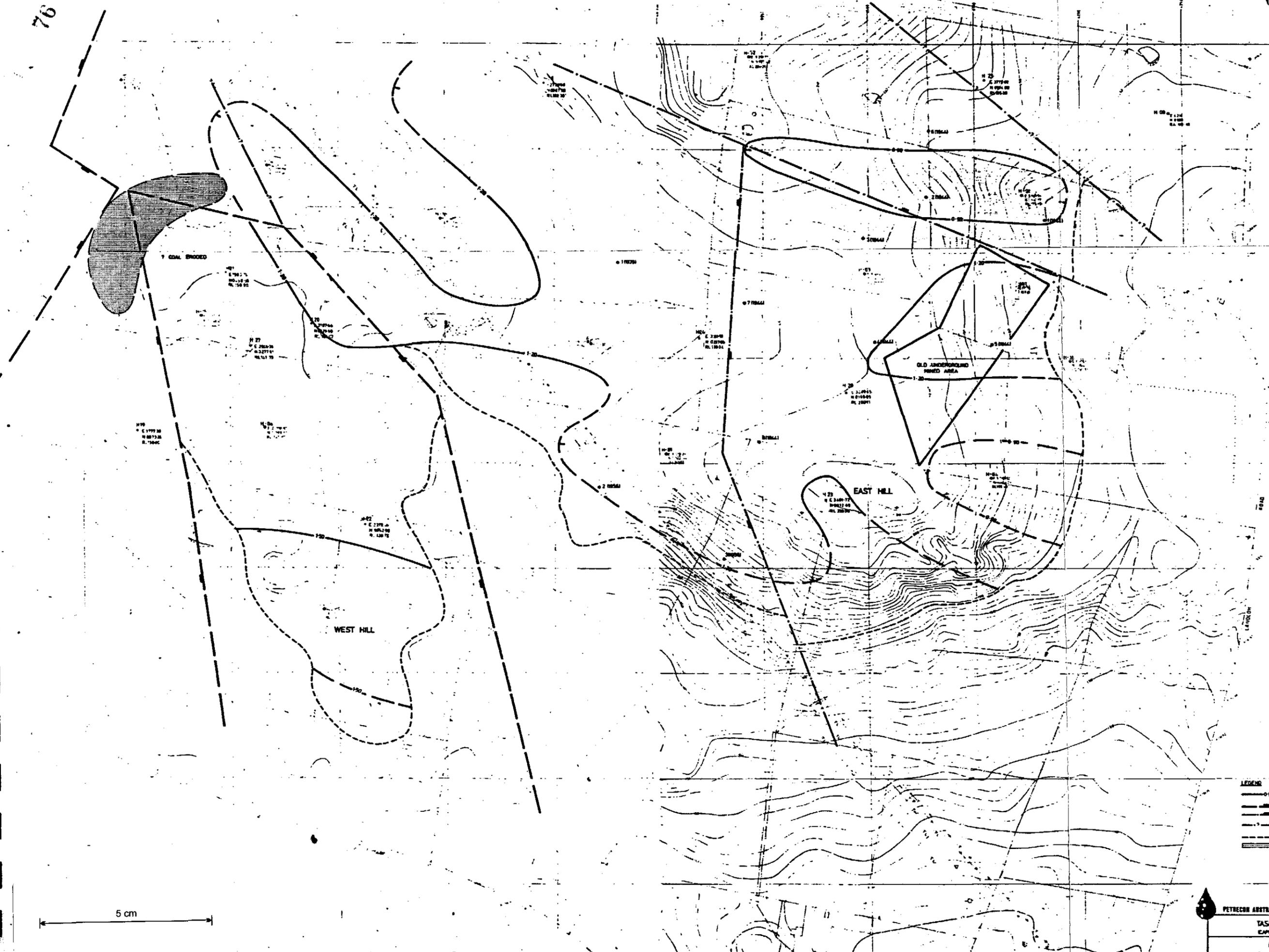
5 cm

5 cm

- LEGEND
- 0.30 — SEAM 'X' THICKNESS, 0.30 METRE CONTOUR INTERNAL
 - — — — — PROVEN FAULTS (DOWNTOWN INDICATED)
 - — — — — PROBABLE FAULTS (DOWNTOWN INDICATED)
 - — — — — STRATIGRAPHIC DISCONTINUITIES (INFERRED FAULTS)
 - — — — — OUTCROP OF TOP SEAM 'X'
 - ▨ BASALT PLUG (TERTIARY AGE)

PETRESOR AUSTRALIA PTY LTD

TASMANIA BASIN KAPICORN MINING LTD	83/6
EL 27/79	COMPILED T.G.S.
LANGLOTH COAL PROJECT	DRAWN W.R.D.
SEAM 'X' ISOPACH MAP	DATE 18-5-83



- LEGEND**
- SEAM B THICKNESS 0.30 METRE CONTOUR INTERNAL
 - PROVEN FAULTS (DOWNTHROW INDICATED)
 - PROBABLE FAULTS (DOWNTHROW INFERRED)
 - STRATIGRAPHIC DISCONTINUITIES (INFERRED)
 - FAULTS
 - OUTCROP TOP SEAM A
 - BASALT PLUS TERTIARY AGE

5 cm

PETROBRAS AUSTRALIA PTY LTD

TASMANIA BASIN CAPRICORN MINING LTD	83/7-
EL 27/79 LANGLOH COAL PROJECT SEAM B ISOPACH MAP	COMPILED: T.C.S. DRAWN: M.R.D. DATE: 18-5-95



- LEGEND**
- SEAM 'C' THICKNESS, 0.2 METRE CONTOUR INTERNAL
 - SEAM 'D' THICKNESS, 0.05 METRE CONTOUR INTERNAL
 - PROBABLE FAULTS DOWNTHROW INDICATED
 - STRATIGRAPHIC DISCONTINUITIES (INFERRED FAULTS)
 - OUTCROP OF TOP SEAM 'A'
 - BASALT PLUS (TERTIARY AGE)

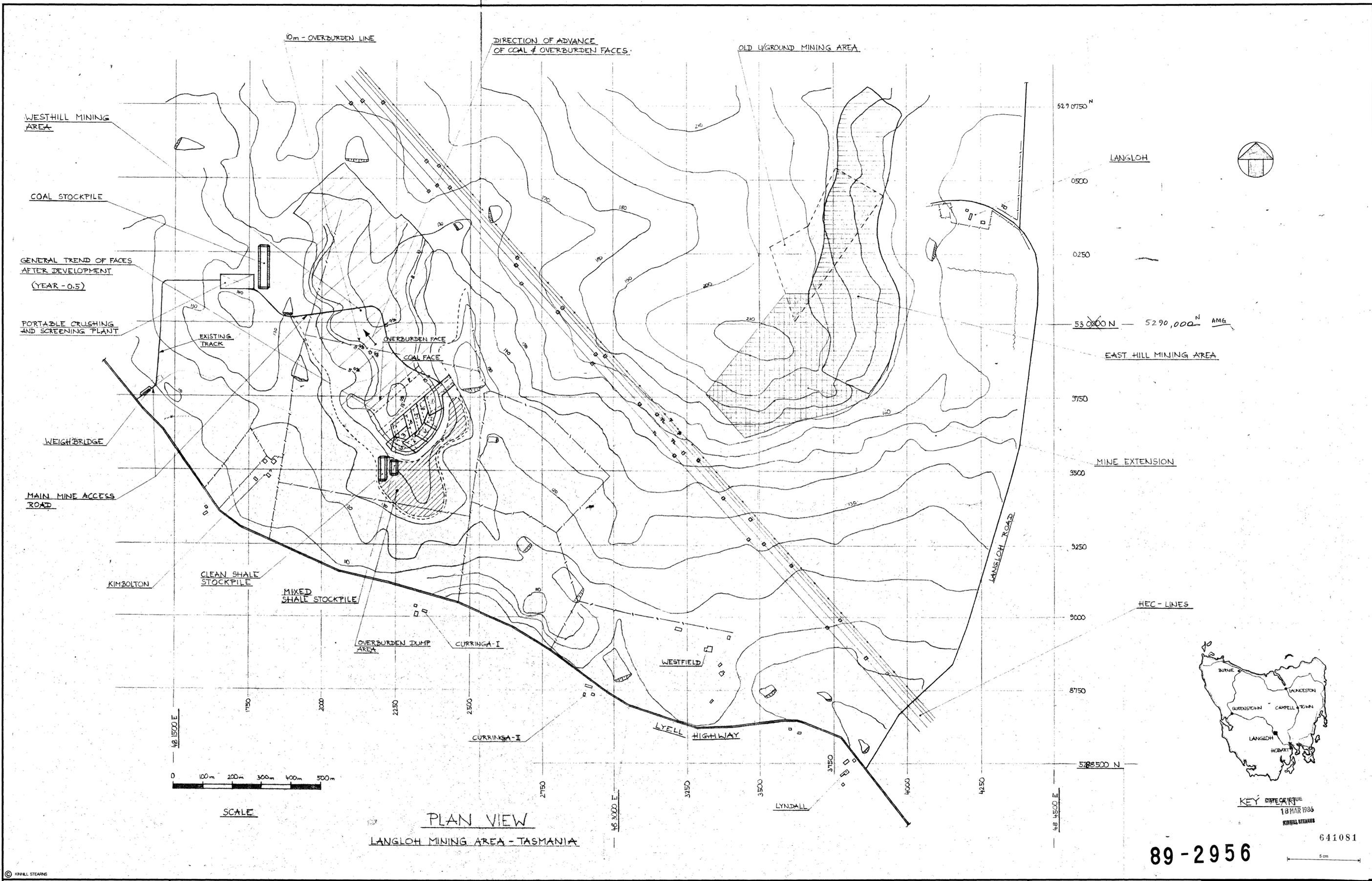
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PETROBRAS AUSTRALIA PTY LTD
TASMANIA BASIN
CAPRICORN HILLS LTD

EL. 27179		63/8
LANGLOH COAL PROJECT		COMPLD 1/2
SEAMS 'C' & 'D' KODACH MAP		DATE 10/2/91

APPENDIX B

- . Mining Block Schedule - South/North Development
Drawing No. A85393-25.05.0001.
- . Mine Operation Diagram
Drawing No. A85393-25.05.0002.



PLAN VIEW
LANGLOH MINING AREA - TASMANIA

Code	Issued for	Issue approval	Date
Issues and Approvals			

Code	Date	Description	Approval
Amendments and Approvals			

KINHILL STEARNS
ENGINEERS
ADELAIDE, BRISBANE, DARWIN, MELBOURNE, PERTH, SYDNEY

Designed: [Signature]
Drawn: E. BAMMINGER

Checked: [Signature]
Date: 14/1/1986

CAPRICORN MINING LTD.
LANGLOH COAL PROJECT
MINING BLOCK SCHEDULE
SOUTH-NORTH DEVELOPMENT

North Point: [Symbol]
Scale: 1:5000
Drawing Number: A85 393 - 25.05.0001
Amend Code:

00
Appendix 7

AN ENVIRONMENTAL IMPACT STUDY

relating to

A PROPOSED OPEN CUT COAL MINE NEAR HAMILTON

prepared for

PETRECON AUSTRALIA PTY. LTD. ON BEHALF OF
CAPRICORN MINING LTD.

by

ENVIRONMENTAL AND TECHNICAL SERVICES PTY. LTD.

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ENVIRONMENTAL & TECHNICAL SERVICES PTY. LTD.

J.R. Stephens B.Sc (Chem E) Hons
ARACI, MIE (Aust)

Managing Director, Environmental &
Technical Services Pty. Ltd.

NOVEMBER 1983

641085

1. SUMMARY

The general framework of a proposal to establish an open cut coal mine at the site of a coal seam discovery near Hamilton is described. Several important parameters, such as the direction of pit development, the location of crushing/screening plant and the means of transporting the coal to customers, are still flexible and have potentially major environmental implications.

The site and the area surrounding the site are described in some detail.

Environmental factors and considerations are canvassed, areas where more operating details are required for proper environmental assessment are defined, and recommendations are made for possible inclusion into future planning.

The main environmental problems relate to seven residences located within (approximately) two kilometres from the site, and especially to two of these houses which are less than 700 metres away.

These houses are downwind of the proposed mining area, with respect to the stronger prevailing winds, and there is potential for dust nuisance to occur on windy days during dry seasons. However, dust can be effectively contained by careful alleviation practices.

Of more concern is the noise situation. The area is currently very quiet during breaks in the traffic along the intervening Lyell Highway. Despite best possible practice and control of noise from the various operations proposed, there is little doubt that the noise environment would be degraded, and in the case of the two closest houses quite seriously degraded, by the development. Possible afternoon shift operations, and especially drilling, would exacerbate this potential problem, even with respect to the five houses some 1 to 2 kilometres away.

Water pollution is not seen as a significant impact, as long as effective diversion and stormwater and sewerage controls are established.

Disposal of solid wastes - overburden and shale - may be effected to provide minimal erosion, small visual impact and progressive restoration of the land to re-establish its current usage.

Traffic along the Lyell Highway will be significantly increased, especially between the site and the turn-off to Macquarie Plains. Concern about the potential hazards to safety, due to frequent coal trucks plying those narrow, curved segments of this Highway to the east of Rosegarland, may be alleviated by -

- (a) transfer of coal to rail at Macquarie Plains and/or
- (b) a current D.M.R. programme aimed at widening and realigning sections of this road.

The economic base and stability of the municipality, and of Hamilton township in particular, will be markedly improved as the result of employment opportunities arising both directly and indirectly from the project.

Matters of environmental importance requiring expansion and further study are :- water diversion plans; water quality and treatment requirements; the size of stormwater catch pond(s); the proposed treatment for sewerage; details of dust suppression measures; details of overburden and shale disposal; the direction of mining; the location of fixed plant and internal roads; the proposed hours of operation, especially of drills; the potential for rail transportation from Macquarie Plains; and details of the number of employees, including contract labour.

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07

3. INTRODUCTION

On 29 July 1983 Environmental and Technical Services Pty. Ltd. was engaged by Petrecon Australia Pty. Ltd., on behalf of the latter Company's client Capricorn Mining Ltd., to investigate the environmental ramifications of the proposal to mine by open cutting a deposit of coal which had been defined as the result of exploration drilling.

General planning of the proposed mining operation was then under way, and since that time the basic framework of operations has been defined, although many of the specific details for the implementation of this plan have not yet been firmed up.

Nevertheless, this work is now sufficiently far advanced to enable a clear description of the proposal, the identification of the major potential environmental impacts, and the definition of those variables requiring more detailed planning to allow definitive environmental assessment.

This "preliminary" Environmental Impact Study is designed to cover all of these issues, and to include recommendations, where appropriate, for consideration within the continuing planning process. It canvasses all of those environmental issues specified for examination in the "Guidelines and Procedures for Environmental Impact Studies", together with some other matters considered to be important with regard to this particular project. A supplementary report is recommended, to include the details of potential impacts and specific data on proposed control measures, with respect to those matters defined in this Study as requiring further investigation.

4. THE DEVELOPER

Whilst most of the exploration and the planning is being co-ordinated by Petrecon Australia Pty. Ltd., the mine operator will be :

Capricorn Mining Ltd.
of 192 Macquarie Street,
HOBART, 7000

09

5. THE PROJECT

The project under investigation is an open-cut coal mine, located approximately 3 km to the west of Hamilton township.

At this location, a deposit of coal has been delineated, comprising approximately 3½ million tonnes available by open cut.

The prospect is to be worked in two separate sections, described as "West Hill" and "East Hill". The West Hill mine is to be worked to completion before the East Hill prospect is opened up. The coal deposit is essentially continuous over the area embracing both of these sections, but the main H.E.C. power transmission lines from the Derwent hydro-electric schemes bisect the area. The need to designate a safety corridor to protect the integrity of these power lines, together with the variations in overburden thickness, have led to the decision to operate the prospect in two distinct and separate phases.

The coal deposit lies essentially in a horizontal plane, in up to three seams each about one metre thick, and each separated from the other by approximately one metre thickness of mudstone shale interburden. The sandstone overburden ranges in thickness from 5 to 31 metres, and will be blasted to uncover the coal. The coal itself and the shale are relatively soft and are expected to be rippable throughout.

The West Hill section of the prospect is to be mined first. The recoverable coal from this section is estimated at 1,930,000 tonnes. The overburden is 5 to 17 metres thick, averaging 11 metres; the tonnage for this project is estimated at 9,830,000 tonnes. Additional waste material will arise from shale, the quantity of which has been estimated at 1,790,000 tonnes.

It is planned to mine 200,000 tonnes of coal per annum, implying a ten year life for the West Hill prospect.

The second stage of mining subsequent to the cessation of operations at West Hill, will be the relocation of plant and equipment

10

to the East Hill prospect, approximately 1 km to the east. Open cut coal mining operations will then be commenced there, still at the 200,000 t/a production rate, and will continue for approximately seven years in this area. Plans for the operations on the East Hill deposit are not well advanced, as the techniques to be employed will be established as the result of experience at West Hill.

The main dissimilarity of the East Hill plan in comparison with the West Hill operations will be that mining will cease against a north-south face, whilst the West Hill proposal basically involves complete removal of the hill. The latter operation is technically simple to accomplish and rehabilitation of the resulting land is relatively uncomplicated; this is one of the main reasons for the initial focus on this section of the prospect. At East Hill, a substantial proportion of the hill will remain undeveloped, because of the steadily increasing thickness of the overburden as the land rises to the west. At the stage of abandonment of economic open-cutting, the coal seam will be exposed at the base of the face of the cut. "Long face" underground mining of this seam could then be a possibility, depending on the prevailing economics of the time (i.e. about the year 2000).

It is possible that development of the area for coal production might be essentially continuous in the long-term, arising from

- * West Hill - open cut, and then
- * East Hill - open cut, and then either
- * under the powerline - open cut, or
- * underground from East Hill

Additionally, it is believed that, in the future, other economic deposits may be discovered in the district.

00 11

6. THE LOCATION

The prospect is located approximately 3 km to the west of the township of Hamilton, immediately to the north of the Lyell Highway (see the road map Figure 1A and the district map Figure 1B).

The West Hill segment is adjacent to "Kimbolton" farmstead, and the area to be open-cut comprises approximately 33 hectares. The total area which will be alienated during the 10 year life of the mine, including roads, stockpiles, treatment plant and overburden disposal will be of the order of 140 hectares.

The later East Hill operations will be located immediately to the west of Langloh Road and approximately 500 metres (at the southern edge) north of the Lyell Highway. The open cut will be approximately 34 hectares in extent, and the total alienated area will be similar to that of the western prospect.

The locations and probable areas to be mined are illustrated on the photocopy of composite aerial photographs, Figure 2 (scale approximately 1 : 15000).

