

SHEET 2131														
GENERAL FEATURES		PHYSICAL PROPERTIES					CURRENT PROCESSES		SUITABILITY FOR SPECIFIED USES			NOTES		
Map Unit	Description	Relief: Slope 4	Industrial Potential	Shear Compressive Strength	Compressive Strength	Shrink Swell Potential	Ease of Construction	USC	Foundation	Road Fill	Base Course		Drainage	Excavation
Unconsolidated														
S ₁	SAND - yellow-brown, fine to medium, sub-angular quartz, no fines, moderately to well sorted, contains occasional well rounded pebbles of quartz	220-250 m; F	Low quality sand and fill	H	L	H	N	N	M	SP				Unlimited area extent, some reworking evident
S ₂	SAND - brown to strong brown, fine to medium, sub-angular quartz, some fine, typically located at surface, poorly sorted	200-300 m; G	Fill sand	H	L	H	L	N	N	H	SW			Occurs in upper reaches of valleys, large colluvial deposits
S ₃	SAND - white to pale grey, fine to medium, occasionally coarse, angular to sub-angular quartz, little fine, poorly to moderately sorted	200-280 m; F	Low quality sand and fill	H	L	H	L	N	N	H	SW			Aluvial sand of broad, shallow valleys, well drained, high water table, prone to flooding in wet weather, unsuitable for foundations in areas subject to inundation
S ₄	SAND - grey to strong brown, fine, sub-angular quartz, well sorted, located at surface	210-280 m; F	Fill sand	H	L	H	L	N	N	M	SP			Generally restricted to fluvial channel with seasonal flow, unsuitable for foundations in areas subject to inundation
S ₅	SAND - pale grey, medium to coarse, angular to sub-angular quartz, no fines, moderately well sorted, some fine to coarse sub-rounded quartz pebbles at top	210-220 m; F	High quality sand and fill	H	L	H	L	N	N	M	SP			Isolated deposit on ridge crest west of Shotts
S ₆	SAND - white to pale grey, fine to coarse, sub-angular quartz, poorly sorted, little fine, occasionally some pebbles of round quartz	200-220 m; F-G	Low quality sand and fill	H	L	H	L	N	N	H	SW			Occurs as fill in interfluvies
Sm ₁	CLAYEY SILTY SAND - pale yellow-brown, mottled, fine to medium, angular quartz, well rounded psittic gravel at top, broken quartz veins common in places	220-300 m; F-G		M	L	M	L	N	L	M	SM			Completely weathered granite material, generally in situ
Sm ₂	CLAYEY SILTY SAND - greyish brown, mottled, fine sub-angular quartz with silt matrix containing some clay	200-260 m; F		M	L	M	L	N	L	M	SM			Aluvial sand of broad shallow valley upstream of Muja Dam, prone to flooding
Sm ₃	GRAVELLY SILTY SAND - as S ₅ but more silt in matrix and common well rounded psittic gravel	240-280 m; G		M	L	M	L	N	L	M	SM			Colluvial valley fill
Sm ₄	PEATY SAND - black, highly organic, medium, sub-angular quartz, unsorted	230-270 m; F		L	M	L	M	L	N	L	M	SM-P		Seasonal flooding
G ₁	GRAVEL - yellow-brown to dark reddish brown, ferruginous or brown, psittic and irregular shapes, poorly sorted, variable amounts of sand and silt in matrix	200-320 m; G	Gravel	H	L	H	L	N	N	H	GW			Widely distributed colluvial gravels found on gentle slopes
G ₂	GRAVEL - as G ₁ but black, individual psittic exhibit coating, partial or total replacement by magnetite	240-250 m; F	Gravel	H	L	H	L	N	N	H	GW			Isolated occurrences of limited area extent
G ₃	GRAVEL - yellow-brown to reddish brown, irregularly shaped, poorly sorted, some medium to coarse angular quartz sand, bound in magnetite, associated with LA ₁	220-300 m; G	Gravel	H	L	H	L	N	N	H	GW			Small, isolated patches in south of sheet
G ₄	SANDY GRAVEL - coarse, sub-angular to rounded quartz gravel matrix, of fine to medium sub-angular quartz sand, coarser	210-220 m; G		H	L	H	L	N	N	H	GW			Associated with LA ₁ north-west of Shotts
G ₅	SILTY SANDY GRAVEL - gravel sized rock fragments and occasional psittic (silt) in strong brown matrix of fine to medium sub-angular quartz sand and silt binder	220-280 m; G		M	L	M	L	N	L	M	SM			Colluvial material along valley slopes
M ₁	SILT - white, leached firm, friable, trace of fine angular quartz, broken quartz	220-230 m; F	3 Structural clay products											Small outcrop in former valley north-west of Shotts, may be oversteepened and redifferentiated weathered granitic material
LA ₁	SANDY SILT - pale yellow-brown, mottled, some fine sub-angular quartz sand disseminated throughout, firm, friable	220-250 m; F		L	M	L	M	L	L	M	SM			Aluvial valley fill, generally restricted to channels with seasonal flow in northern part of sheet
LA ₂	GRAVELLY SANDY SILT - black, silt, saturated silt containing fine, angular to sub-angular quartz sand and silt, well rounded quartz	210-230 m; F		L	M	L	M	L	L	M	SM			Isolated deposits along margins of Collie River floodplain
LA ₃	LATERITE - massive, friable to strongly indurated, occasionally vesicular, iron rich, developed on granite	220-360 m; F-G	Bauxite	H	N	A	M	N	A	N	L	N		Extensive deposits of variable thickness on ridge crests, requires blasting for excavation
LA ₄	LATERITE - massive, ironstone cemented gravels (G ₂) at a lower level, often beneath willy sediment	220-320 m; F-G	Bauxite	H	N	A	M	N	A	N	L	N		Iron cemented colluvial gravels (G ₂) found on lower slopes, requires blasting for excavation
LA ₅	LATERITE - massive, indurated, nodular and vesicular, iron cemented, much fine to medium angular quartz and occasionally some fine well rounded quartz and quartzite pebbles	210-280 m; F-G		H	N	A	M	N	A	N	L	N		Extensive deposits occurring on ridge crests within coal basin, is laterized and iron cemented silt south of Shotts (see adjoining Collie sheet)
LA ₆	LATERITE - as LA ₅ but contains abundant coarse, well rounded quartz pebbles	220-230 m; G		H	N	A	M	N	A	N	L	N		Small outcrop north-west of Shotts
LA ₇	LATERITE - pale brown to strong reddish brown, medium to coarse, angular, psittic quartz and occasional rounded quartz pebbles in a limestone matrix	220-300 m; F-G		H	N	A	M	N	A	N	L	N		Extensive deposits occurring on ridge crests in south-east part of sheet
GR	GRANITE - fine to coarse even-grained and variate granitic, quartz monzonitic and syenitic granitic rocks	220-360 m; M-S	Crushed rock	H	N	A	N	A	N	A	N	N		Extensive outcrops along flanks of deeply incised valleys
DO	DOLERITE - fine-grained, mafic, 2-30 m wide dykes trending east to north-east, intruded into granitic rocks	240-300 m; M-S	Crushed rock	H	N	A	N	A	N	A	N	N		Generally trending north-east to south-west throughout the granitic terrain
Q	QUARTZ - mainly as flows and reefs associated with faulting in granitic rocks	220-260 m; M-S	Crushed rock	H	N	A	N	A	N	A	N	N		Associated with faulting in granitic terrain along Collie River

