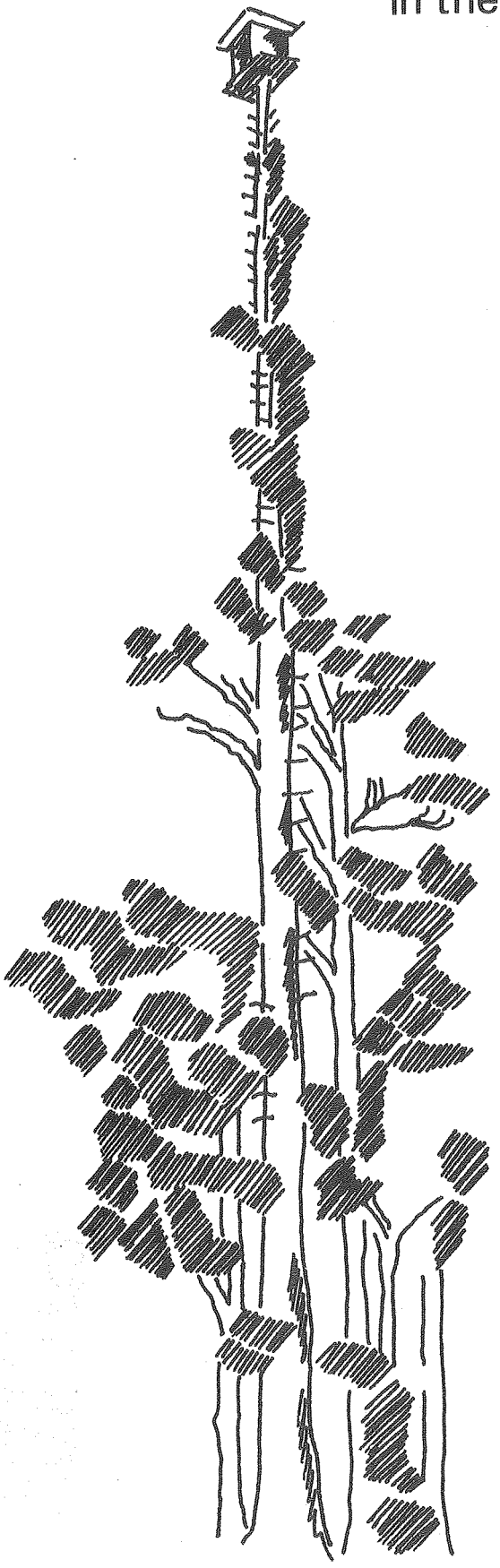
Report on Crown Land for Release to Agriculture or for Pine Production in the Manjimup Shire



FORESTS DEPARTMENT
PRODUCTION
PROTECTION
RECREATION
CONSERVATION
WESTERN AUSTRALIA

Western Australian
Department of Agriculture

RELEASE OF CROWN LAND FOR AGRICULTURE

OR PINE PLANTATIONS IN THE MANJIMUP SHIRE

Prepared by a Joint Study Group from

The Departments of Agriculture and Forests

October 1984

RELEASE OF CROWN LAND FOR AGRICULTURE OR PINE PLANTATIONS IN THE MANJIMUP SHIRE

Page

FIGURES

TABLES

APPENDICES

SUMMARY

A joint Study Group was convened in April 1984 from the Departments of Agriculture and Forests to investigate the suitability of Crown Land in the Manjimup Shire for release to agriculture or conversion to pine plantation. The objective of the study was to find land in the Shire to assist the Government in its programme to plant 500 hectares of pine in the region each year to meet a deficit resulting from declining hardwood yields.

Vacant Crown Land (VCL), State Forest and Forest Act Timber Reserves not encumbered within the proposed South Coast Park, Shannon Park, Nature Reserves, National Park and Management Priority Areas for Conservation were considered. On State Forest and Forest Act Timber Reserves, only non-forest or poor forest types were reviewed.