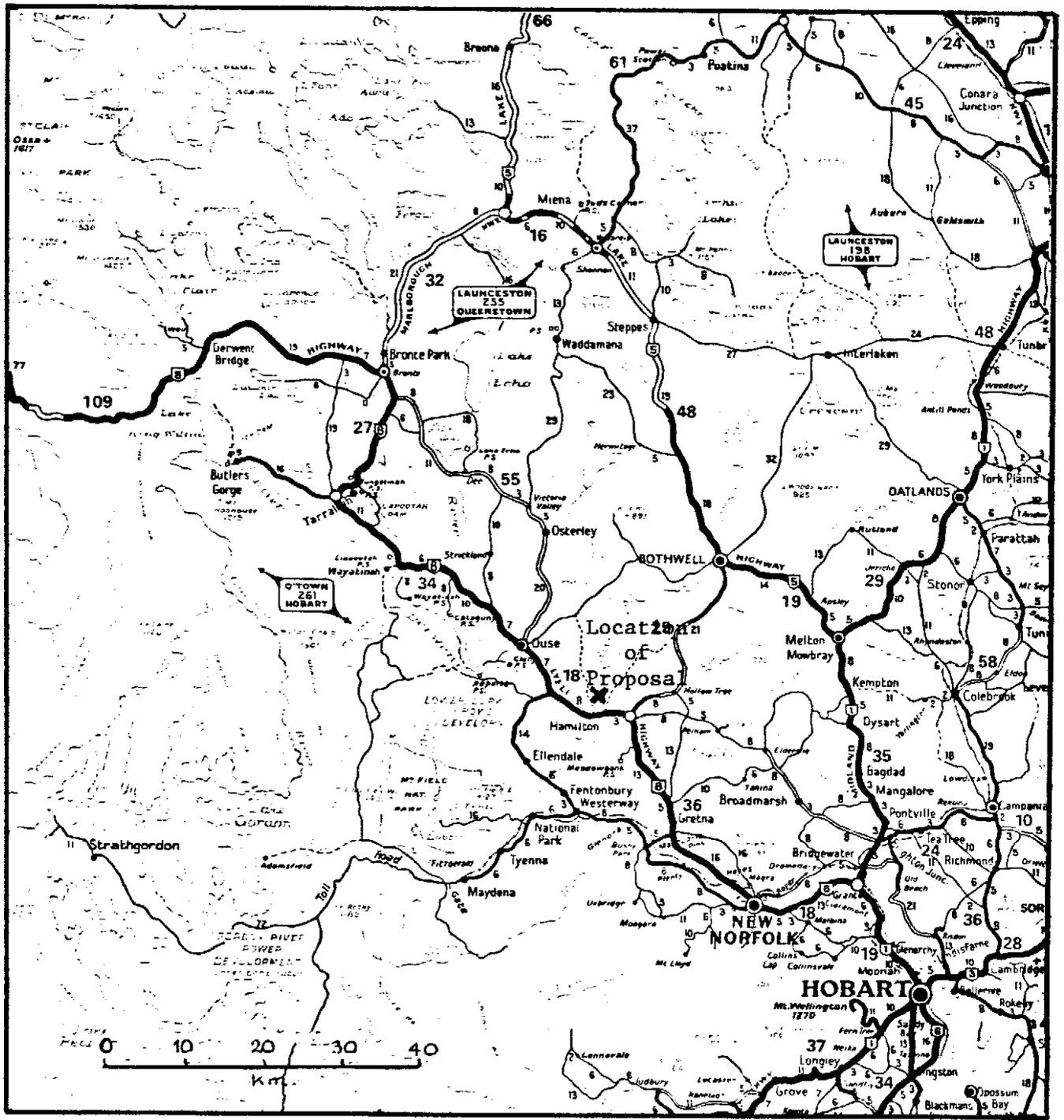


FIGURE 1A

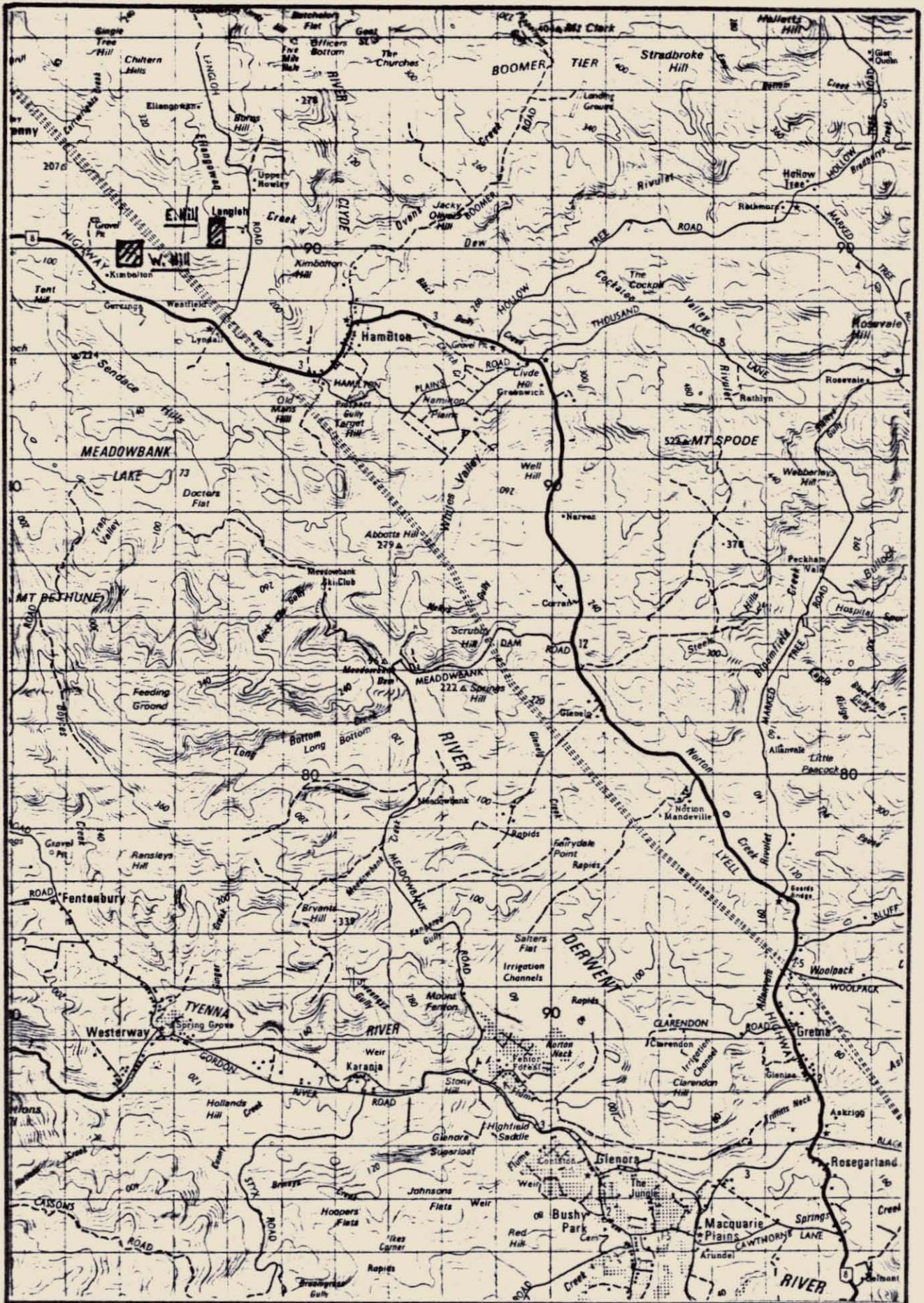


FIGURE 1B

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FIGURE 2.

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7. DESCRIPTION OF PROPOSED OPERATIONS

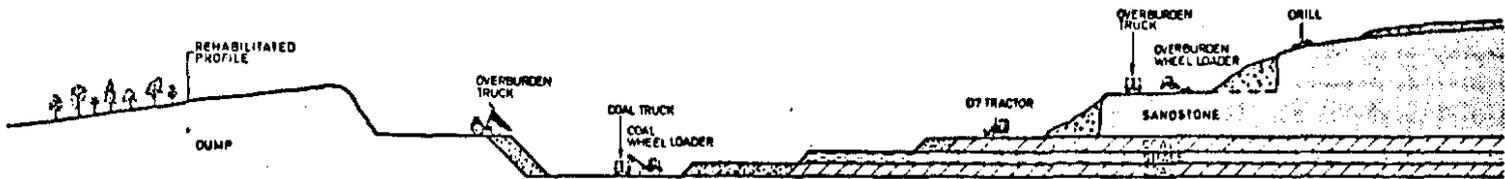
A plan view of the proposed West Hill mine and the possible locations of ancillary plant are given in Figure 3. Each of the numbered zones within the open-cut area represents one year's operations. This illustration refers to a south-to-north mining proposal; a reverse order north-to-south operating plan has also been prepared for consideration, mainly for the purposes of suppression of operating noise with respect to vantage points to the south (see Section 10.3).

The proposed mining method is graphically portrayed in Figure 4. This technique will apply initially to the West Hill project, and ultimately, with refinements, to the East Hill operation.

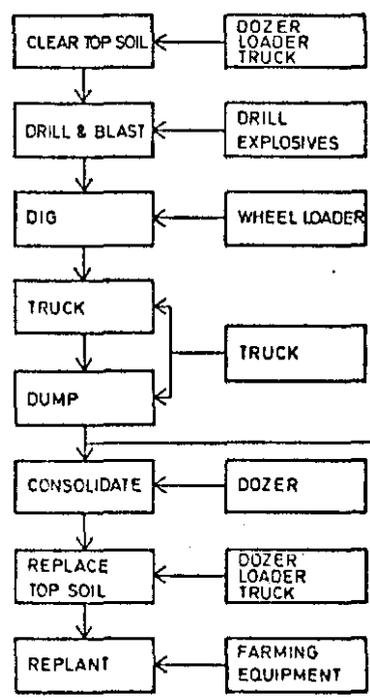
A plan of the East Hill mine area is given in Figure 5. The details of its operation will not be formulated for some years, and will be the subject of a supplementary environmental study closer to the time of its proposed development. Consequently, the foregoing descriptions and environmental evaluations are largely confined to West Hill operations.

Topsoil will be cleared by bulldozer, loaded aboard a truck and taken to a nearby storage area by contractors. The notional storage area is located between the operations zone and the Lyell Highway. This pile will be added to or reduced according to the day-to-day balance between new stripping operations and respreading for rehabilitation procedures. It is believed that the face of the pile visible from the Highway should be maintained in a stable situation until final area rehabilitation is commenced. Consequently, it is intended to develop vegetative growth on this visible face to minimise erosion and also to provide a visual screen.

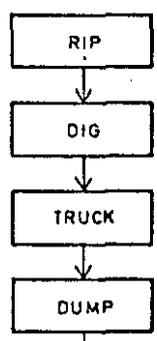
The exposed overburden is then to be drilled from the top, or from the top of the bench when deeper sections of overburden require dual-bench removal. Silenced "Air Trak" drills will be used for this service.



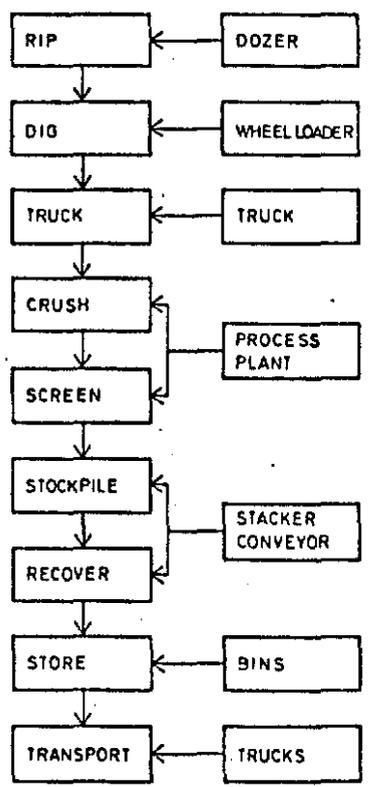
OVERBURDEN OPERATION



SHALE



COAL RECOVERY



ORGANISATION

- MINE PLANNING -- OWNER
- DRILL & BLAST -- CONTRACTOR
- OVERBURDEN DIG, TRUCK AND DUMP -- CONTRACTOR
- COAL AND SHALE RIP -- OWNER
- COAL DIG -- OWNER
- COAL TRUCK -- CONTRACTOR
- CRUSH & SCREEN COAL -- OWNER
- STOCKPILE AND RECOVER COAL -- OWNER
- STORE COAL -- OWNER
- TRANSPORT -- CONTRACTOR
- REHABILITATION -- CONTRACTOR

FIGURE 4.

DRAFT

© KINHILL STEARNS				KINHILL STEARNS ENGINEERS ADVANCE PROGRAM DAWSON MACHINERY PERTH BRIDGE				CAPRICORN MINING LTD. LANGLOH PROJECT MINE OPERATION DIAGRAM							
Title	Issued for	Group approval	Date	Client	Date	Engineer	Approval	In-plant	Checked	Technical Approval	Signature	Date	Drawn	Checked	Date
Author and Approvals				Author and Approvals				Drawn: A.K.				Date: 27.7.83			
												A83215-05			

DRAWING CONTINUES A83215-1 & 2

C. 18

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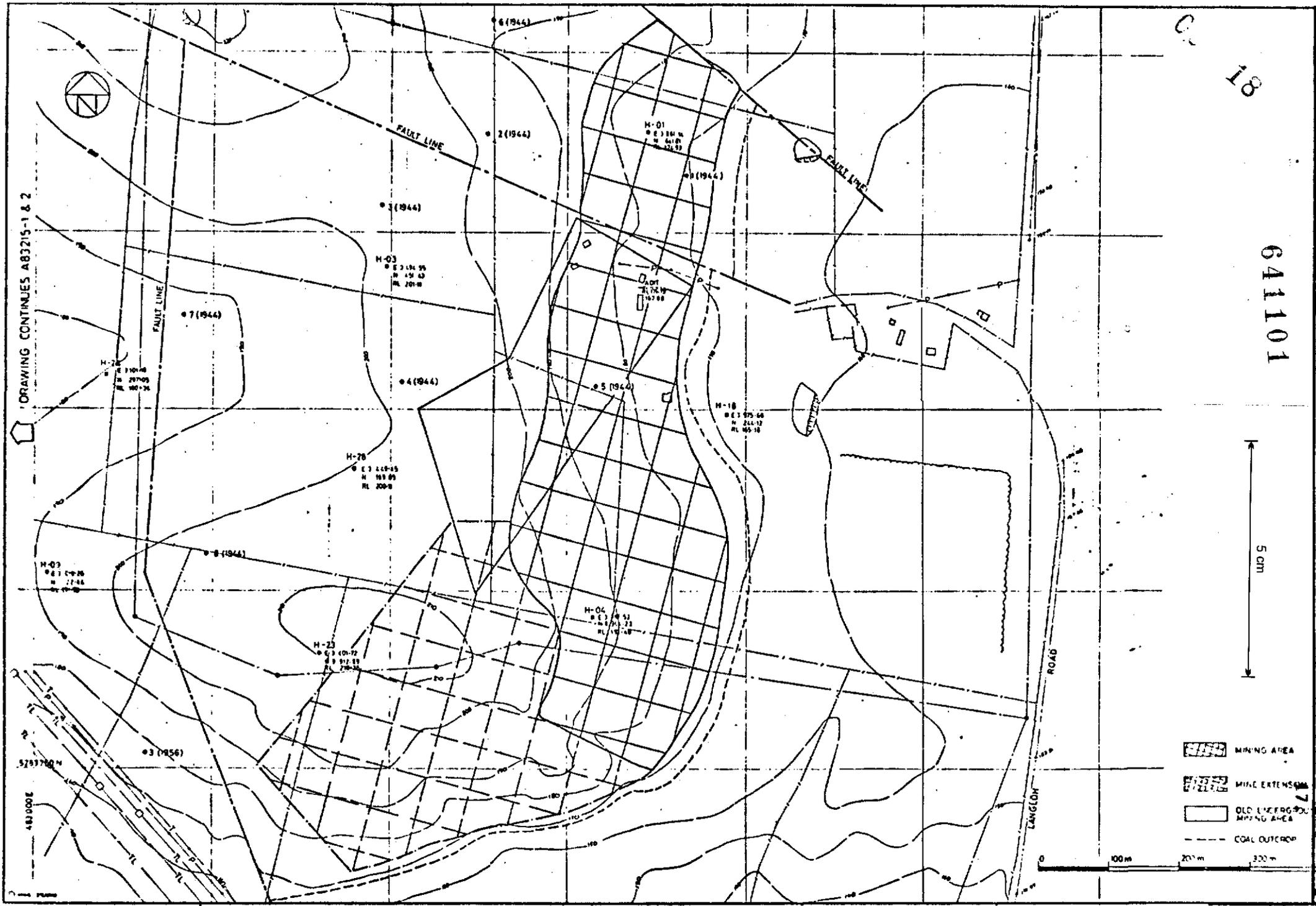


FIGURE 5.

19

The overburden will then be blasted daily, using low energy sequential delay blasting patterns to achieve the necessary fragmentation with the lowest possible noise output. The overburden sandstone matrix exhibits considerable fracturing, and it is believed that only relatively light charges will be adequate to achieve sufficient shattering of this rock layer.

The bulk of the resulting fragmented waste rock will be stripped and loaded onto trucks by a wheel loader and carted to the overburden dump as rapidly as possible by contractors. The layer of approximately 30 cm of sandstone overlaying the coal will then be more carefully stripped off to expose the coal. It is intended that the overburden will be emplaced in an area between the proposed open cut zone and the Lyell Highway and possibly close to the topsoil storage area. Details of its location and management have not yet been formulated, but the matter is discussed in greater detail in Sections 10.2, 10.3 and 10.4 of this Study.

The exposed coal is then to be ripped, using a bulldozer, and the coal is to be loaded on mine trucks by a wheel loader and conveyed to the crushing/screening plant.

Interburden shale/mudstone is to be ripped and conveyed to the overburden dump.

On-site vehicles will be :-

- * A D7 bulldozer for clearing and ripping operations
- * two front end loaders, one for overburden and one for coal loading
- * three mine trucks to convey coal to the treatment plant
- * three (contractors') trucks for shifting topsoil, overburden and shale

20

Operations will be on a two-shift basis for overburden removal (dayshift and afternoon shift) and on dayshift only for the winning and preparation of coal for market.

Coal quality will be maintained by blending the products from the several seams, which are of differing quality. Thus coal winning and shale removal will require several operating faces at any one time. This will tend to increase the distance between the zone of overburden removal and that where the mining of the lower coal seam takes place, thus increasing the overall active operating area. It has been recommended that overburden removal be completed at least six months in advance of main coal removal, to achieve maximum control of blending and to establish clean coal lines.

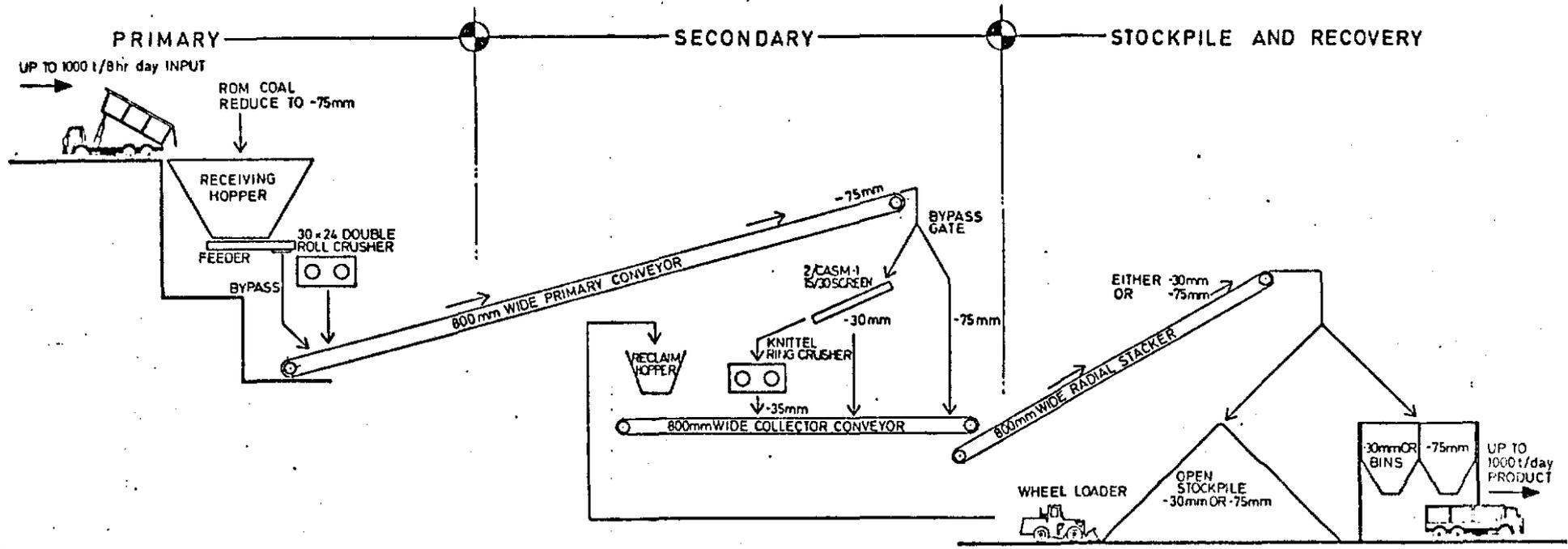
The coal treatment plant is to comprise primary crushing by a double-roll crusher, screening, and secondary crushing of the over-size by a Knittel ring crusher. The product coal is then conveyed either to three ready-use loading bins or to the open stockpile, via a radial stacker. This plant is illustrated in Figure 6. Coal will be recovered from the open stockpile as necessary by front-end loader, which will convey it to a reclaim hopper. From the reclaim hopper, a belt conveyor will carry the material to the radial stacker. A drawing showing the side elevation and plan view of this plant is reproduced in Figure 7.

It is notable that no coal washery is considered necessary. Because of the open cut techniques, clean coal can be selectively derived from individual seams, and blended to maintain desired quality. Shale and other waste materials are mechanically separated from the product in-situ, rather than washed from an intimate mixture of product and contaminant. This lack of washery operations is a significant environmental issue, in terms of both water quality and solids waste disposal.

Buildings and structures will comprise mine office (transportable), workshop, stores, garage, magazine and the crushing and screening plant. A sketch illustrating the possible layout and appearance of the ancillary buildings is given in Figure 8.

Power usage will be approximately 500 kW.

FIGURE 6.