- 1 See Lithological Classification
- 2 These terms are used in the engineering sense of "soil" and "rock". The term "soil" denotes an aggregate of mineral grains which can be separated by gentle mechanical means. The term "rock" denotes an aggregate of minerals connected by strong and permanent forces
- 3 Maximum and minimum elevation of the unit with respect to Australian Height Datum
- 4 Slopes expressed qualitatively: F-flat; G-gentle; M-moderate; S-steep; SW-very steep. The dominant slope of each unit is given
- 5 H - high; M - moderate; L - low; N - none; N/A - not applicable
- 6 Unified Soil Classification System which describes soils in terms of grain size, grading characteristics and compressibility. N/A - not applicable
- 7 X - land use undesirable for the environment; + - environment unsuitable for the land use; - - - - - possible problems for the environment; - - - - - possible problems for the land use; - - - - - land use compatible with unit
- 8 Subdivided into three classes on the basis of the rock mass classification devised by Selby (1980), 2. Glenelg, R.F., 24, No. 1, p. 31-51. 1 - moderate; 2 - strong; U - undifferentiated
- 9 Assessed in terms of the mineral resource potential of the unit

The data contained on this sheet are provided for preliminary studies and are not intended as a substitute for detailed on-site investigation

LITHOLOGICAL CLASSIFICATION

UNCONSOLIDATED MATERIAL

A single capital letter denotes the main lithology of the soil unit, followed, if required, by lower case letters denoting qualifying lithologies in descending order of importance - left to right