The main conclusions from the Study were:

1. Up to 2860 ha of Crown Land in the Manjimup Shire may be suitable for release for agricultural development.

2. Preliminary examination of soil type and profitability indicates that 1610 ha of this area, comprising 710 ha Vacant Crown Land and 900 ha of State Forest, would support profitable farms or viable run-off blocks.

3. A further 1250 ha comprising 450 ha Vacant Crown Land and 800 ha of State Forest, may support viable run-off blocks.

4. The areas in 2 and 3 above are also suited to pine planting.

5. A further 4 300 ha of non-forest country within State Forest may prove suitable for pine establishment.

6. Areas concerned are conditional on the results of further detailed survey. Proposed pine areas generally would require the inclusion of some better quality soil areas or association with established plantations.

7. Any requirement for significant additional areas to those above would require clearing of medium to high quality hardwood forest on State Forest or inclusion of areas outside of the Shire boundary.

The Study Group recommends that:

(a) To commence the programme areas suitable for agriculture should be considered for release to compensate for a similar area of farmland being planted to pines.

(b) Non-forest and associated areas in State Forest be further considered to provide additional pine planting areas within the programme.

PREAMBLE

In October 1983 the Premier advised the Manjimup Shire that the Government was committed to the planting of 500 hectares of pine per year in the Manjimup region. The programme would provide for the establishment of a large softwood-based industry in the Shire.

The new industry was desirable to compensate for the declining hardwood cut and would ensure that long term deficits in the hardwood resource, accentuated by the creation of the Shannon National Park were replaced. The programme, which involved the purchase of farmland as one option for obtaining suitable land for pines, had been under consideration by the previous Government.

The Manjimup Shire is concerned to ensure that the profitable agricultural base in the Shire should be maintained and has suggested that all further pine planting should be in State Forest. The Premier has indicated that the destruction of good quality hardwood forest for pine planting will not be considered but that a number of options were being investigated to resolve the problem of obtaining suitable areas for pine planting. These are:

1. Exchange Crown Land suitable for agriculture for agricultural land which is more suitable for pine plantation establishment. Significant areas of Crown land and even land within State forest do not carry hardwood forest.

2. Purchase agricultural land not required for horticultural production for conversion to pine plantations.

3. Co-operative arrangements in which suitable freehold farmland would be used for pines, are being considered. An annual rental for lease of the land could be paid.

4. The establishment of pine forest on cleared land within the Warren Catchment. This could have the additional benefit of reducing stream salinity.

5. The establishment of pine plantations on Vacant Crown Land and State forest which does not support good quality hardwood forest.

A combination of these strategies is likely to achieve the objective of establishing a softwood-based industry in a manner mutually beneficial to individual farmers, the community and the State.

At the request of the Hon Premier and Minister for Forests the Acting Conservator of Forests contacted the Director, Department of Agriculture on April 2nd 1984 to set up joint working parties to examine in detail firstly the application of agroforestry and secondly the possible release of Crown land for farming or plantation forestry in the Manjimup area.

This report concerns only the possibilities for release of Crown land in the Manjimup Shire to assist pine plantation proposals.

THE STUDY GROUP

The Study Group nominated comprised

Dr E R Hopkins, Forests Department (Convenor)

Mr T C Stoneman, Department of Agriculture

Mr K E Hawley, Department of Agriculture, Manjimup
Mr A R Lush, Forests Department, Manjimup
Dr D A Morrison, Department of Agriculture
Mr B Mattinson, Department of Agriculture

In practice, most field evaluation and report compilation was effected by

Mr B K Kingdom, Department of Agriculture, Manjimup
Mr D J Stanton, Department of Agriculture, Bridgetown
Mr M E Rayner, Forests Department, Manjimup