DRAFT

29 JUL 1983

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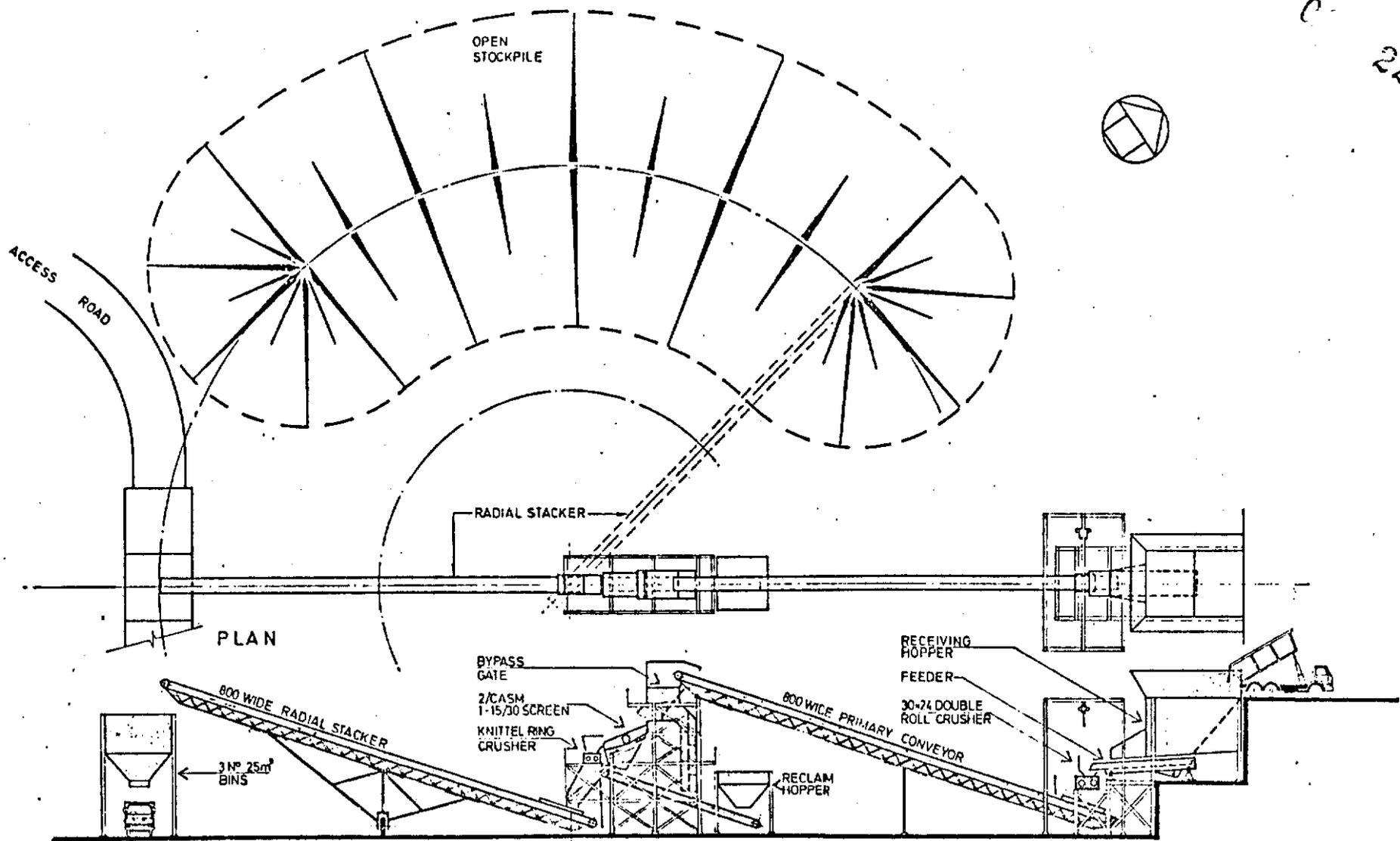
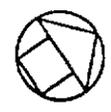
				KINHILL STEARNS ENGINEERS ADELAIDE BRISBANE DARRWIN MELBOURNE PERTH SYDNEY			CAPRICORN MINING LTD. LANGLOH PROJECT PROCESS PLANT DIAGRAM		
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PLAN

ELEVATION

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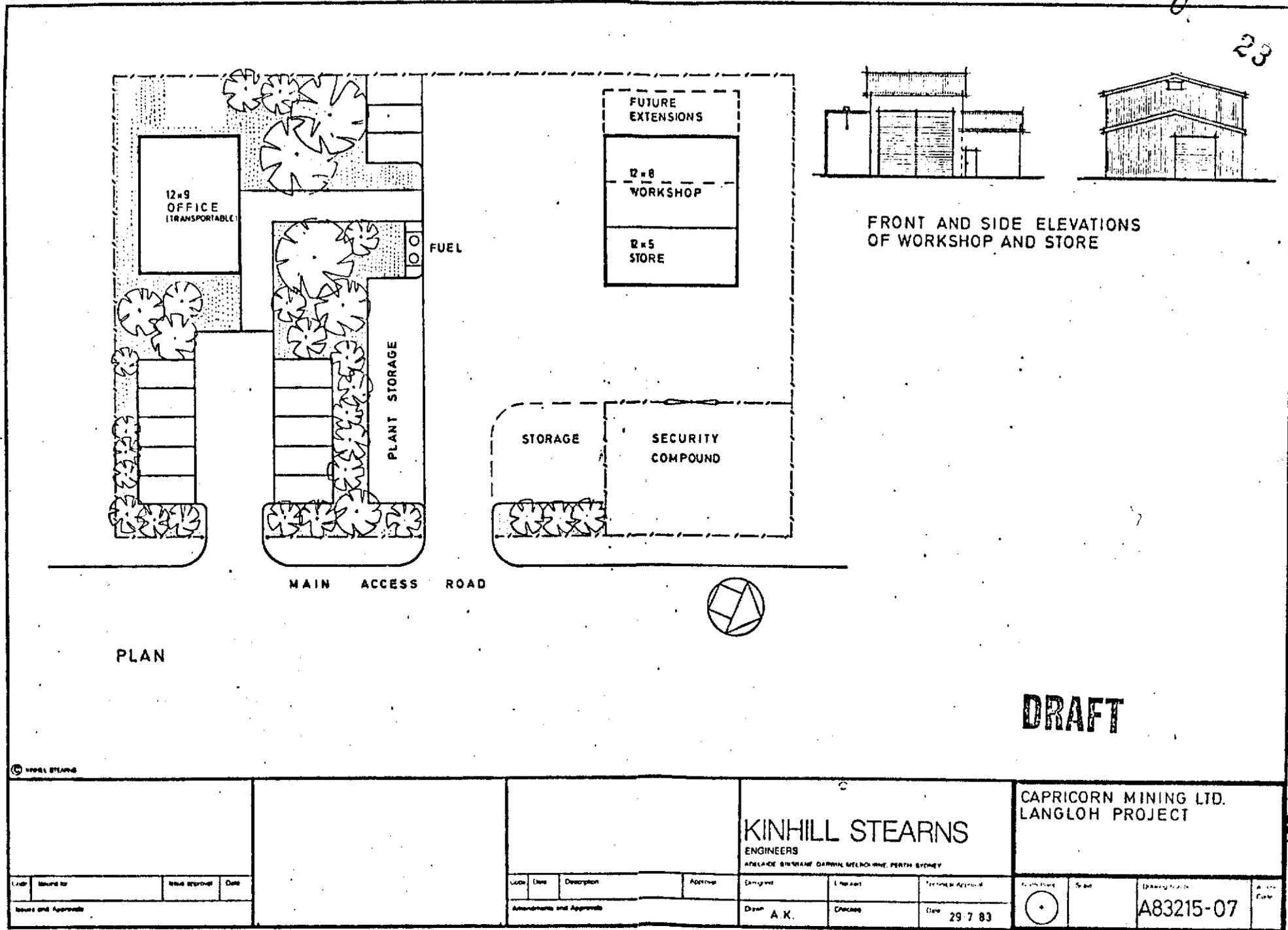
- 3 AUG 1983

				KINHILL STEARNS ENGINEERS <small>SIDELEIGH BRISBANE DARWIN MELBOURNE PERTH SYDNEY</small>				CAPRICORN MINING LTD. LANGLOH PROJECT CRUSHING AND SCREENING PLANT LAYOUT			
Client	Issued for	Date	Approved	Checked	Drawn	Date	Scale	Sheet No.	Total Sheets	Project No.	Rev.
						1-8-83		1	1	A83215-07	
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FIGURE 7.

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FIGURE 8.



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8. TRANSPORTATION

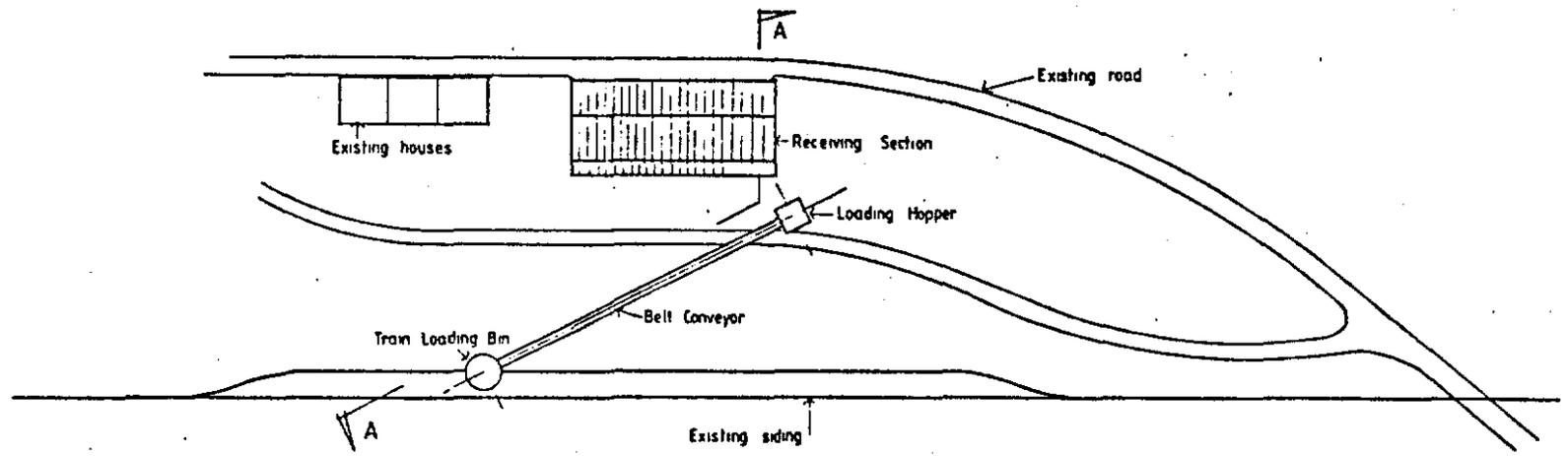
On-site operations will involve one bulldozer on dayshift, three loaders all on dayshift and one on afternoon shift as well, three mine trucks on dayshift only and three overburden trucks on both day and afternoon shifts.

Coal will be transported away from the mine by trucks, either direct to markets at New Norfolk and/or Hobart, or to a rail loading facility at Macquarie Plains.

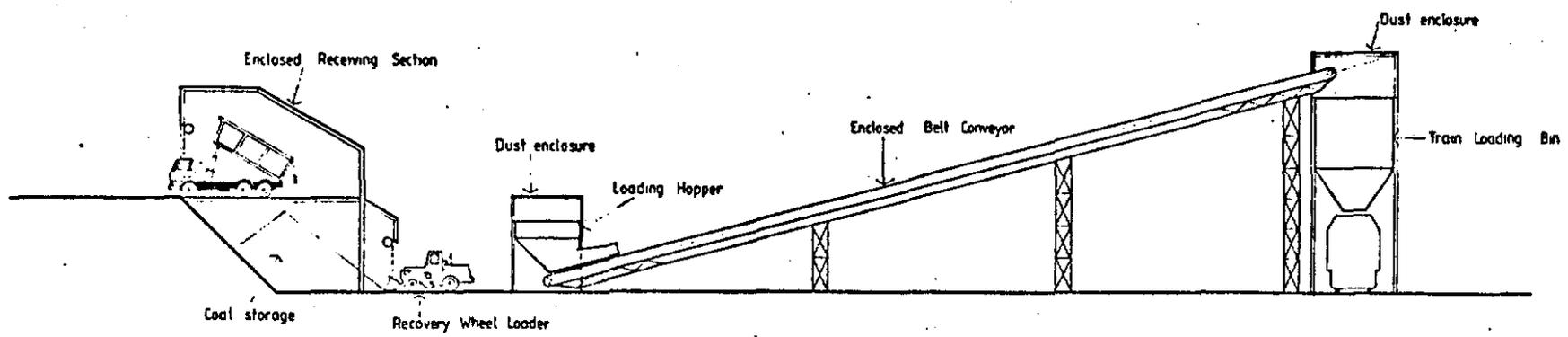
A simple estimation based on 40 weeks operation/annum, 5 days/week and 20 tonne capacity trucks indicates that 50 truckloads per day will be necessary to shift the planned output of the mine. If such transportation was on a 10 hours/day basis - which seems to represent the most probable operating time - this would represent an average of 5 return trips per hour. The environmental implications of this significant traffic load are canvassed later in this Study.

A notional design for a rail-loading depot at Macquarie Plains is given in Figure 9. Trucks would off-load in an enclosed receiving shed by tipping the coal through a floor grating into a storage area below. Recovery could be by loader to hopper to enclosed belt conveyor to loading bin to container.

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PLAN
Scale 1:500



SECTION A - A
Scale 1:200

FIGURE 9.

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				KINHILL STEARNS ENGINEERS <small>BELLEVILLE BRISBANE DARWIN MELBOURNE PERTH SYDNEY</small>			CAPRICORN MINING LTD LANGLOH COAL PROJECT MACQUARIE PLAINS DEPOT																						
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9. DESCRIPTION OF THE AREA SURROUNDING THE SITES

9.1 GENERAL

The immediate area is gently undulating at a maximum 200 m elevation above sea level. All of the land for many kilometres around has been long since cleared for agriculture and grazing purposes. Trees and shrubs are very sparse, the vast majority of the area being laid to grassland for stock. This is illustrated by Plate 1, which is a view of the district looking southwards from the crest of West Hill, and by Plate 2, which is looking westwards at East Hill.

The soil in the vicinity of West Hill is chocolate to red basaltic residuum up to about a metre deep, overlying the sandstone. This is illustrated in Plate 3, which is a view from a potential site for the crushing/screening plant, looking eastwards at West Hill. The land near East Hill has lesser agricultural potential, comprising mainly sandy loam generated by the weathering of the underlying sandstone.

The H.E.C. power transmission lines are routed through this area, following approximately the direction of the Lyell Highway (see Figure 1B and Plate 3).

A number of scattered farmsteads and dwellings line the Lyell Highway for the entire distance between Hamilton and Ouse (Figure 1B). Those houses within around 2 km of the West Hill proposal are located according to the sketch Figure 10, and are at the following distances from the closest zone of operations :

Kimbolton	225 metres
"C"	495 metres
Curringa 1	630 metres
Curringa 2	975 metres
Westfield	1110 metres
"B"	1410 metres
Lyndall	1590 metres
"A"	2100 metres

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PLATE 1



PLATE 2



PLATE 3



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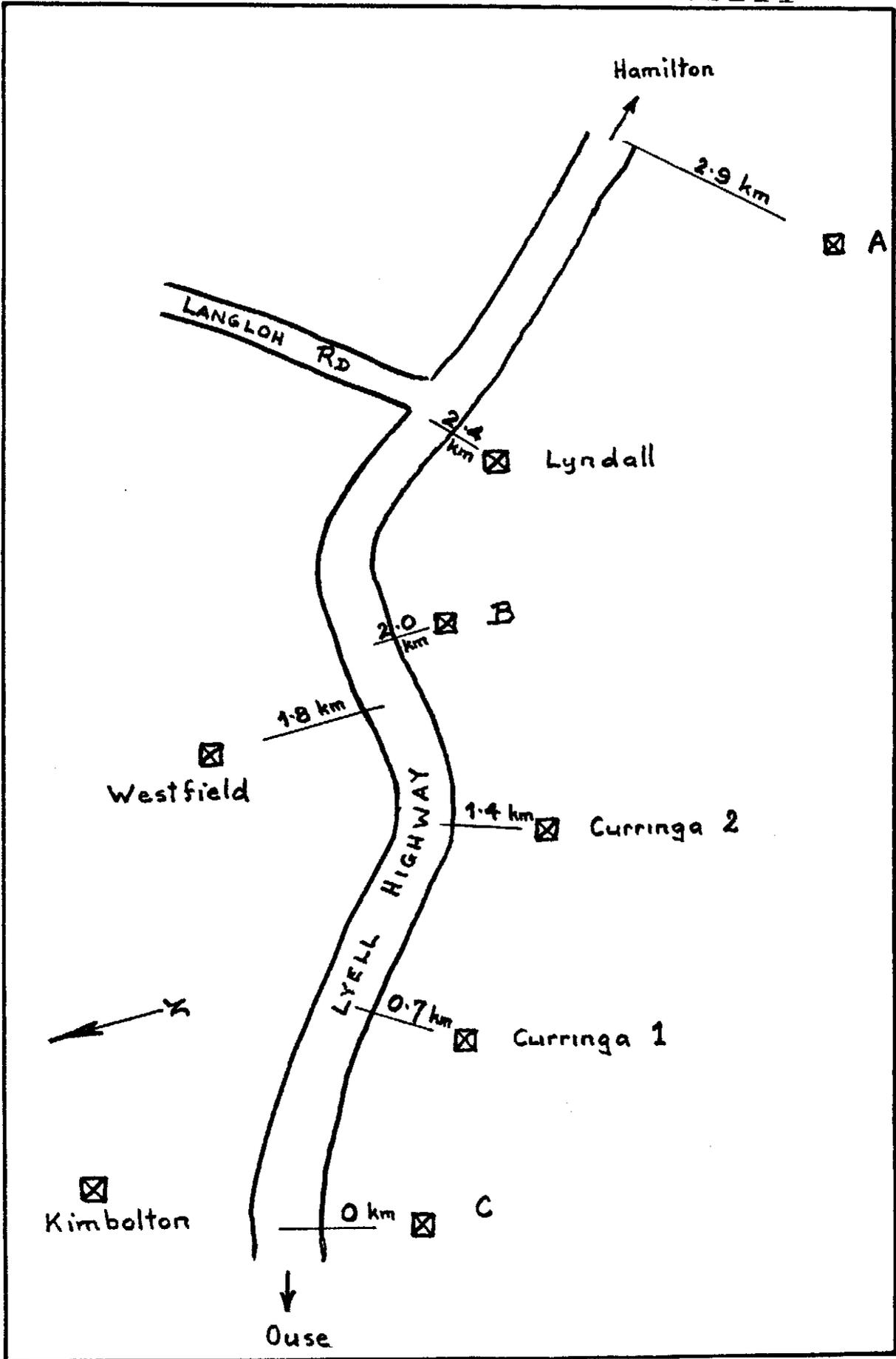


FIGURE 10.

With respect to the East Hill proposal, there are seven residences within 2 km of the site as follows :

two dwellings at Langloh (east)	345 and 390 metres
two dwellings at Upper Howley (north-east)	750 and 795 metres
Westfield(south)	600 metres
Lyndall (south)	1050 metres
Ellangowan (north)	1875 metres

The eastern periphery of the East Hill working area is approximately 2600 metres from the closest dwellings within Hamilton township.

Within the East Hill prospect are the remains of an abandoned coal mining enterprise, opened up about the turn of the century and shut down in the early 1960's. This was a small underground mining operation. The flooded adit and the remains of surface buildings and of very old equipment are still to be seen at Langloh. The natural revegetation occurring on a substantial pile of discarded shales adjacent to the former operations area is of some interest in any assessment of the ability of these wastes to support plant life.

To the north of the sites lies a range of hills running to the north-west (approximately parallel to, and three kilometres to the north of the Lyell Highway), cresting at about 320 metres above sea-level.

Meadowbank Lake lies to the south and west only 1½ km away from West Hill at its closest point (to the south-west).

As previously indicated, the township of Hamilton is located a few kilometres to the east. This is a small town comprising less than thirty buildings, including a church, three stores, a police station, and municipal building, mostly fronting the Highway. The population appears to be declining (see Section 9.6 describing the demography of the municipality) and seems to be currently economically depressed, as indicated by the closure of one of the general stores and the advertisement for sale of several of the residences.

The township of Ouse is located about 10½ kilometres to the north-west of the West Hill prospect.

9.2 THE NOISE ENVIRONMENT

The area surrounding the site is of a rural nature and therefore extremely quiet. The most significant source of area noise arises from traffic passing along the Lyell Highway. Noise also stems from the frequent use of tractors on most of the surrounding properties, and also from cattle and sheep. There are, in fact, large numbers of sheep stocking nearby properties (see also Section 9.6); during area noise measurements the writer's equipment was upset by a flock of several hundred sheep being transferred along the road from one paddock to another.

Neglecting this aborted measurement run, two sites were selected for measurements on 3rd October 1983, using a Noise Analyser and a Sound Level Meter (and Recorder). Both sites were just off the verge of the highway, the first approximately 100 metres to the west of the existing "Kimbolton" entry road, and the second at the corner of Langloh Road. Conditions and results are given in Appendix 1, and the statistical results are illustrated on Figures 11 and 12.

Taking the L_{90} value as the criterion of "background" noise, as suggested by the Australian Standard AS1055, the district noise environment is defined as about 29 dB(A) equivalent.

At the second site, a distinct distribution peak at 35 dB(A) was attributable to the operation of a tractor in a distant field on the "Lyndall" property.

The results from the first site also show distribution peaks between 30 and 35 dB(A); these arose from the sounds of sheep grazing in a nearby paddock.