C - clay; G - gravel; M - silt; P - organic material; S - sand

ROCK

Double capital letters denote lithological symbols of rocks

LA - Laterite; DO - Dolerite; GR - Granite; QT - Quartzite

Different mappable units of similar lithologies are shown by the lithological symbol followed by an Arabic number

SYMBOLS

GEOLGY - geological boundary; Disturbed ground, Muja Power Station and associated works

COAL MINE FEATURES

underground extent of abandoned mines; underground extent of working mines; area affected by mining; current excavation; area of backfill; steep angled (35°) spoil dumps; low angled (14°) spoil dumps; areas of ground collapse; carbonaceous waste; lake; abandoned collapse features; see reverse side for details of potential mines and open cuts and coal mine status

HYDROLOGY

general stream with direction of flow; seasonal stream with direction of flow; marsh; lake; depth (metres) figure on high side of line; depth to groundwater, metres; area subject to inundation; production bore development area

BOREHOLES, WELLS AND OTHER WORKS

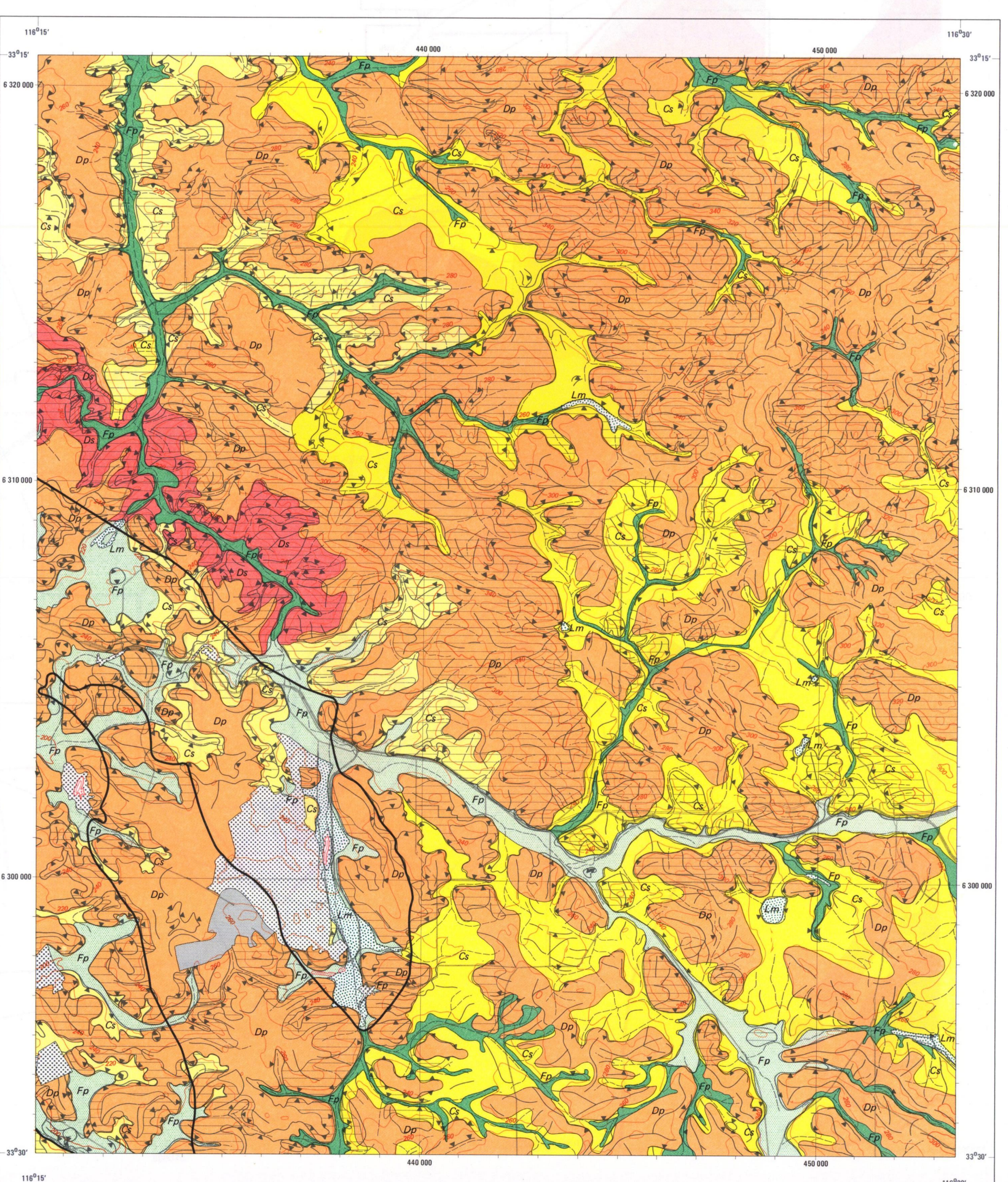
production borehole; pipeline; storage pond; drain; solid waste disposal site, active