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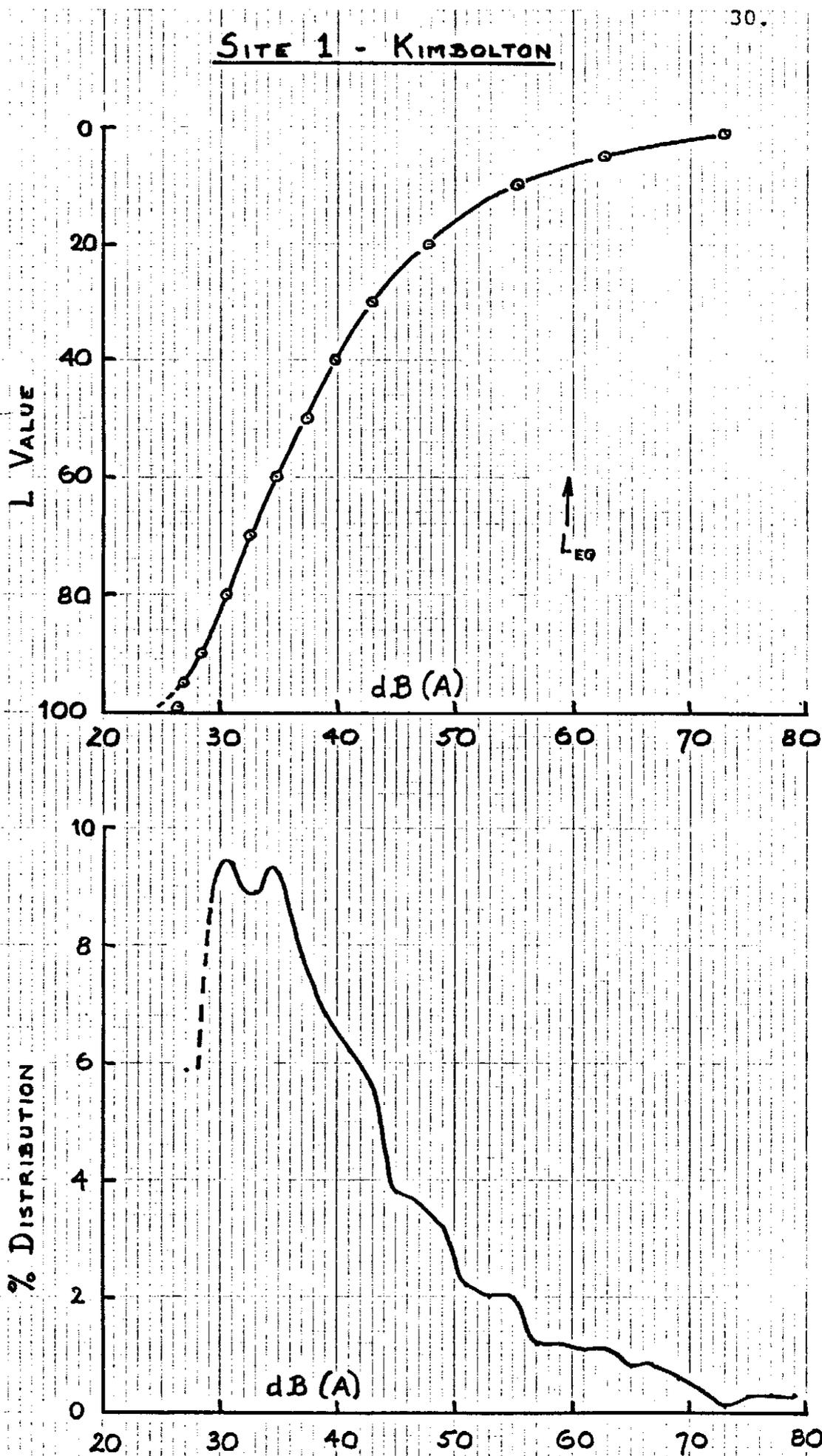


FIGURE 11

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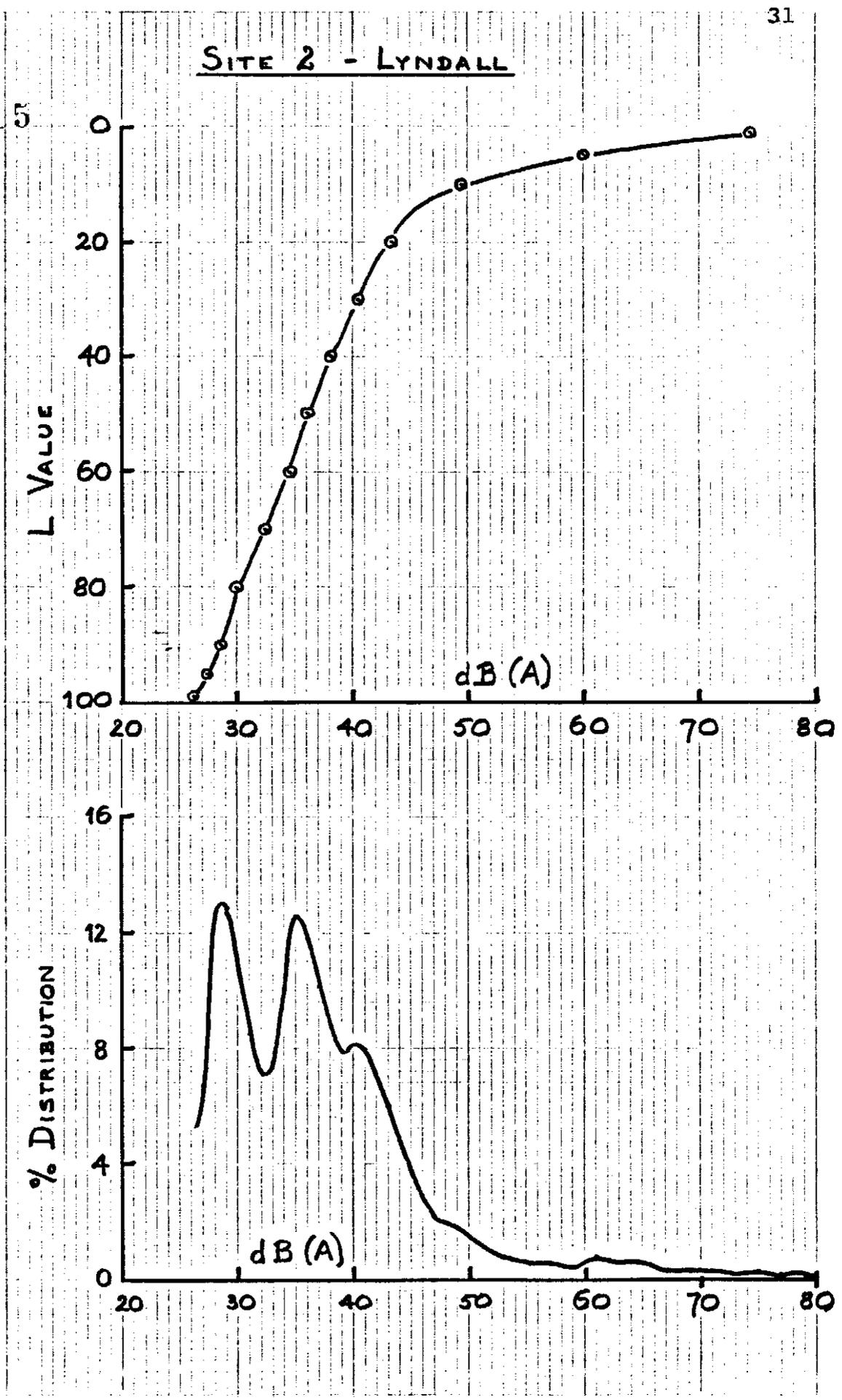


FIGURE 12.

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9.3 METEOROLOGY

9.3.1 RAINFALL

Data on area rainfall has been logged at Hamilton from 1884 to 1978. Mean values for mms rainfall and number of rain days each month are plotted in Figure 13.

It is seen that during the seven-month period May to November inclusive, the number of raindays are 11 to 13 each month - that is, rain falls at some time during approximately 40% of the days. The low precipitation rate, at only 40 to 50 mm per month during this period indicates that light rainfall is prevalent, with infrequent heavier rains occurring largely during October.

February and March represent the driest period during the year, with only 34 and 33 mm of rainfall respectively.

9.3.2 WIND

No data is available for the immediate area. However, records over 23 years are available from a station at Bushy Park, some 18 km to the SSE of the prospect; these are taken as indicative of the situation in the Hamilton area.

These recordings are summarised in Appendix 2, in which morning (0900 hours) and afternoon (1500 hours) observations are listed in terms of direction for each of three wind velocity intervals, corresponding to "light" (1-10 kph), "moderate" (11-30 kph) and "strong" (above 30 kph). These data are also plotted on the wind roses Figures 14 and 15.

The first matter of some note is the very large component of calm conditions.

Winds from the quadrant north to west will be the most critical from the viewpoints of dust and noise carrying characteristics with reference to the nearest residences. It is seen that the most frequently-occurring and strongest winds are from the north-west.

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HAMILTON

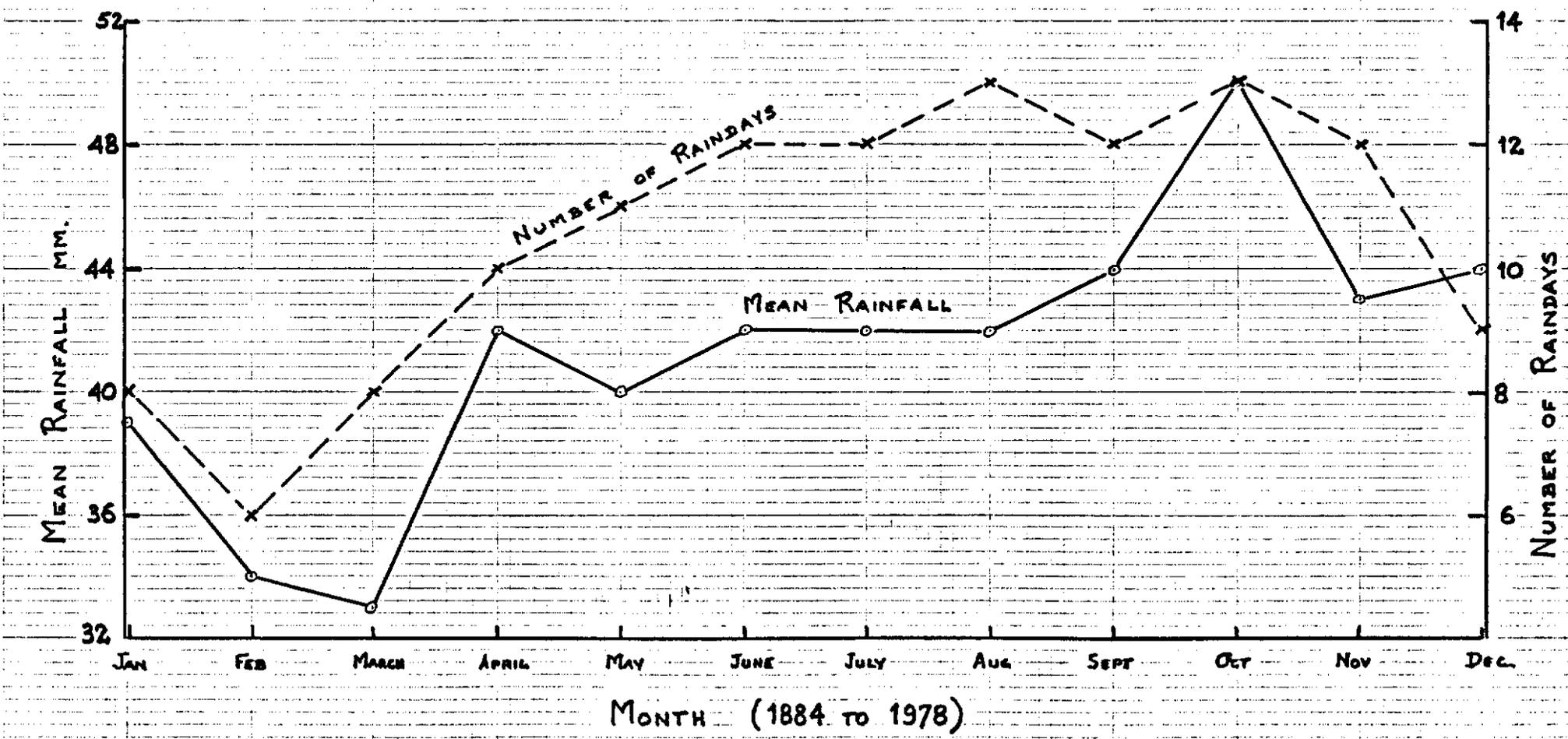


FIGURE 13.

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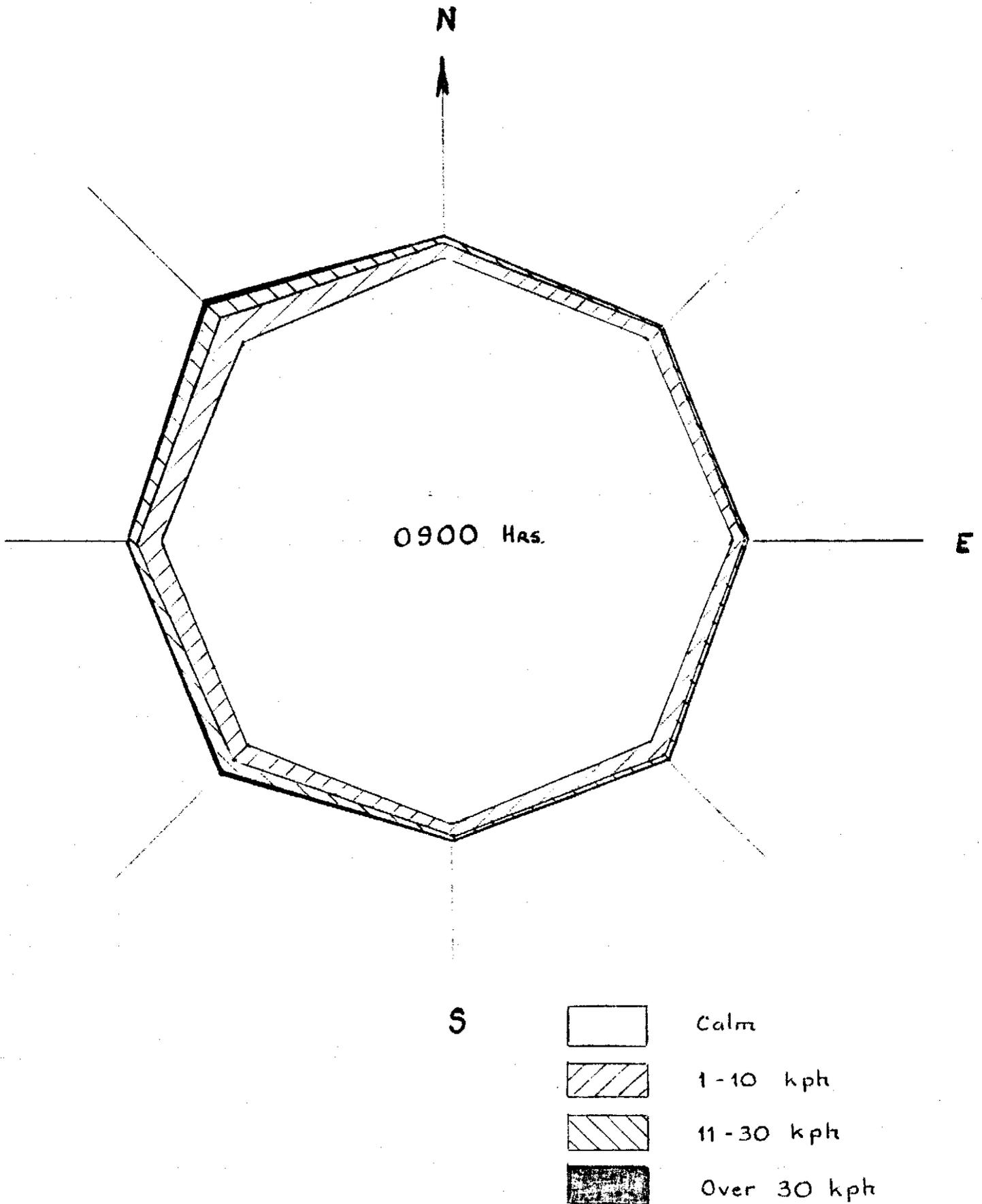


FIGURE 14.

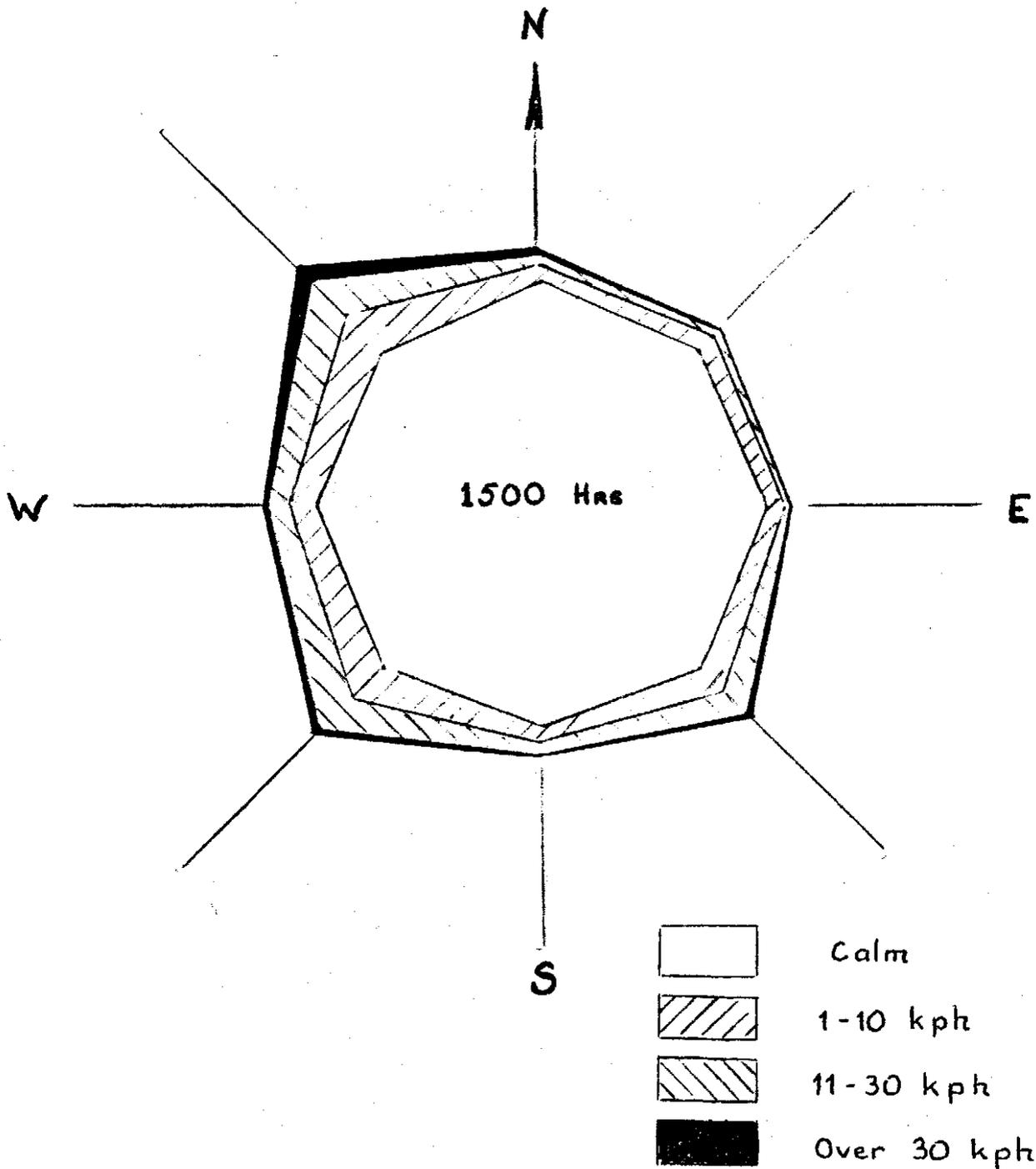


FIGURE 15.

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Winds from the critical quadrant occur for 21.6% of the time in the mornings and 29.4% of the time in the afternoons. Moderate winds from these directions occur about 7 to 12% of the time and strong winds for 1 to 3% of the time.

The approximate frequency of strong winds from the north-to-west quadrant, on a month-by-month basis is illustrated in Figure 16. The most frequent occurrence (about 8% of the time based on afternoon observations) is during October, which coincidentally is also the wettest month of the year. Such winds are rare from May to August inclusive. Their occasional occurrence during January, February and March is of relevance to the dusting situation, as these months are also the driest.

9.3.3 TEMPERATURE

Although probably of no great relevance to the environmental impacts of this project, summarised temperature data from the Bushy Park station have been included as Figure 17. Mean daily temperatures vary from 24°C maximum in the summer to 1½°C minimum in mid-winter.

9.3.4 FOG

During work on the prospect in winter time, it has been noted that fogs occur infrequently, probably due to the locality (within the valley and adjacent to Lake Meadowbank).

This may have implications on the visibility of operations from the public domain, safety aspects relating to traffic movements along the Lyell Highway and perhaps the transmission of noise to residences in the district.

BUSHY PARK

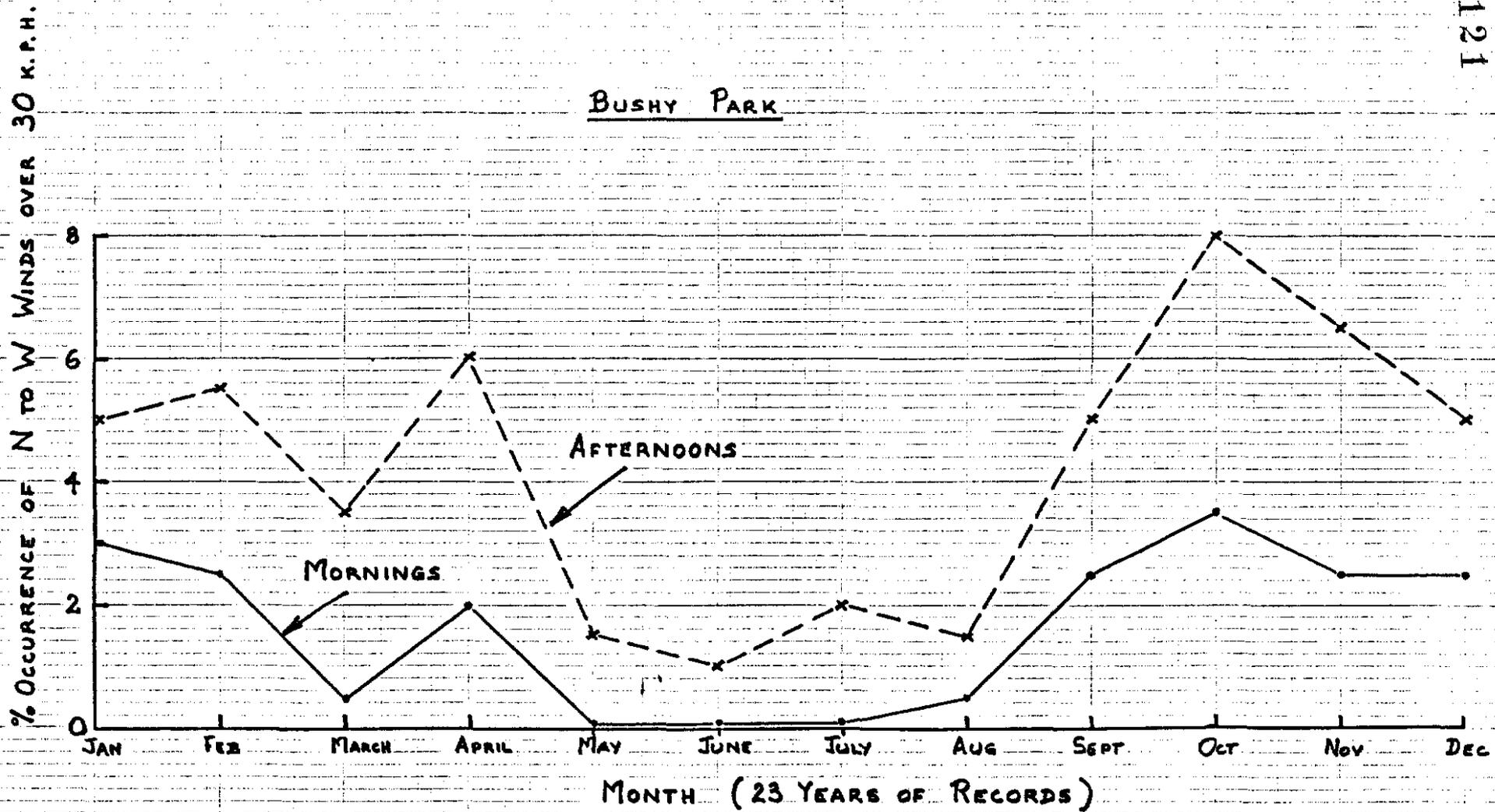


FIGURE 16.