MINERAL RESOURCES

quarry or pit, active; quarry or pit, inactive; mineral occurrence; clay; gravel; sand

TOPOGRAPHICAL INFORMATION

road, classification as shown; railway; powerline; townsite boundary; local authority boundary; mine fence boundary; contour in metres



GEOMORPHOLOGY

GEOMORPHOLOGICAL CLASSIFICATION

Area affected by mining; Muja Power Station; Broad shallow sandy valley floors; Gently undulating lateritic uplands; Narrow alluvial valley floors; Broad valleys with gentle slopes

ORIGIN

Lacustrine; Fluvial; Pluvial; Denudational; e.g. Denudational slope

LANDFORM

Slope; Ridge; Plain; Marsh; e.g. fluvial plain

SLOPES

0°-3°; 3°-10°; 10°-20°; 20°-30°

FEATURES

Prominent ridge; Prominent valley; Sharp convex break of slope; Sharp concave break of slope

Published by and available from Geological Survey of Western Australia, 68 Adelaide Terrace, Perth. Cartography by the Mapping Branch, Survey and Mapping Division, Department of Mines. Topographic base from compilation by the Department of Land Administration, Canberra from Department of Conservation and Land Management. Printed by the Government Printing Office, Perth, 1987.

Bibliographic Reference: Gossard, J. R. and Jordan, J. E. 1987 Muja Sheet 2131 II, Environmental Geology Series, Geological Survey of Western Australia.

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P. L. PLAYFORD, DIRECTOR, GEOLOGICAL SURVEY

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MUJA

SHEET 2131 II

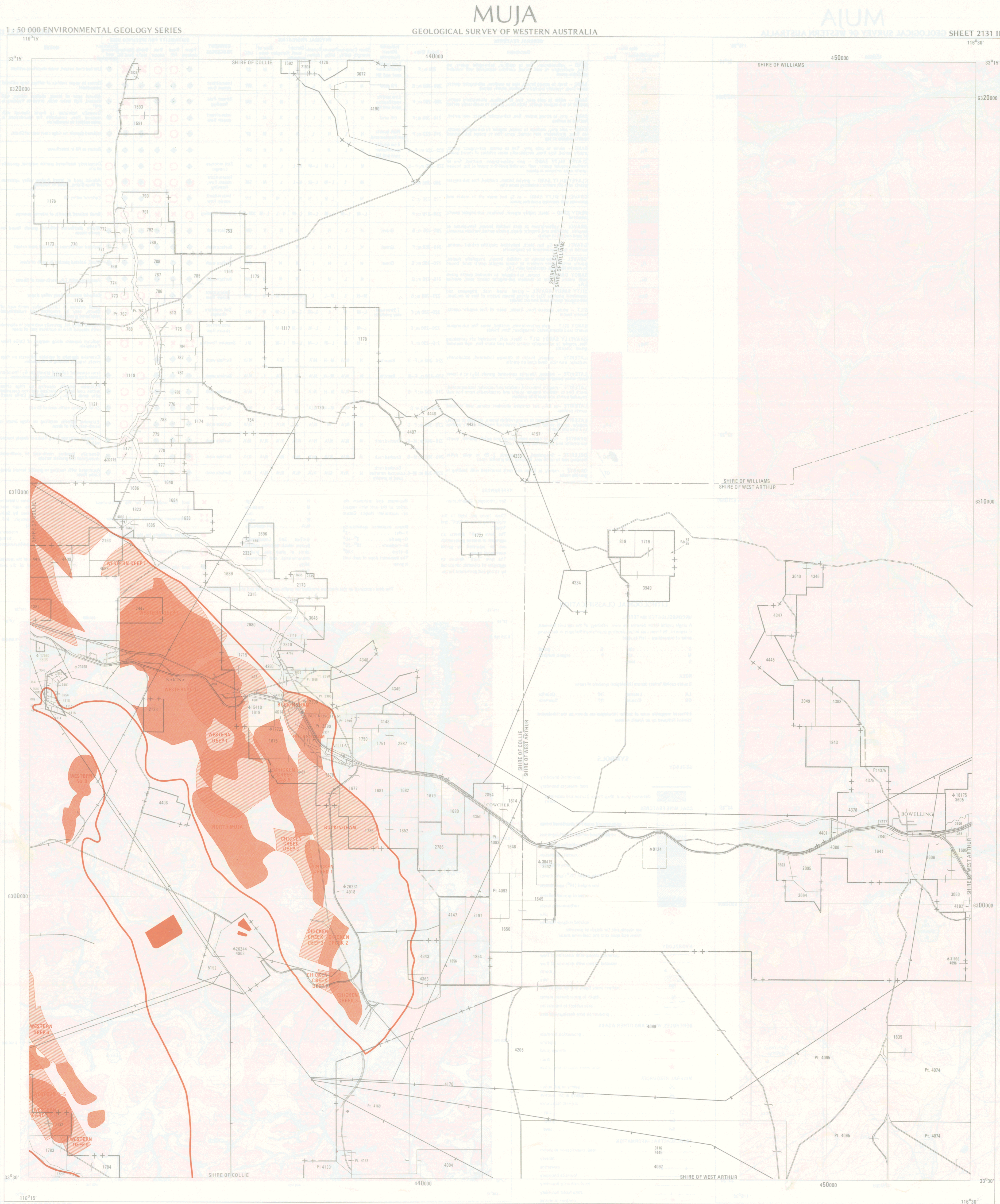
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SCALE 1 : 50 000