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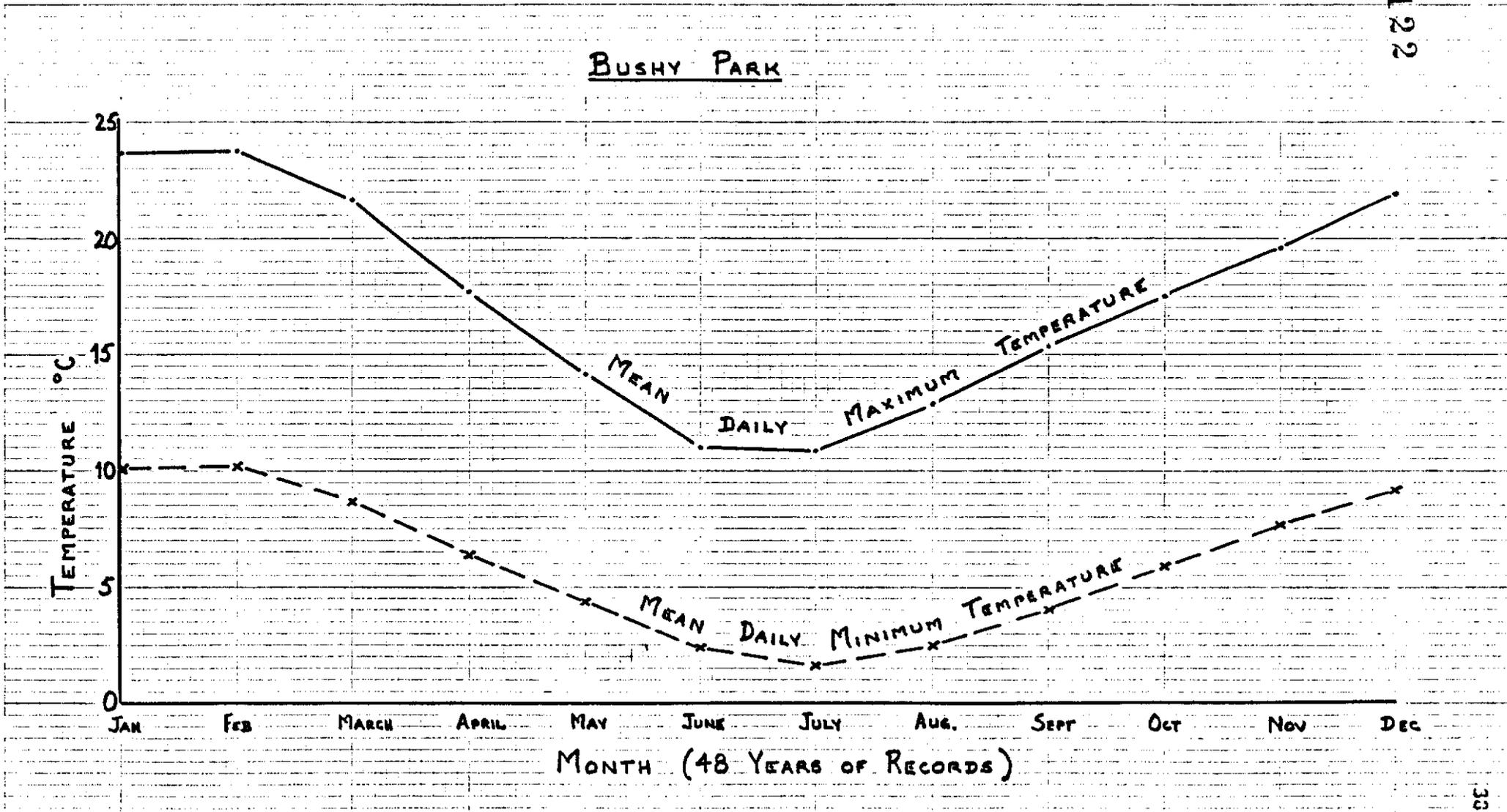


FIGURE 17.

9.4 ACCESS ROADS

All coal carrying trucks from the mine would ply the section of the Lyell Highway from the minesite to the turn-off to Macquarie Plains (see Figure 1B). This is a bitumen-sealed, two-lane road, often with significant, well-defined gravel verges. Although the road curves in some places, visibility is usually adequate to allow slowly-moving vehicles to be passed in safety. The road surface is generally fair, but some short sections are heavily patched. Dwellings fronting this stretch of road are relatively sparse until the township of Gretna is approached. Along the 3 km stretch of Highway through Gretna, houses line both sides of the road.

Trucks delivering coal to the notional rail siding at Macquarie Plains would turn to the right off the Highway just before Rosegarland and proceed approximately 3 kilometres along a curving sealed road to the siding, which would abut this road. The trip length for these vehicles is 25½ kilometres from mine to siding.

Trucks delivering coal to markets at New Norfolk and Hobart would continue south-eastwards along the Lyell Highway. This road is also sealed, but there are several sections south of Rosegarland where the road parallels the Derwent River that are narrow, sharply curved and afford very limited forward visibility. The stretch of Highway between Rosegarland and New Norfolk is currently subject to extensive and progressive roadworks by the Department of Main Roads, aimed at widening and in places realigning those narrow or "blind" segments that are considered to be potential safety hazards.

Verbal advice to the author of this Study indicates this Department's medium-term plan, now in progress, is to upgrade this stretch of road to highway standards.

It is notable that the investigation into double-handling the coal from truck to rail has been undertaken as the result of uncertainty regarding the safety aspects of routing frequent coal trucks along this stretch of road. Although the D.M.R.'s upgrading

programme alleviates this concern to a large extent, examination of the potential for transferring to rail at Macquarie Plains is still proceeding, although it is known that there will be a resulting significant cost penalty.

Trucks transporting logs from forests west of Ouse to Australian Newsprint Mills Ltd. at Boyer are frequently encountered along the entire route to New Norfolk.

Those vehicles proceeding past New Norfolk to Hobart would continue along the Lyell Highway, which is well-surfaced and heavily-trafficked. From Bridgewater to Hobart, this road has been upgraded to mainly four-lane width, to National Highway standards.

Data will be sought relating to the impact of frequent heavy vehicle movements on the road surface of Esk Main Road, a segment of which carries coal trucks from the Cornwall coal mines.

9.5 EXISTING TRAFFIC PATTERNS

Traffic counts in 1982 carried out by the Department of Main Roads on the section of the Lyell Highway between Ouse and New Norfolk are as follows:

<u>Section</u>	<u>Average Annual Daily Count</u>
West of Ouse	550
Ouse to Hamilton	800
Hamilton to Fenton Main Road	1000
Fenton Main Road to West New Norfolk	1500
West New Norfolk to New Norfolk	1900

An average of 15% of these vehicles are said to be defined as heavy (dual axle) trucks.

The progressive build-up of traffic from Ouse to New Norfolk is evident.

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9.6 DEMOGRAPHY

The Municipality of Hamilton embraces the townships of Ouse, Hamilton, Gretna, Ellendale, Strathgordon, Wayatinah and Tarraleah, and covers an area of 585,000 hectares.

Census counts show the population of the Municipality to be continuously declining since 1976, at an average rate of 5.28%, viz:

1976	3,490
1977	3,220
1978	2,920
1979	2,650
1980	2,610
1981	2,488
1982	2,520 (estimated)

This population decline rate is exceeded only at Gormanston (a reduction from 390 to 110 over this period), with Queenstown in third place at a decline rate of 3.84% (4,680 to 3,700).

Age groupings are given in Appendix 3. It is seen that there is a significant majority of males resident in the district, especially in the age groupings teenage to early 20's and late 30's to mid 60's.

From 1976 to 1981, the number of employed males fell from 1,199 to 771, with the number of registered unemployed increasing from 13 to 44. The equivalent statistics for females are 297 to 262 employed, and 24 to 30 unemployed.

Income levels are relatively low, with only 78 males and 14 females earning over \$18,000 per annum in 1981, from a total of 1,033 employed persons.

The occupational statistics (Appendix 4) show that the greatest number of employed persons are described as tradesmen (342), although it is in this occupation that the greatest reduction in employed persons has occurred since 1976. Farming as a full-time occupation rates second in the district, with the numbers declining

only marginally. In 1981, there were no persons described as miners or quarrymen. The greatest numbers of employed persons, especially in professional, technical, administrative and clerical occupations were engaged in the generation and supply of electricity.

The number of occupied dwellings in the municipality fell from 954 in 1976 to 749 in 1981, with the decline largely confined to rental housing.

The number of manufacturing establishments fell from 5 to 3 during this period; these are small operations employing a total of only 24 persons (not including administrative, clerical and sales staff).

There were 22 retail establishments in the municipality in 1980, employing a total of 59 persons, and having a turnover of just less than one million dollars during the year.

The agricultural nature of the district is clearly illustrated by the following summary of 1981 data :

number of agricultural establishments	119
total agricultural area in hectares	139,888
sown pastures and grasses in hectares	42,759
area for barley in hectares	61
area for oats in hectares	475
number of beef cattle	23,105
number of dairy cattle	2,275
number of sheep	288,050
number of pigs	35

The wool industry obviously provides the major agricultural occupation, with the production of shorn wool during this year being 1,365,542 tonnes.

No wheat, sunflower, potatoes, tomatoes, onions, orchard trees or grapevines were recorded to be grown in the municipality.

At the end of 1981, there were 217 km of sealed road and 521 km of formed surfaced road in the total of 749 km of roads in the municipality.

The police force comprises one officer at each of Hamilton, Ouse, Wayatinah and Tarraleah.

In 1980, medical services comprised a medical practitioner based at Ouse, and the Ouse District Hospital.

Libraries are recorded at Ouse and Hamilton, and there are six schools (Bronte Park State, Ellendale State, Hamilton State, Tarraleah State, Wayatinah State and Ouse District).

Sporting clubs include the Gretna Cricket Club, the Ouse Bowls Club, the Ouse Cricket Club, the Ouse Golf Club, the Ellendale Cricket Club and badminton clubs at Hamilton, Wayatinah and Tarraleah.

10. ENVIRONMENTAL FACTORS AND CONSIDERATIONS

As this project is still in the stages of formative planning, the various environmental factors arising from the proposal have been identified, but in many cases objective predictions of the effects may not yet be made. In such cases, recommendations for further studies are made, to provide the data to be included in a more detached supplementary impact statement. All considerations refer specifically to the West Hill segment of the prospect, but in general terms will also be relevant to the subsequent East Hill mine.

10.1 WATER

No process wastewater will be generated. As previously stated, open cut techniques allow the relatively simple mechanical separation of coal from shale, thus obviating any need for a coal washery.

It is believed probable that there is a significant ground-water column not far below ground surface. This will be checked by sinking test bores "upstream" of the proposed mine. At present it appears that the water table is essentially parallel to, and 6 to 10 metres below the topographical surface; this would indicate considerable hydraulic pressures.

It will be necessary to divert groundwater and any upland surface water around the mine. One possibility is to dewater the aquifer by a line of bores upstream of the mine, diverting this and surface water by means of surface channels to a gully below the mine.

It has been proposed that groundwater moves rapidly downwards through faults in the sandstone (although the sandstone itself is of very limited permeability) but does not penetrate the coal. If this is the case, the main line of water movement could be along the sandstone-coal interface, thereby enabling deep-trenching techniques to trap and divert groundwater, together with any upland surface water, around the workings.

Whichever of these alternatives is ultimately adopted, it is clear that only the stormwater falling directly on the exposed surface

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workings and on the overburden/interburden storage piles may be potentially contaminated by particulates and/or leachates, arising from contact with exposed rock and coal.

It is assumed that, at maximum, the exposed mine area will be equivalent to about one year's operations - say 4 hectares - since the mine plan involves continuous "rolling" rehabilitation behind the open cut (see Sections 10.2, 10.3 and 10.4). Based on Bushy Park data, the highest daily rainfall recorded during the 21 years from 1962 to 1982 was 40.9 mm (on 22-2-1969); these records are summarised in Figure 18. This means that the maximum anticipated daily runoff from the mine workings would be approximately 1,600 kL. A catchpond of 200 kL capacity (for example 10 metres by 10 metres by 2 metres deep) would allow at least two hours' residence time before decanting to the environment even under such extreme rainfall conditions, thus enabling maintenance of control over the quality of the mine water.

The exposed area of the overburden/shale dump would be less - perhaps 1 hectare - and a smaller separate catchpond would suffice to allow settlement of any coarse particulates scoured away by stormwater.

It should be noted from Section 9.3, dealing with the district meteorology, that the greatest mean monthly rainfall (October) is only 50 mm, spread over an average of 13 raindays. This implies that high rainfall incidents are infrequent and short-lived.

The extent of stormwater contamination by leaching will be evaluated later in the development programme by laboratory assessment and analysis of water from the old underground workings. This will enable the determination of the treatment, if any, required to control the quality of stormwater runoff to statutory limitations. At this stage it is believed that settling and decanting will be adequate to achieve such quality.

The possibility of utilising either or both the diverted groundwater and the stormwater for watering stock on neighbouring rural properties will be explored, as it is understood that occasionally the availability of water is severely limited in the near area.

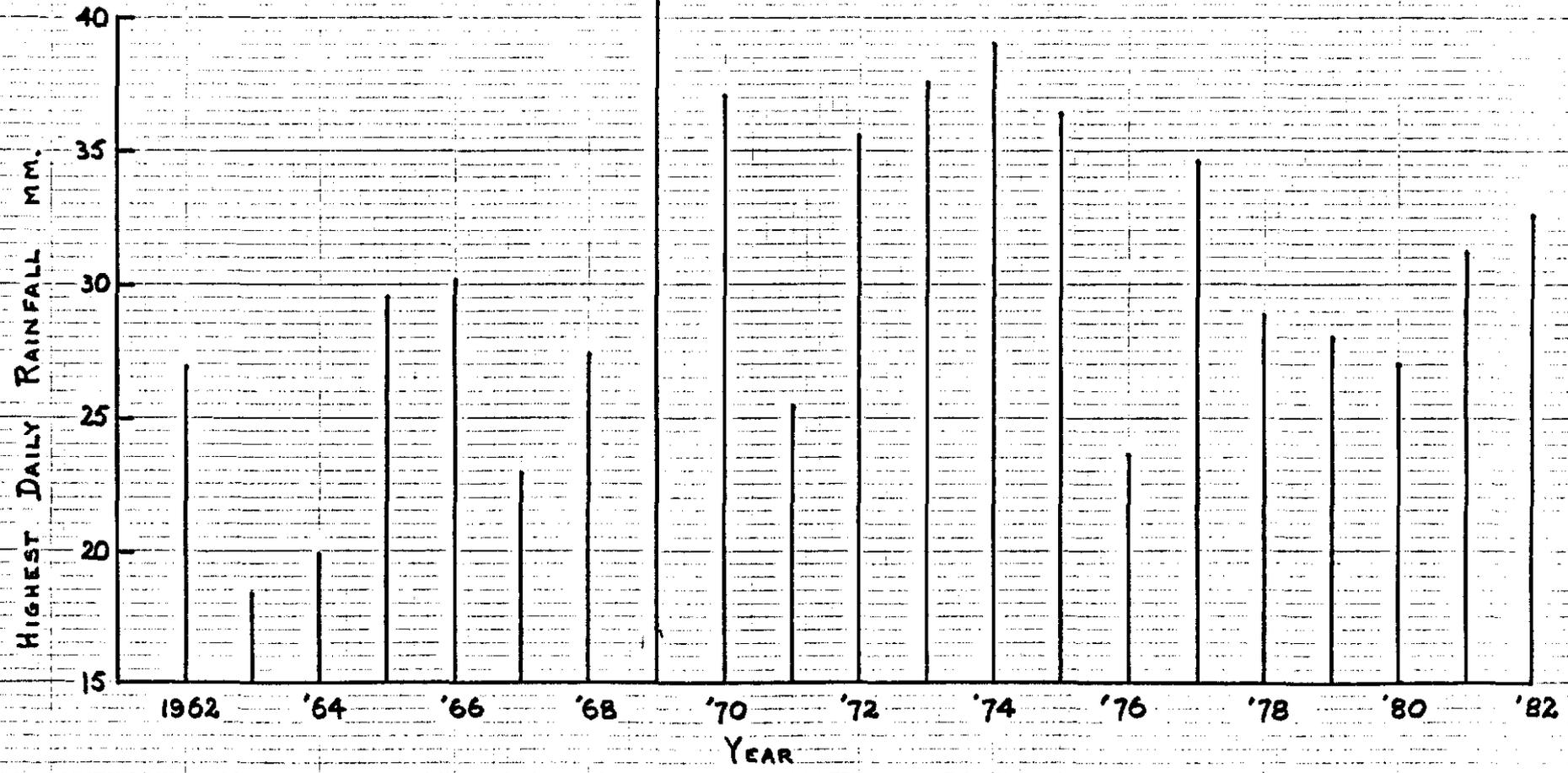


FIGURE 18.

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Toilets and ablution facilities will be provided for employees and contractors working on-site. The sewerage water will be treated, most probably by septic tank, to the requirements of the relevant authorities.

Water from the site will enter shallow streamways which eventually flow into the River Clyde some 3½ km to the south-east, just above this river's entry into Meadowbank Lake.

10.2 DUST

Dust may arise from the following operations :

- * drilling
- * blasting
- * ripping
- * loading and transporting overburden and coal
- * operating vehicles within the open cut
- * crushing/screening
- * coal stockpile
- * coal loading
- * off-highway coal truck movements
- * windage from overburden dump
- * windage from topsoil storage
- * coal transfer from truck to rail

In this context, it is important to recall that the strongest prevailing winds are from the segment north-to-west, which would tend to direct any dust generated towards the nearest residences. However, calm conditions are relatively frequent. It is also notable that in the period December-January-February, when the afternoon occurrence of strong winds from this quarter is 5% or more, the number of raindays when rapid dust settling would occur is less than 10 each month. Consequently, this will be the critical period for the control of any dust problems arising from these operations.

Each of the processes cited above are briefly considered in the order of their listing :-

10.2.1 Drilling

Experience indicates that only a small quantity of dust will arise from drilling operations. However, any such dust may be readily visible from vantage points beyond the premises, as drilling would take place at the top of the working face.

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10.2.2 Blasting

Some dust will inevitably arise from blasting. Little can be done about this, but as blasting is to be a single daily event, the dust will disperse rapidly. Some dust may tend to occasionally settle over the properties to the south.

10.2.3 Ripping

Dust arising from this operation can be readily minimised on-site by water sprays as necessary.

10.2.4 Loading and Transporting Overburden and Coal

The coal-winning area should be kept slightly damp to minimise dust generation from the recovery and transportation of coal.

Dust may well arise from the rapid transportation of overburden to the dumpsite, and also during the recovery of overburden for filling and rehabilitation. Some operator care will be necessary in this respect during dry, windy weather.

10.2.5 Operating Vehicles Within the Open Cut

Again, if the exposed working areas are kept damp, dust generation should be minimal.

10.2.6 Crushing/Screening

These processes will obviously tend to produce coal dust, and the provision of sprays for water (preferably dosed with surfactants or dust-suppressing chemicals) at critical points in the plant (especially transfer points) will be vital.

10.2.7 Coal Stockpile

Experience in the handling of washed Fingal Valley coal indicates that windage from frequently turned over open stockpiles of this material is negligible. It is not known whether the unwashed

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open-cut coal from this project will have similar characteristics, so unless better information becomes available, the provision of water sprays to dampen the stockpile surface during adverse weather conditions should be seriously considered.

10.2.8 Coal Loading

Because of the insidious and highly visible nature of coal dust, it will be important to ensure that the surface of the coal is kept damp during all handling operations. The transfer of coal from hopper to truck is unlikely to produce a great deal of dust; nevertheless, provision of water sprays at this transfer point also should be provided.

Any dusting during transportation to customers or to the rail siding should be avoided by surface damping and/or covering the loads with tarpaulins.