KILOMETRES

SCHEMATIC CROSS-SECTION TO SHOW THE RELATIONSHIP OF THE UNITS

Vertical exaggeration x 12.5



COLLIE COAL MINE STATUS

MINE NAME	TYPE ¹	PHYSICAL DESCRIPTIVE PARAMETERS																				
		Location (distance from Collie, km)	Area affected by mining (ha.)	Area of water (ha.)	Year opened	Year closed	Quantities produced (tonnes)	Sinks mined	Member	Depth of cover (metres)	% extracted	Safety hazard		Accessibility ⁴	Visibility ⁴	Waste dumps	Overcast unroofed	Shafts uncovered and unroofed	Abandoned plant and machinery	Derelict buildings and structures	Close to habitation and main roads	
												type	hazard ⁴									
WESTERN No. 3	OC	15	99	9	1954	1958	1 685 927	Mura Stockton Wailand	Ewington	10-70	90	Hot ash	L	M	VH	Yes	Yes		No	No	No	
WESTERN No. 4	UM				1958	1969	742 190	Mura Stockton Wailand	Ewington	15-143	47											
WESTERN No. 5	OC	17	600	4	1970		9 350 344 ²	Cardiff North Wyvern	Cardiff Collaburn	10-50	92	current mine		M-H	VH	current mining operations					No	
WESTERN No. 6	UM				1976		1 174 232 ²	Wyvern	Collaburn	15-120	20	current mine		M-H	H	current mining operations					No	
PREMIER	UM	12	17	0.5	1911	1927	475 597	No. 4	Premier	15-152	41	Hot ash collapses	M	M	M-H	L	Yes		No	No	Yes	Yes
WESTERN No. 1	UM	14			1952	1956	341 173	No. 1, No. 2	Premier	10-33	22	Hot ash collapses	L	M	L-W	L	Yes		Yes	No	Yes	No
CHICKEN CREEK	OC	16			1981		809 678 ²	Centaur	Premier	10-20	95	current mine		M-H	VH	current mining operations					No	
MUJA	OC	20	775	5	1953		24 626 780	2, 3 Iron, Mabo, Gahewa, Pines, Iron, Dana, Ceres, Bellona, Aul	Muja	15-110	95	current mine		M-H	VH	current mining operations					No	
HERE	UM	20			1954	1965	1 209 822	Hake	Muja	15-199	18		L	L	workings exposed in Muja open cut							
CENTAUR	UM	22			1951	1957	173 686	Centaur	Premier	9-58	37	Hot ash	M	M-H	VH	Yes		Yes	Yes	Yes	No	
	OC	20				Centaur	Premier			Water drains	M	H	VH	Yes	Yes		No	No	No			

REFERENCES

1 UM Underground mine
OC Open cut

2 Figures to 31-12-85

3 Include Centaur open cut

4 L low
M moderate
H high
VH very high

- LEGEND
- Potential open cut
 - Potential deep mine
 - Coal stockpile area
 - Coal measures boundary

POTENTIAL MINES and OPEN CUTS