10.2.9 Off-Highway Coal Truck Movements

The route from the highway to the coal-loading facility is to be bitumen-sealed. As long as there is no coal spillage on this access road, no dust will arise from truck movements to and from the highway.

Dedicated mine trucks will transfer coal from the open cut to the crushing/screening plant, along a route yet to be specified. This route will be bitumen-sealed or watered or oiled to suppress dust arising from such transportation.

10.2.10 Windage from Overburden Dump

The total quantity of overburden from the West Hill mine is predicted to be 9,830,000 tonnes and of shale 1,790,000 tonnes. Whilst this implies a very extensive overburden dump, the mining plan provides for continuous "rolling" filling and surface rehabilitation to match the advancement of the operating face (see Figure 4.). It is therefore probable that the overburden dump will comprise only about one year's material (perhaps 1½ million tonnes) and that after the first year's

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operations, overburden can be transported directly to the refilling zone. This implies that the overburden dump will not be part of the day-to-day operations, and therefore could be stabilized by the establishment of vegetation, over all except perhaps its rearmost, potentially "active" area.

Thus, not only would any potential for dusting be avoided, but also erosion would be prevented and aesthetic benefits would accrue.

10.2.11 Windage from Topsoil Storage

It is planned that the topsoil storage pile would be stabilised by vegetative cover, in the same way and for the same reasons as for the overburden dump.

10.2.12 Coal Transfer from Truck to Rail

The location of the possible rail siding at Macquarie Plains adjacent to residences and within an important hop-growing area heightens the importance of containment of any coal dust arising from this transfer.

The sketch drawing of the notional depot, Figure 9, shows that the coal receiving section would be enclosed, the transfer points would be fitted with "dust enclosures" and the belt conveyor to the train loading bin would also be enclosed.

10.3 NOISE

Section 9.2 of this report shows that the existing "background" noise level is extremely low at around 29 dB(A). Traffic along the Highway is fairly frequent, but discontinuous.

Continuous noise, as well as isolated noise events, will arise from the mining operations and will be audible at existing residences to the south and east of the prospect.

It is not possible, at this stage of planning, to make any sensible quantitative predictions of the noise to be heard at these residences. Nevertheless, some generalised predictions are made, based on past experience, and are discussed below under sub-headings relating to the major sources of noise, viz:

- * operations on the floor of the open cut
- * drilling
- * blasting
- * transportaion of coal
- * transportation of wastes
- * crushing/screening

10.3.1 Operations on the Floor of the Open Cut

These operations would involve the use of vehicles and other mobile equipment to clear away the blasted overburden, rip the coal and interburden, load and transfer coal to the crushing/screening plant, and relay and compact overburden and topsoil for rehabilitation.

Adoption of the original south-to-north mining proposal at West Hill would mean that noise from the open-cut mining operations would be attenuated only by distance, (according to the inverse square law), by any artificial physical intervening barrier such as an overburden dump and to a lesser extent by ground cover absorption and air diffusion. The location of an artificial barrier would probably be too far distant from the noise sources to provide appreciable noise reduction.

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Neglecting "Kimbolton" itself, which is located adjacent to the prospect and will be used by mine personnel, the nearest residence is only 495 metres from the closest zone of operations. Distance attenuation would be 36 dB(A) relative to the noise level from equipment at 7½ metres. This means that the output from a typical loader (92 dB(A) at 7½ metres) would reduce to 56 dB(A) at this house, neglecting any additional reduction afforded by barriers. Typical noise outputs from relevant items of equipment are summarised in Appendix 5.

A north-to-south "reverse" mining proposition is under examination, whereby mining would commence from a "slot" at the northern periphery of the deposit and proceed progressively southwards, thus working behind the active face with respect to southern residences. This scheme would certainly reduce much of the operations noise as heard to the south, as the result of the barrier effect created by the intervening higher ground, until the final stages of mining at this site.

Two other houses, both named "Curringa" are less than 1 km from the minesite, at 630 and 975 metres. These are a little east of south of the prospect, and would also benefit from the north-to-south mining proposal.

The other residences cited as being within about 2 km of the site, "Westfield" (1110 metres), "B" (1410 metres), "Lyndall" (1590 metres) and "A" (2100 metres) are all located in a line to the south-east of the site and might not benefit to any great extent from this alternative proposal. Ignoring any possible barriers, attenuation at "Westfield" is calculated as 45½ dB(A) based on the noise level at 7½ metres from items of equipment. Against the background level of 29 dB(A), typical equipment at 92 dB(A) at 7½ metres would still be clearly audible.

Such audibility would not necessarily be of great concern during the daytime, but such activities as clearing overburden during afternoon shifts might create difficulties.

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10.3.2 Drilling

Drilling operations will take place at the top of the bench, thereby minimising any potential for barrier reduction, possibly extending into night time hours. Long hole percussion drilling represents the most intense long-term noise of all open-cut mining operations. Measurements taken near a new drill rig and compressor typical of the equipment planned for the mine are illustrated in Figure 19. Compressor noise centred around 85 dB(A) at 7½ metres; this was relatively noisy, and other units of similar capacity have been measured at as low as 76 dB(A) at 7½ metres. However, compressor noise is overshadowed by that from the drill itself; levels varied from 87 to 93 dB(A), and centred about 90 dB(A) at 13 ½ metres. Taking the L_{10} value as the criterion of the noise intensity during a typical hole-drilling cycle, the basis for noise predictions is 93 dB(A) at 13½ metres (see Appendix 5). This gives a calculated maximum unobstructed noise of 60 dB(A) at the closest house, 56 dB(A) at the nearest "Curringa" and 49 dB(A) at "Westfield". It is consequently predicted that drilling noise will be relatively intense at the nearest dwellings, "C" and "Curringa 1", at around 25 to 30 dB(A) above the background, and will be clearly audible at all of the five other cited residences within about 2 km of the operations area.

10.3.3 Blasting

Blasting will be necessary to fragment the overburden, and is planned to occur each working day at a fixed time in the middle of the day shift. No secondary blasting ("popping") will be necessary, thus avoiding what has been found to be the main source of irritating noise at residences close to hard-rock quarrying operations.

The main environmental connotations from blasting will be:-

- * ground vibration
- * noise from warning siren
- * low frequency air blast

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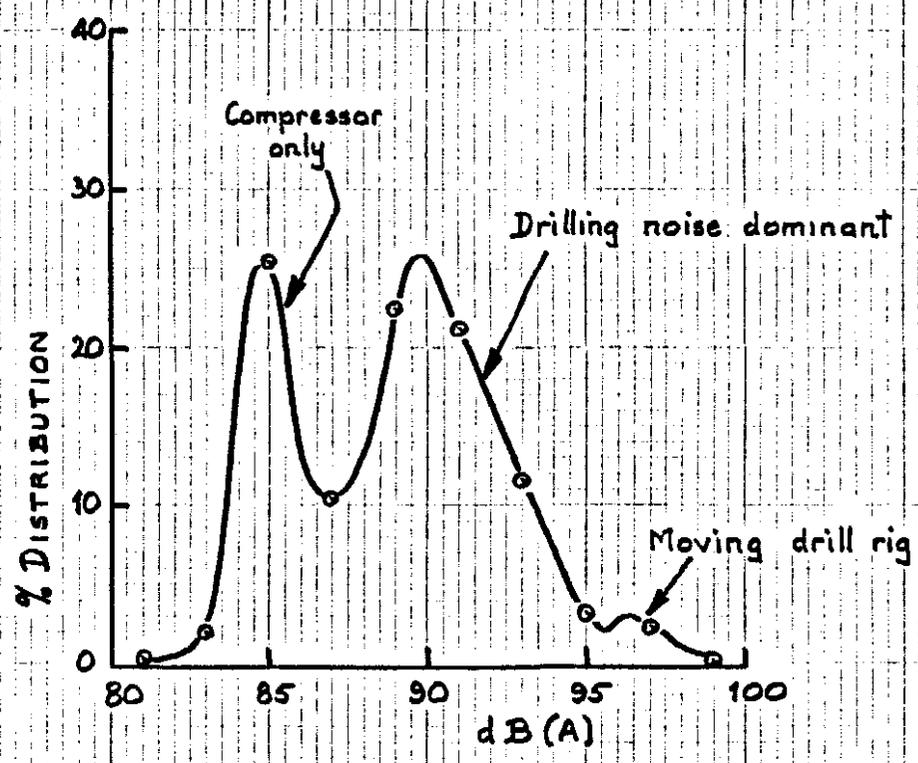
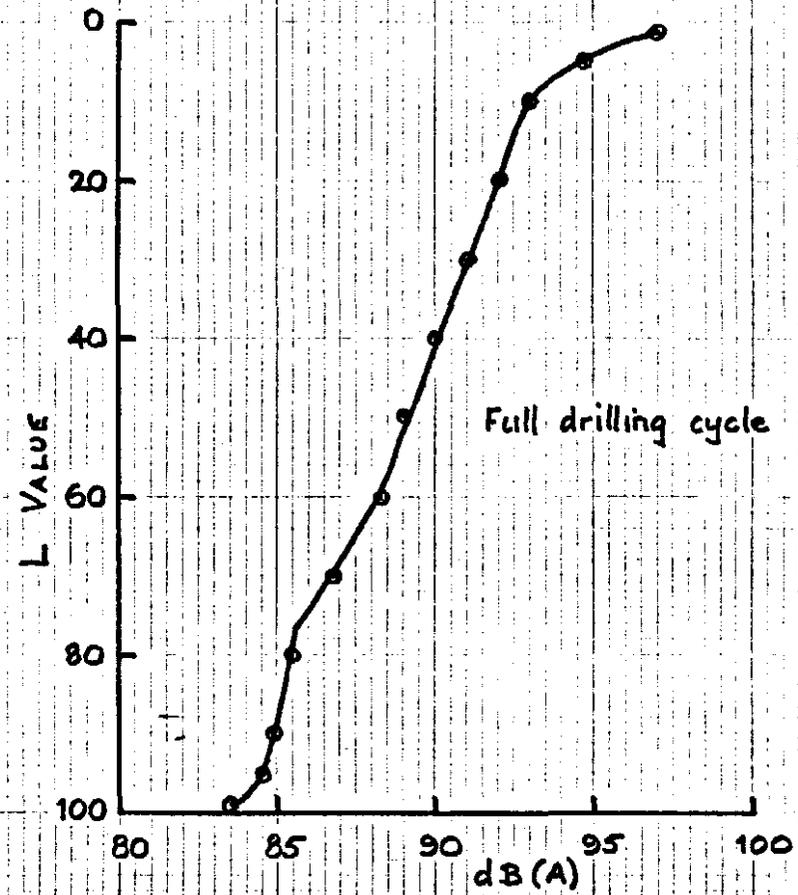


FIGURE 19.

A. Ground Vibration

Ground vibration depends on a series of factors, including size of charge, delay pattern, ground structure and distance from the blast. Only the last of these variables is currently known with reference to nearby structures.

Safe blasting practices are controlled by the Tasmanian Department of Mines, which has the responsibility to ensure that structural damage will not occur. Whilst the Australian Code C13-1967 requires a maximum of 19 mm/s particle velocity for the protection of structures, a goal of less than 1 mm/s at the nearest residence (495 metres away) should be applied to achieve a "barely perceptible" vibration level. A maximum vibration amplitude of 0.2 mm is set by the Australian Standard CA 23-1967, but again a value significantly less than this would be more appropriate with respect to nearby rural dwellings.

B. Noise from Warning Siren

The siren sounding the warning prior to a blast is, of necessity, pitched to an intensity exceeding that from any normal on-site operation, with a "pure-tone" frequency characteristic designed to enhance its attention-seeking capability.

In the very quiet rural environment, it is probable that this warning noise would be audible several kilometres away. However, it would be sounded at a regular time of day and only for a relatively brief span of time.

C. Noise from Blasting

As indicated previously, the overburden rock is closely-jointed and is expected to be readily shattered. It is proposed to use minimal charges to achieve the necessary diminution of the matrix, at delay intervals designed to create minimal transference of energy to the air.

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Nevertheless, this noise will be audible over a wide area (measurements elsewhere indicated a maximum value of 85 dB(A) at 1500 m, although these blasts were in hard dolerite rock), but the duration would be only a fraction of a second.

D. Low Frequency Air Blast

Low frequency air blast is probably the most significant factor attracting adverse social response to blasting operations. Such air blasts are the result of the propagation of a portion of the explosive energy through the air, at frequencies between $\frac{1}{2}$ and 2 Hz. Secondary blasting releases a much greater proportion of the energy than primary blasting, but such "popping" will not be necessary at this site.

Air blasts are not attenuated by topographical barriers, and are sometimes magnified or focussed during adverse weather conditions (for example, under low cloud cover). Nearby residents often mistake this phenomenon for ground vibration.

Prediction of the propagation of air blasts is not practical; some measure of control may best be established by defining a 1 km radius "buffer zone" around the blast site, as experience shows that a large proportion of complaints of alleged discomfort or damage arises from residences located within 1 km of the site. Three dwellings, "C", "Curringa 1" and (marginally) "Curringa 2" are within this arbitrary zone, and some transient daily disturbance may occur in terms of the rattling of windows and crockery at these houses, regardless of the most careful control of the mining procedures and practices.

10.3.4 Transportation of Coal

Some 40 to 50 trucks of 20 tonne capacity will arrive at the loading facility and depart eastwards each working day, from perhaps 7 a.m. to 5 p.m.

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Section 9.5 of this report indicates an average annual daily count of 120 to 150 trucks currently plying the section of the Lyell Highway between Ouse and Rosegarland. The increase in traffic along this road arising from the transportation of coal is therefore significant, and the traffic noise will increase in proportion.

Additionally, the low-gear, slow movement of trucks negotiating into and out of the highway will tend to create longer-term, more intense noise than if merely passing by, with respect to the area immediately adjacent to the turn-off. The location of the entry road is not yet fixed, but it might be possible to locate the turnoff along the relatively straight stretch of highway approximately 1 km to the west of the existing entry to the "Kimbolton" property, and therefore about 1 km from the nearest residence.

Dedicated mine trucks will transport coal from the pit to the crushing/screening plant on a semi-continuous basis. Typical measured noise levels from similar dump trucks operating elsewhere average out at 92 dB(A) at 7½ metres (Appendix 5). There is a shallow gully leading from the northern section of the operations area towards one of the alternative sites for the crushing/screening plant and it is hoped that this access road can be located along this depression to take advantage of topographical screening for the creation of a barrier between this road and residences on the opposite side of the highway. If located in this depression, the road would also be a minimum of 750 metres away from the nearest residence (residence "C"), so that the attenuation due to only distance, ground cover and air absorption would reduce the maximum noise heard from such vehicles to approximately 47 dB(A), with further reductions stemming from the barrier.

10.3.5 Transportation of Wastes

Initially, trucks would operate almost continuously between the pit and the overburden/shale dump.

The location of this dump has not yet been specified, but might possibly be located between the operations area and the highway

to provide a potential visual and noise screen. This would imply that truck operations would move relatively close to the two "Curringa" residences (approximately 400 metres). Nevertheless, close operations would be behind the screen afforded by the waste dump, and at such close proximity, this intervening barrier would provide some, and perhaps significant attenuation, depending on its location, extent and height

After 1 year's operation, a considerable proportion of the overburden would be transferred directly from the working face to the worked-out area under rehabilitation, in which case the noise from such vehicles would become a part of the open-cut operations noise previously discussed.

The noise from trucks transferring overburden away from the active area would have more significance than that from other vehicles and mobile equipment, as a result of the proposed two-shift operating period extending the time of noise output into the more critical night time period.

10.3.6 Crushing/Screening

The location of crushing/screening plant is not yet fixed. One alternative location, some 250 metres to the west of the western periphery of the deposit has been suggested, to take advantage of the potential attenuation of a small adjacent area of high ground (to the south).

The plant site suggested in preliminary drawings (Figure 3) is 600 metres to the north of the closest house, neglecting "Kimbolton", (that is: residence "C"), while the alternative location behind the hill is approximately 1000 metres away.

Measurements elsewhere indicate that the combined noise from a crusher/screening complex is of the order of 90 dB(A) at 18 metres (see Appendix 5 for typical figures from some individual units). Attenuation calculations including distance reduction, atmospheric diffusion and ground cover absorption, but with no topographical

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barrier, show equivalent values of 58 dB(A) at 600 metres and 49 dB(A) at 1000 metres.

The latter situation is by far the more preferable with regard to continuous noise, but is still about 20 dB(A) above the quiet background level. The combination of this noise with that potentially emanating from the pit would put the discrepancy even higher. Therefore, any possible topographical advantage to provide a barrier effect in order to further reduce the contribution of plant noise, would be beneficial to the noise environment at nearest residences.

The crushing/screening plant would operate only during the daytime.

10.3.7 Summary

The nearest two residences, neglecting "Kimbolton" itself, are well within the generally-accepted buffer zone of 1 km from the working site. These would be affected to some extent by blasting. Operations at the minesite would be clearly audible, but might not be of great concern during the daytime if the north-to-south mining plan is adopted to take advantage of topographical barriers.

Site operations would also be audible at five other houses located between approximately 1 and 2 kilometres from the proposed open cut, especially the noise from rock drills.

Traffic noise at all of these residences would increase.

Of greatest concern is the possible operation of drills and earth-moving machinery during afternoon shifts.

Noise is the most important environmental issue arising from the proposal, in terms of its potential effects at the seven residences within about 2 km of the site, and will be the subject of a more detailed analysis when the development plans are firmed up.

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10.4 SOLIDS WASTES

As previously discussed, some 9.83 million tonnes of overburden and 1.79 million tonnes of shale are expected to be moved during the ten year life of the West Hill mine.

A proportion of this waste - perhaps $1\frac{1}{2}$ to 2 million tonnes - will be stored at an overburden dump site not far from the open cut. The south and east faces of this pile will face the Lyell Highway, especially if employed as a visual and acoustic barrier between the site and the houses to the south. These faces will be stabilized by the establishment of vegetation on a layer of overlying compacted topsoil.

Once mining has progressed for a year or so, overburden and shale will be transferred to the worked-out area behind the active zone, compacted and covered for rehabilitation. This will take place on a continuous basis to the end of the working life of the mine. Some wastes will be added to the overburden dump pile, or taken away from it as required, but such activities will take place along the northern periphery of the dump so that the stabilized faces will remain undisturbed.

10.5 REHABILITATION

Detailed plans have not yet been formulated, but the principle is, as previously described, "rolling" replacement of overburden and shale over worked-out land to follow the movement of the active mineface. Then, once the final level has been established, topsoil is to be layered over this material, and vegetation sown or planted, according to the proposed end-use of the land.

The most probable final use of the restored land will be as at present - that is, as pasture and/or tillage - and therefore it is likely that nitrogen-fixing grasses such as ryegrass and clover will be sown over the surface to prevent any erosion of the replaced soil.

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10.6 LAND USE

As described in a previous section of this Study, the current land-use is rural, for grazing and cropping.

The zone of operations would be alienated to mining for a ten year period, and then most probably returned to its former usage.

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10.7 AESTHETICS

Some of the operations will be visible from the near surrounds, especially from the Lyell Highway, and as this is virtually exclusively a rural district, the presence of a mine might seem to be alien to the general aesthetic nature of the district. However, the area to be mined is relatively small and the duration of the visual impact to Highway travellers will be short.

Adoption of the north-to-south mining procedure, coupled with the establishment of a vegetation-stabilized overburden dump would establish visual screening to very strictly limit the visibility of the mine.

Selection of a site for the crushing/screening plant and coal stockpile behind the knoll to the north of the Highway, as previously described, would likewise limit the visibility of fixed plant.

The routing of mine trucks along the natural depression between the coal deposit and the fixed plant would ensure that such activities would be obscured.

In general, it is seen that, if practicable, there are a number of variables that might be included in the planning and operating procedures that could reduce the potential visual impact of the mine and associated works.

It is not considered that aesthetic considerations are of major significance with respect to the potential environmental impacts of the proposal.

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10.8 TRAFFIC PATTERNS

As previously discussed, average annual daily traffic counts in 1982 show progressive increases in traffic from Ouse to New Norfolk. Neglecting the 3 km stretch of highway from the mine to Hamilton, the least count along the route to be taken by trucks delivering coal is a daily average of 1000 vehicles.

Some 15% of this total - 150 - represents heavy vehicles, of which a significant proportion is trucks delivering logs from forests west of Ouse to the newsprint mills at Boyer.

Between 40 and 50 truckloads of coal per day will be transported eastwards to the rail siding or to markets. As the trucks, once emptied will return to the mine for a new load, this represents between 80 and 100 truck movements each day along the Lyell Highway to and from the mine.

Thus, it is seen that there will be a significant increase in daytime week-day traffic along this road, deriving from the project. The noise and safety aspects of this increase have been canvassed in previous sections of this Study.

The transportation of perhaps 20 persons each day between the minesite and their places of residence (presumably mainly at Hamilton) will not be significant against the existing average daily vehicle count of 800 on the highway between Hamilton and Ouse.

10.9 SOCIAL FACTORS

It is presumed that about 20 persons would be employed full-time at the mine, exclusive of contractors engaged in shifting overburden and coal transportation.

This will have important and beneficial effects on the economic base and stability of the nearby township of Hamilton. An assessment of the effects on local housing, amenities, water supplies and sewerage will be derived when planning is further advanced.

The Cornwall Coal Company is presently the sole supplier of indigenous coal to industrial users. The coal derived from the proposed open cut mine will supplant some of the markets currently supplied by this Company, and therefore some short-term effects might be expected on its output. On the other hand, it is apparent that a significant number of this State's industries have converted, or are contemplating conversion, from heavy fuel oil to coal as the source of energy for their operations. This trend is expected to continue, as the disparity in cost between these two sources of energy progressively increases. Consequently, the effects on the Fingal Valley supplier and the employment it supports will probably not be very great.

10.10 OTHER FACTORS

There are a number of items appearing in Part B of Appendix 2 of the "Guidelines and Procedures for Environmental Impact Studies" that have not been mentioned in this Study. In these areas, the potential impacts are either not applicable to the project or negligible. Brief comments are given below:-

- * Changes to existing vegetation - the existing grassland will be alienated to mining and later restored.
- * Effects on wildlife - the population of wild animals is sparse, and neither animals nor birds will be affected by the project.
- * Changes to historic features - there are no historic features nearer the prospect than Hamilton township, so there will be no changes.
- * Effects on scientific features - there are no scientific features in the area.
- * Effects on scenic or recreational aspects - there are no scenic features, apart from the general rural nature of the countryside; it cannot be predicted whether recreational facilities in the area will be improved as a result of the improved economic base.
- * Improved access to surrounding region - there will be no improved access.

11. ENVIRONMENT PROTECTION MEASURES

Whilst it is yet too early in the planning stage to be specific about the environment protection measures to be incorporated into the operation of the proposed mine, some general proposals (already discussed) may be summarised as follows:-

- * Groundwater and upland surface water will be diverted around the mine.
- * Stormwater will be collected and ponded before discharge.
- * The possibility of providing stock water from the diversion will be investigated.
- * Dusting will be minimised by water spraying, sealing of access roads where practicable, oiling or watering internal gravel roads, covering coal trucks, etc.
- * Investigations are proceeding concerning a reverse-order mining plan to minimise noise from operations on the floor of the pit.
- * Explosive charges and delay patterns will be derived to create the least possible noise and low frequency air blast arising from blasting operations.
- * An alternative site for fixed plant is being examined to take advantage of rising ground for a noise and visual barrier.
- * A route between the mine and crushing/screening plant is to be examined with the view to achieving the greatest possible topographical screening of trucks supplying coal to the plant.
- * An alternative safe access turnoff from the highway is under consideration, at a distance of approximately one kilometre from any house.
- * A rail siding for some or all of the product is being contemplated at Macquarie Plains, to limit truck movements along the presently narrow, twisting sections of the Lyell Highway east of Rosegarland.

- * Topsoil is to be stored for land rehabilitation.
- * The waste overburden and shale pile is to be located to provide a visual screen and partial noise barrier.
- * Those faces of this waste dump visible from the public domain will be stabilized by soil covering and vegetation.
- * Overburden and shale will be transferred from the active zone to worked-out areas to enable the progressive re-filling and restoration of the land to its former usage.
- * Rehabilitation of compacted waste will be accomplished by respreading topsoil over the completed fill and sowing with grasses.

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APPENDIX 1DETAILS OF NOISE MEASUREMENTSSITE 1 - 100 metres west of entry to "Kimbolton"

Date : 3 October 1983
 Commence : 1400 hours
 Cloud cover : 4/10
 Pressure : 756 mm Hg
 Temperature : 16°C
 Wind : not discernible
 Equipment : B & K 4426 Noise Analyser, B & K 2204 Precision
 Sound Level Meter, Rion LR-04 Recorder
 Calibrations : (a) 93.8 dB(A) against the standard 93.6 dB(A)
 for the ½ inch microphone of the 4426.
 (b) 124.0 dB(C) against the standard 124.0
 dB(C) for the 2204.
 Adjustments : Recorder only adjusted against the standard
 Mounting : Microphones were stand-mounted, at least 1.2 m
 above ground level.
 4426 samples : 10,000 samples were taken
 Recorder : Fast response, chart speed 1 mm/s
 Identified
 Sounds : Bus, trucks, cars, sheep, birds, cattle

SITE 2 - at the corner of Lyell Highway and Langloh Road, opposite
the property "Lyndall".

Date : 3 October, 1983
 Commence : 1450 hours
 Cloud cover : 5/10
 Pressure : 756 mm Hg
 Temperature : 15°C
 Wind : occasional very light breeze from the south-
 east, less than 1 knot
 Equipment : as above
 Calibrations : as above

Adjustments : nil
 Mounting : as above
 4426 samples : 16,475 samples were taken
 Recorder : as above
 Identified sounds : log trucks, gravel trucks, cars, distant tractor, distant flock of sheep, frogs and birds.

RESULTS

<u>L value</u>	<u>dB(A)</u>		<u>Bin No.</u> <u>dB(A)</u>	<u>% Distribution</u>	
	<u>Site 1</u>	<u>Site 2</u>		<u>Site 1</u>	<u>Site 2</u>
99	26.3	26.3	26-28	5.9	6.7
95	26.8	27.5	28-30	8.6	12.9
90	28.3	28.5	30-32	9.4	8.5
80	30.5	30.0	32-34	8.9	7.5
70	32.5	32.3	34-36	9.2	12.6
60	34.8	34.5	36-38	7.8	10.1
50	37.3	36.0	38-40	6.8	7.9
40	39.8	38.0	40-42	6.2	8.0
30	43.0	40.5	42-44	5.6	6.0
20	47.8	43.3	44-46	3.8	3.8
10	55.3	49.5	46-48	3.6	2.2
5	62.8	60.0	48-50	3.2	1.8
1	73.0	74.3	50-52	2.2	1.3
EQ	59.5	-	52-54	2.0	0.8
			54-56	2.0	0.6
			56-58	1.2	0.6
			58-60	1.2	0.4
			60-62	1.1	0.8
			62-64	1.1	0.6
			64-66	0.8	0.6
			66-68	0.8	0.3
			68-70	0.6	0.3
			70-72	0.4	0.3
			72-74	0.1	0.2
			74-76	0.3	0.3
			76-78	0.3	0.2
			78-80	0.3	0.1
			80-82	0	0.1
			82-84	0	0

APPENDIX 2SUMMARY OF WIND DATA, BUSHY PARK0900 hours

	<u>Calm</u>	<u>1-10 kph</u>	<u>11-10 kph</u>	<u>Over 30 kph</u>	<u>Total</u>
N		2.8	1.1	occ.	3.9
NE		3.2	0.3	v. occ	3.5
E		2.3	0.3	never	2.6
SE		3.8	1.1	v. occ	4.9
S		2.3	0.8	occ	3.1
SW		3.8	2.8	0.4	7.0
W		4.7	1.7	occ	6.4
NW		6.1	4.3	0.9	11.3
Calm	54.8%				(42.7)
Totals	54.8	29.0	12.4+	1.3+	97.5+

1500 hours

	<u>Calm</u>	<u>1-10 kph</u>	<u>11-30 kph</u>	<u>Over 30 kph</u>	<u>Total</u>
N		2.3	1.5	0.2	4.0
NE		2.7	1.1	occ	3.8
E		2.4	0.7	v. occ	3.1
SE		4.6	4.8	0.3	9.7
S		2.3	1.8	occ	4.1
SW		6.3	6.5	1.1	13.9
W		4.0	3.1	0.3	7.4
NW		7.8	7.3	2.9	18.0
Calm	35.1%				(64.0)
Totals	35.1	32.4	26.8+	4.8+	99.1+

APPENDIX 3AGE GROUPINGS - HAMILTON MUNICIPALITY, 1981

<u>Grouping</u>	<u>Males</u>	<u>Females</u>	<u>Total Persons</u>
Under 1	26	22	48
1 - 4	101	105	206
5 - 14	260	218	478
15 - 24	253	170	423
25 - 34	208	196	404
35 - 44	169	137	306
45 - 54	144	108	252
55 - 64	114	75	189
65 - 74	67	65	132
75 and over	24	26	50

APPENDIX 4OCCUPATIONAL STATISTICS - HAMILTON MUNICIPALITY

<u>Occupation</u>	<u>Persons Employed</u> <u>1976</u>	<u>Persons Employed</u> <u>1981</u>
Professional, technical	110	89
Administration	40	32
Clerical	60	39
Sales	47	38
Farmers	337	299
Miners, quarrymen	10	0
Transport, communication	66	47
Tradesmen	643	342
Service, sport, etc.	74	82

<u>Industry</u>	<u>Persons Employed</u> <u>1976</u>	<u>Persons Employed</u> <u>1981</u>
Agriculture	320	297
Mining	2	0
Manufacturing	62	24
Electricity	285	336
Construction	76	33
Wholesale, retail	73	67
Transport, storage	24	24
Communication	9	7
Financial, property	6	2
Public administration	10	22
Community services	102	101
Recreation, personal	413	53
Occupation inadequately described	115	63

APPENDIX 5TYPICAL NOISE EMISSIONS

Some typical measured noise levels near various items of quarrying/mining equipment are given below.

Loader at 7½ metres

92 dB(A) with octave-band frequency analyses :-

Hz	31	63	125	250	500	1K	2K	4K	8K
dB	90	93	86	86	86	88	86	83	76

Dump Truck at 7½ metres

92 dB(A), with octave-band frequency analysis :-

Hz	31	63	125	250	500	1K	2K	4K	8K
dB	88	93	87	86	85	86	85	80	77

Drill Rig 1 at 13½ metres

L_{10} value of 93 dB(A), with octave-band frequency analysis:-

Hz	31	63	125	250	500	1K	2K	4K	8K
dB	72	90	85	82	85	85	84	82	78

Drill Rig 2 at 7½ metres

Observed value 94 dB(A) with octave-band frequency analysis:-

Hz	31	63	125	250	500	1K	2K	4K	8K
dB	74	82	82	82	86	88	87	87	82

Primary Crusher at 20 metres

L_{10} value 89 dB(A), with octave-band frequency analysis:-

Hz	31	63	125	250	500	1K	2K	4K	8K
dB	75	81	84	81	83	81	81	78	69

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Secondary Crusher at 18 metres

Observed value 88 dB(A) with octave-band frequency analysis :-

Hz	31	63	125	250	500	1K	2K	4K	8K
dB	74	77	83	83	80	76	74	72	65

Screen at 20 metres

L_{10} value 78 dB(A) with octave-band frequency analysis :-

Hz	31	63	125	250	500	1K	2K	4K	8K
dB	67	73	69	66	72	73	77	73	63

Compressor at 7½ metres

Observed value 77 dB(A) with octave-band frequency analysis:-

Hz	31	63	125	250	500	1K	2K	4K	8K
dB	70	83	87	75	72	73	69	66	60

MINES	
File Ref.	RL 891
	- 9 M th 1989
Doc.	
Action/Office	LETTER
	8. 5. 89
	REFERS
Resubmit to	Date

ECONOMIC GEOLOGY OF
 THE LANGLOH COAL DEPOSIT
 EL 27/79 - HAMILTON
 PART 2
 PLANS 1 - 7

OPEN FILE

TO ACCOMPANY : APPLICATION FOR RL 891

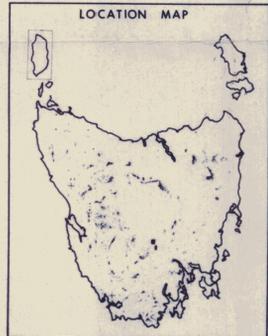
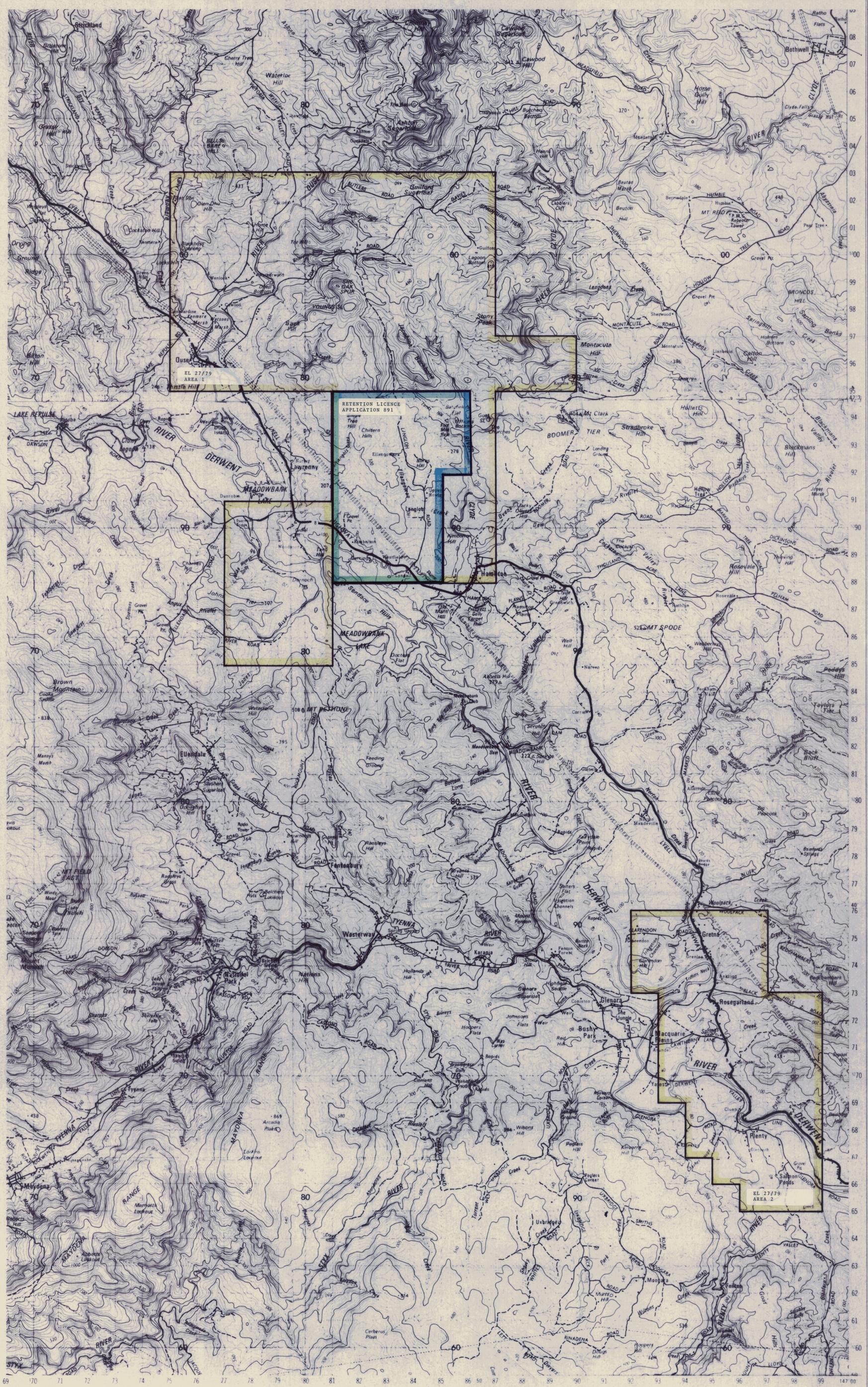
OPEN FILE

89-2956

VOL 2

LIST OF PLANS

- Plan 1. Location Map - EL 27/79, (Hamilton) and RL 891,
1 : 50,000
- Plan 2. Geology of the Langloh Coalfield, 1: 10,000
- Plan 3. Langloh Coal Project - Coal Seam Correlation
- Plan 4. Langloh Coal Project - Top Coal Structure
- Plan 5. Langloh Coal Project - Overburden Isopach Map
- Plan 6. Langloh Coal Project - Total Coal Isopach Map
- Plan 7. East Hill and West Hill Coal Deposits



PROJECTION: Universal Transverse Mercator (UTM)
 HORIZONTAL DATUM: Australian Geodetic Datum 1986
 VERTICAL DATUM: Australian Height Datum 1980
 ELEVATION: Contours are shown at 10m intervals
 GRID: 1000m squares
 COORDINATE SYSTEM: 1982
 MAGNETIC VARIATION: True and Magnetic North are shown
 METRIC UNITS: All measurements are in meters

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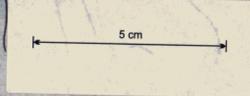
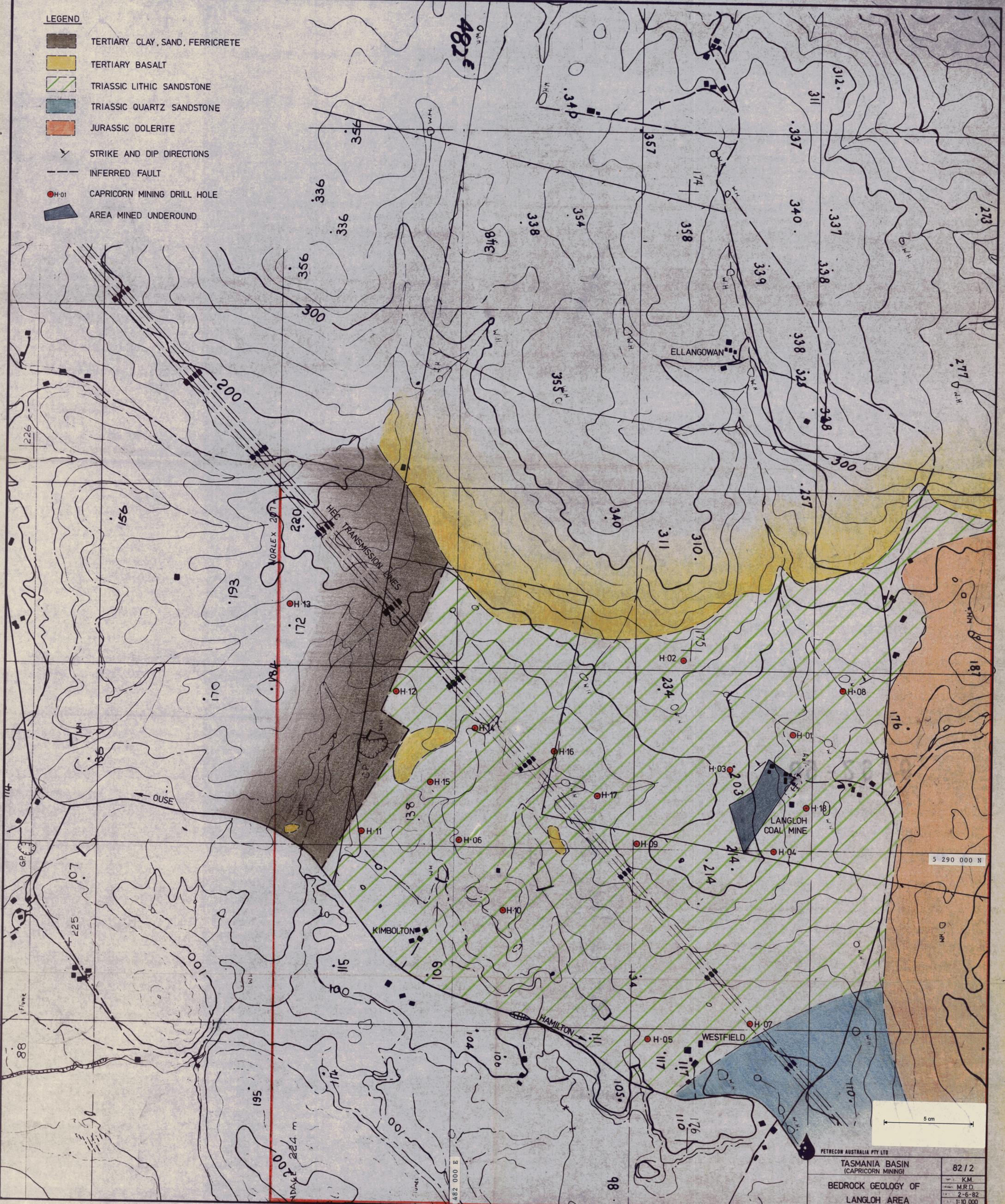
CAPRICORN MINING LIMITED

LOCATION MAP - EL 27/79 & RL 891

COMPILED	
DRAWN	
SCALE	
FIGURE	

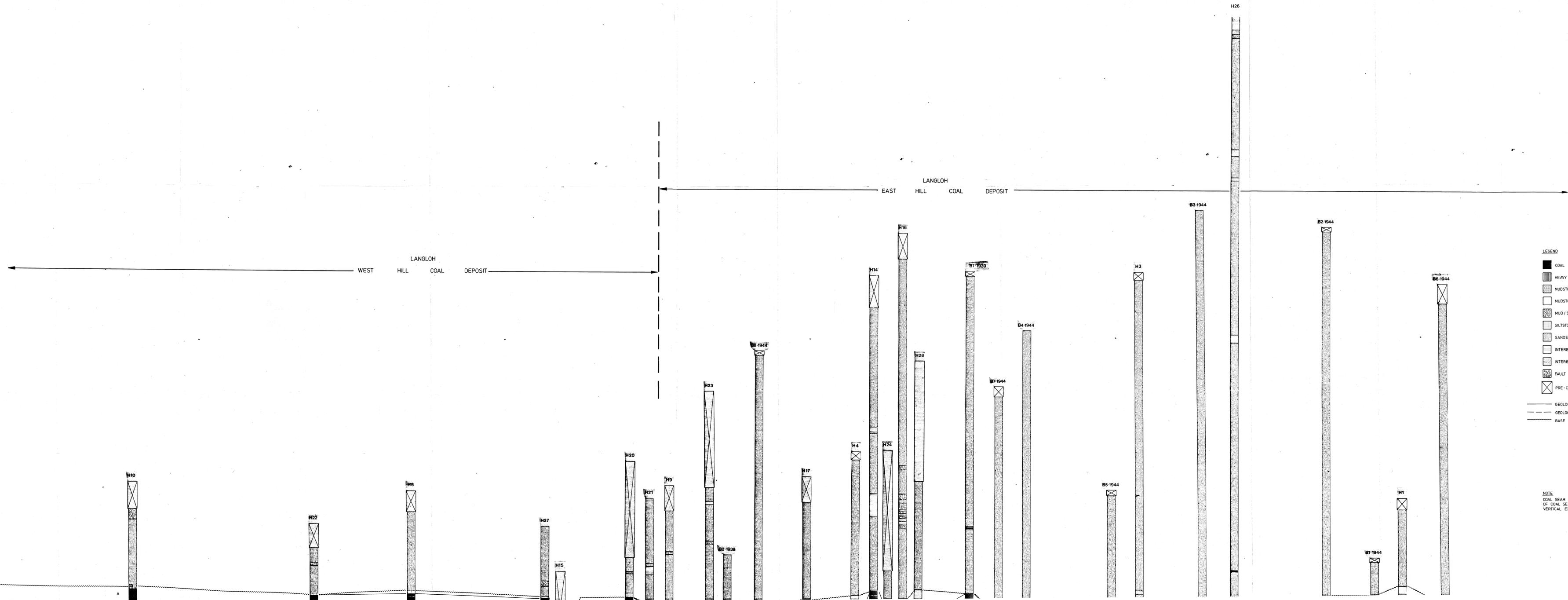
LEGEND

-  TERTIARY CLAY, SAND, FERRICRETE
-  TERTIARY BASALT
-  TRIASSIC LITHIC SANDSTONE
-  TRIASSIC QUARTZ SANDSTONE
-  JURASSIC DOLERITE
-  STRIKE AND DIP DIRECTIONS
-  INFERRED FAULT
-  CAPRICORN MINING DRILL HOLE
-  AREA MINED UNDERGROUND



PETRECON AUSTRALIA PTY LTD
 TASMANIA BASIN
 (CAPRICORN MINING)
 BEDROCK GEOLOGY OF
 LANGLOH AREA

8212
K.M.
M.R.D.
2-6-82
1:10 000

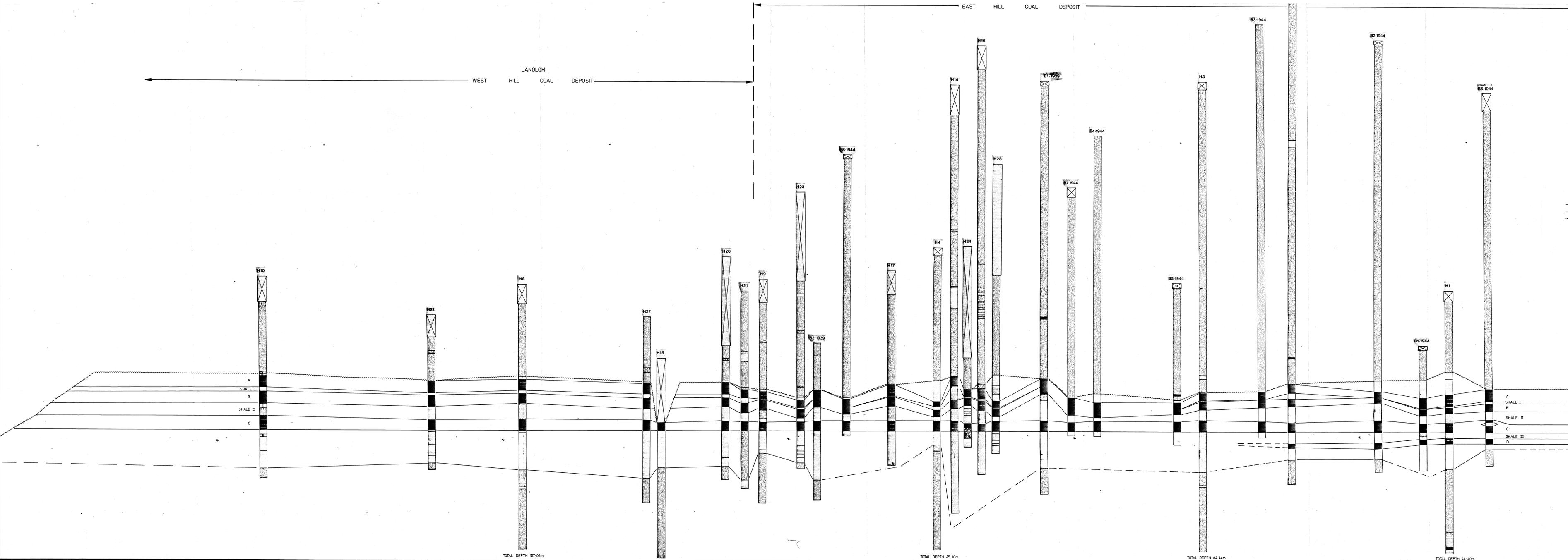


- LEGEND**
- COAL
 - ▨ HEAVY DULL COAL
 - ▤ MUDSTONE / SHALE (CARBONACEOUS)
 - ▥ MUDSTONE / SHALE (GREY / BROWN)
 - ▧ MUD / SILT PELLET CONGLOMERATE
 - ▩ SILTSTONE
 - SANDSTONE - LITHIC
 - INTERBEDDED MUDSTONE & SILTSTONE
 - ▬ INTERBEDDED SILTSTONE & SANDSTONE
 - ▭ FAULT BRECCIA
 - ⊠ PRE-COLLAR (NON-CORED SECTION OF HOLE)
 - GEOLOGICAL BOUNDARY - CORRELATION APPROXIMATE
 - - - GEOLOGICAL BOUNDARY - CORRELATION INFERRED
 - ~~~~~ BASE SANDSTONE ROOF

NOTE
 COAL SEAM CORRELATION BASED ON THE LONGITUDINAL PROJECTION OF COAL SEAMS ONTO A VERTICAL PLANE STRIKING 24° (TRUE).
 VERTICAL EXAGGERATION = 10:1

EAST HILL COAL DEPOSIT

WEST LANGLOH HILL COAL DEPOSIT



- LEGEND
- COAL
 - ▨ HEAVY DULL COAL
 - ▤ MUDSTONE / SHALE (CARBONACEOUS)
 - ▥ MUDSTONE / SHALE (GREY / BROWN)
 - ▧ MUD / SILT PELLET CONGLOMERATE
 - ▩ SILTSTONE
 - SANDSTONE - LITHIC
 - INTERBEDDED MUDSTONE & SILTSTONE
 - ▬ INTERBEDDED SILTSTONE & SANDSTONE
 - ▭ FAULT BRECCIA
 - ⊠ PRE-COLLAR (NON-CORED SECTION OF HOLE)
 - GEOLOGICAL BOUNDARY - CORRELATION APPROXIMATE
 - - - GEOLOGICAL BOUNDARY - CORRELATION INFERRED
 - ⋯ BASE SANDSTONE ROOF

NOTE
 COAL SEAM CORRELATION BASED ON THE LONGITUDINAL PROJECTION OF COAL SEAMS ONTO A VERTICAL PLANE STRIKING 24° (TRUE).
 VERTICAL EXAGGERATION = 10:1

TOTAL DEPTH 157.06m

TOTAL DEPTH 45.10m

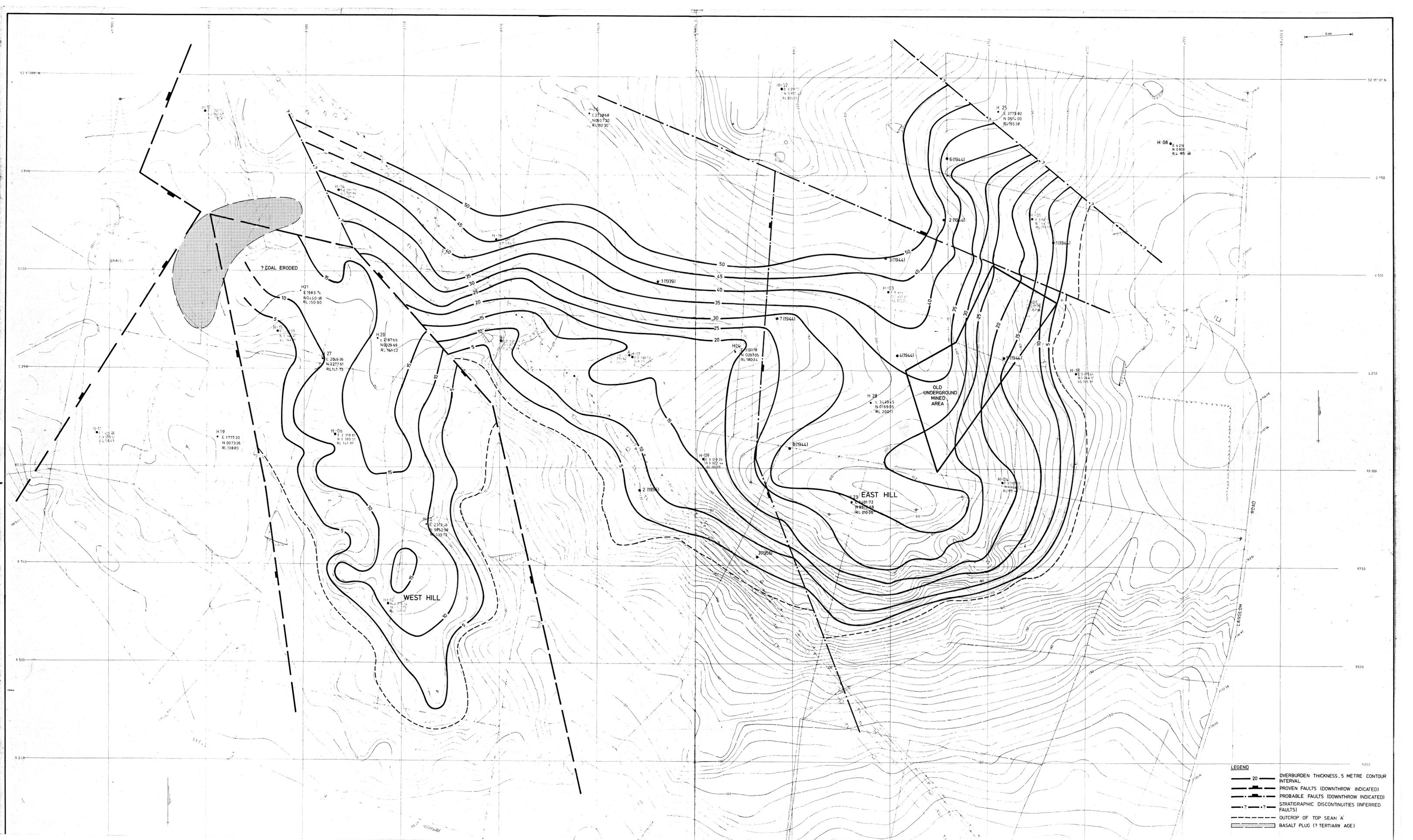
TOTAL DEPTH 84.44m

TOTAL DEPTH 44.40m

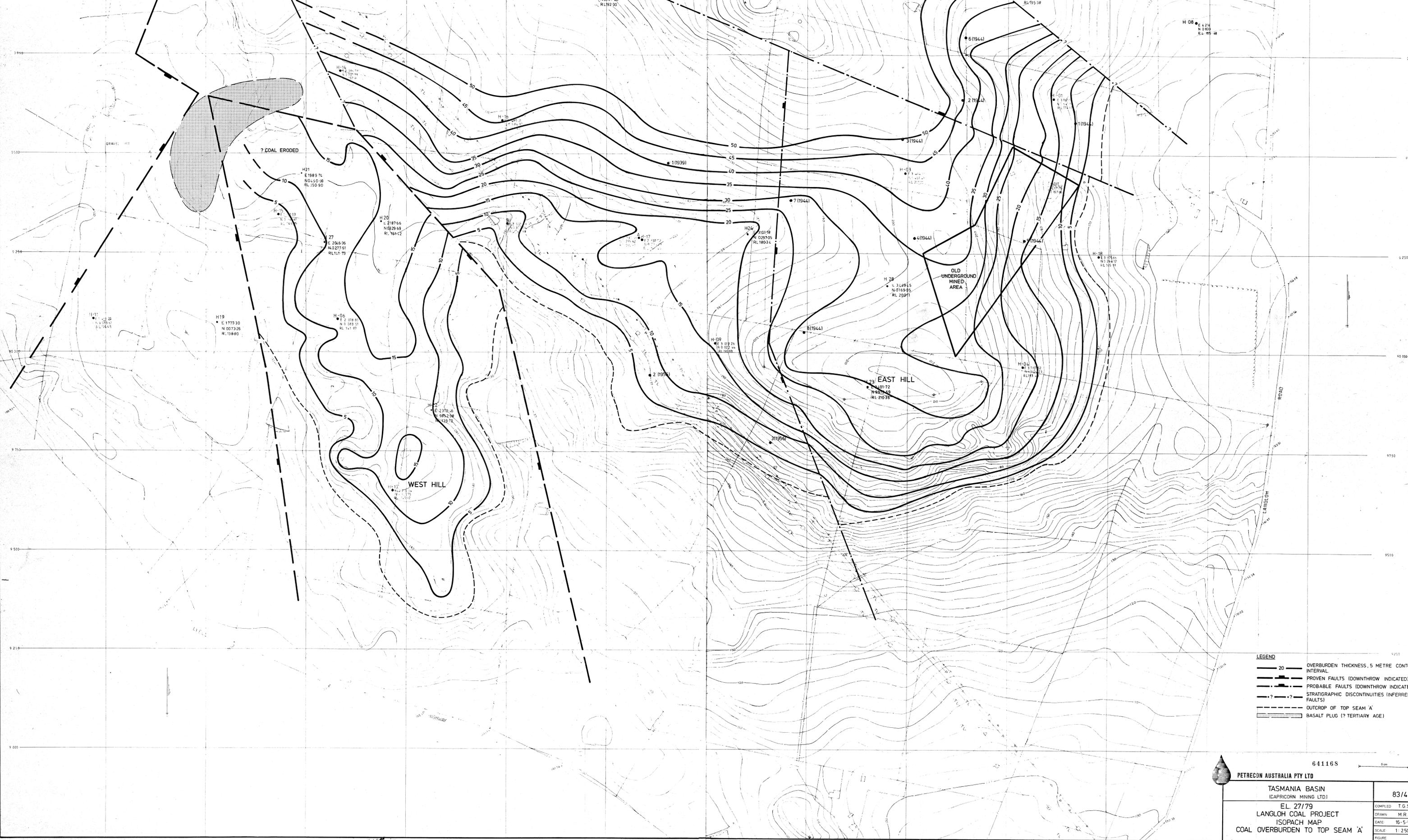
89-2956
 641166
 TASMANIAN BASIN
 LANGLOH COAL PROJECT
 COAL SEAM CORRELATION



- LEGEND**
- 165 — TOP COAL LEVEL, 5 METRE CONTOUR INTERVAL.
 - PROVEN FAULTS (DOWNTHROW INDICATED)
 - PROBABLE FAULTS (DOWNTHROW INDICATED)
 - ? — STRATIGRAPHIC DISCONTINUITIES (INFERRED FAULTS)
 - — — — — OUTCROP OF TOP SEAM A
 - ▨ BASALT PLUG (? TERTIARY AGE)



- LEGEND**
- OVERBURDEN THICKNESS, 5 METRE CONTOUR INTERVAL.
 - PROVEN FAULTS (DOWNTHROW INDICATED)
 - PROBABLE FAULTS (DOWNTHROW INDICATED)
 - STRATIGRAPHIC DISCONTINUITIES (INFERRED FAULTS)
 - OUTCROP OF TOP SEAM 'A'
 - BASALT PLUG (? TERTIARY AGE)



- LEGEND**
- 20 — OVERBURDEN THICKNESS, 5 METRE CONTOUR INTERVAL.
 - PROVEN FAULTS (DOWNTHROW INDICATED)
 - PROBABLE FAULTS (DOWNTHROW INDICATED)
 - STRATIGRAPHIC DISCONTINUITIES (INFERRED FAULTS)
 - OUTCROP OF TOP SEAM 'A'
 - BASALT PLUG (? TERTIARY AGE)

641168

5m

PETRECON AUSTRALIA PTY LTD

TASMANIA BASIN (CAPRICORN MINING LTD) EL. 27/79 LANGLOH COAL PROJECT ISOPACH MAP COAL OVERBURDEN TO TOP SEAM 'A'	83/4 COMPILED T.G.S. DRAWN M.R.D. DATE: 16-5-'83 SCALE: 1:2500 FIGURE
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- LEGEND**
- 3.6 TOTAL COAL THICKNESS (SEAMS A+B+C+D), 0.3 METRES CONTOUR INTERVAL
 - PROVEN FAULTS (DOWNTHROW INDICATED)
 - PROBABLE FAULTS (DOWNTHROW INDICATED)
 - STRATIGRAPHIC DISCONTINUITIES (INFERRED FAULTS)
 - OUTCROP OF TOP SEAM 'A'
 - BASALT PLUG (?) TERTIARY AGE)

CROSS SECTION OF DRG. 82/76

? COAL ERODED

OLD UNDERGROUND MINED AREA

EAST HILL

WEST HILL

LYELL

ROAD

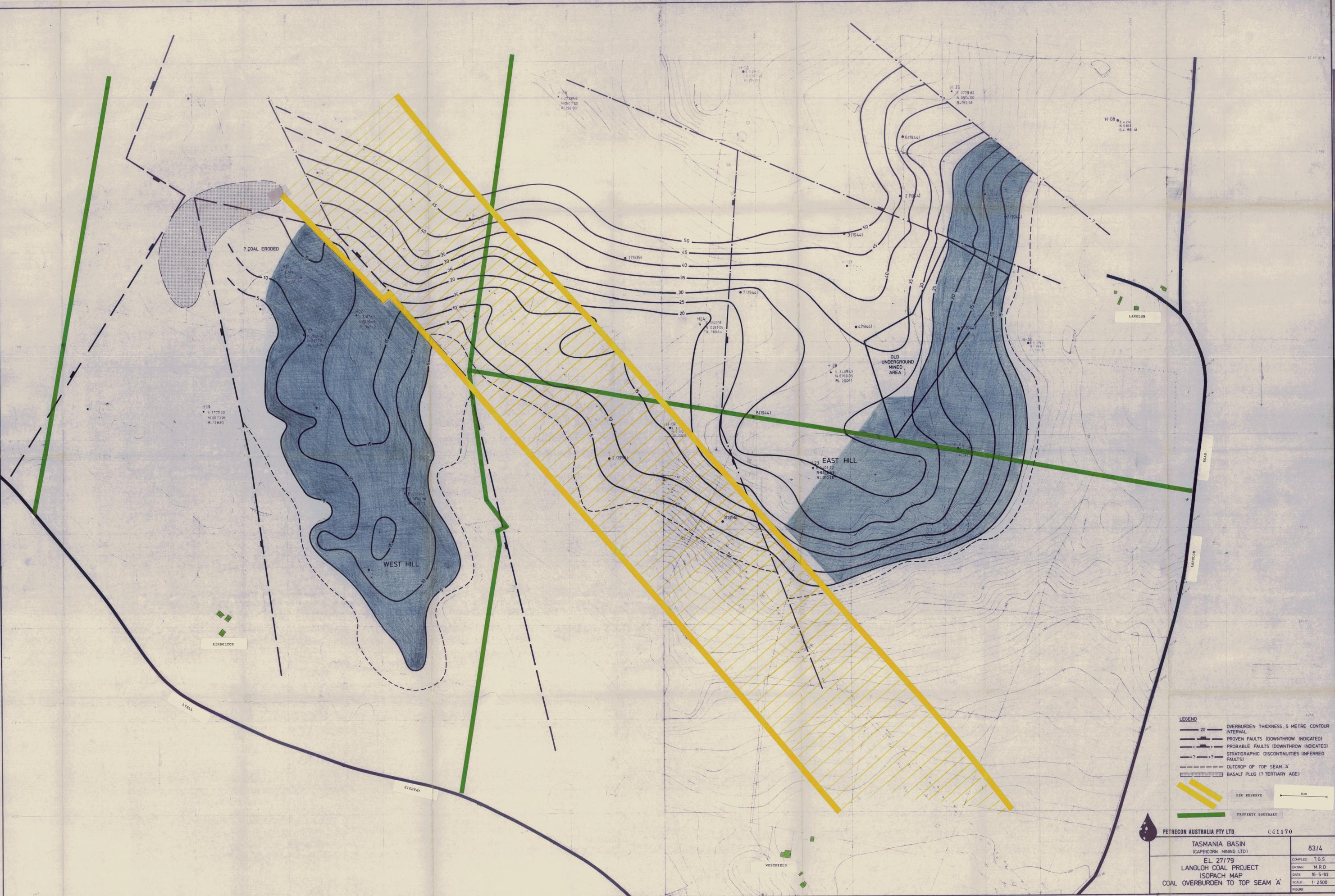
ROAD

HIGHWAY

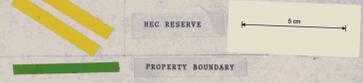
GRAVE







- LEGEND**
- 20 — OVERBURDEN THICKNESS, 5 METRE CONTOUR INTERVAL
 - — — — — PROVEN FAULTS (DOWNTHROW INDICATED)
 - — — — — PROBABLE FAULTS (DOWNTHROW INDICATED)
 - — — — — STRATIGRAPHIC DISCONTINUITIES (INFERRED FAULTS)
 - — — — — OUTCROP OF TOP SEAM 'A'
 - ▨ BASALT PLUG (? TERTIARY AGE)



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TASMANIA BASIN (CAPRICORN MINING LTD)	83/4
EL. 27/79 LANGLOH COAL PROJECT ISOPACH MAP COAL OVERBURDEN TO TOP SEAM 'A'	COMPILED T.G.S. DRAWN M.R.D. DATE 16-5-'83 SCALE 1:2500 FIGURE
PLAN 7	

89-2956