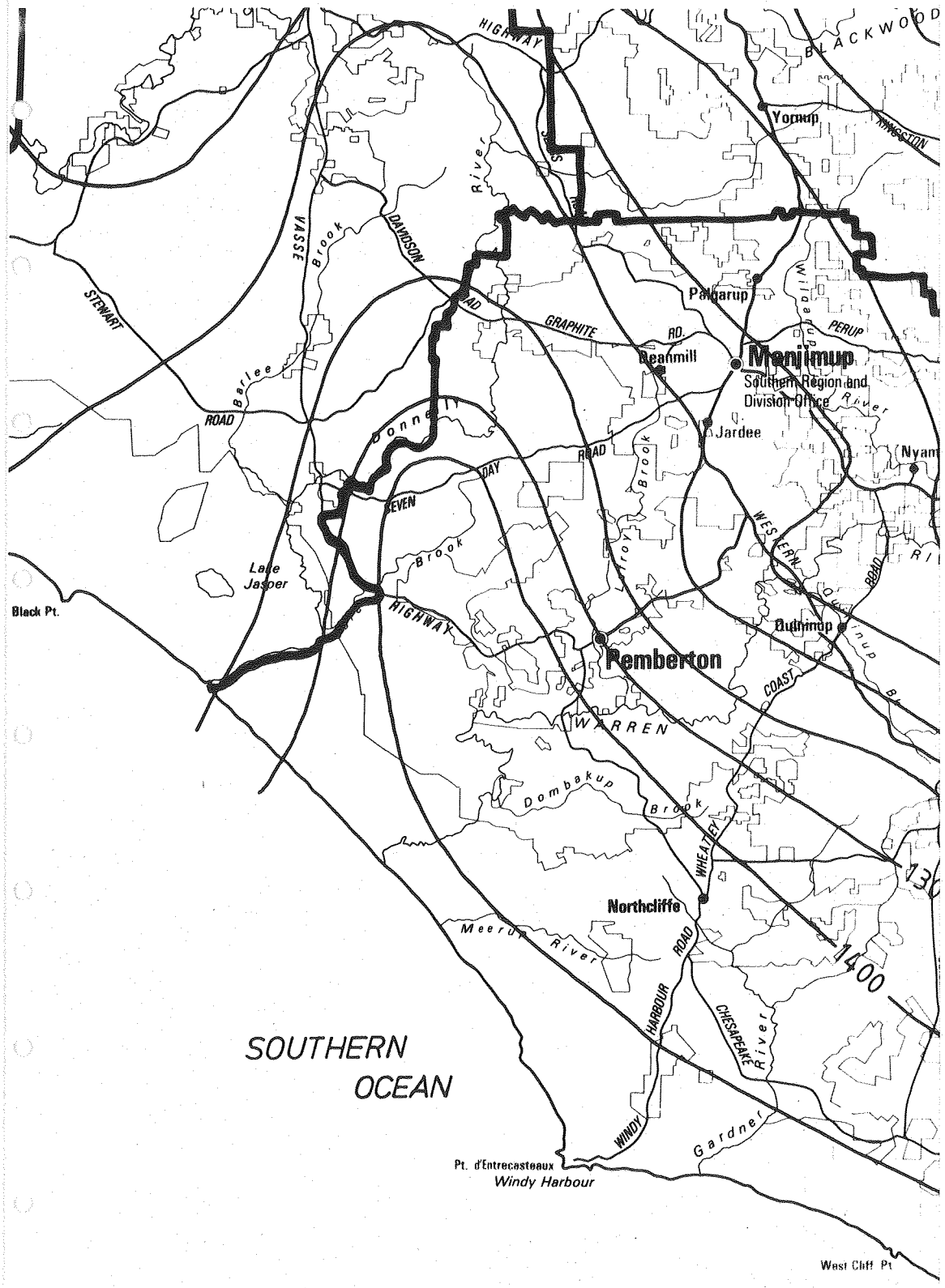


FIG. 1

MAP SHOWING MANJIMUP SHIRE
AND ISOHYETS
SCALE 1:500 000

TERMS OF REFERENCE

The terms of reference adopted by the Study Group were

TO INVESTIGATE AND REPORT ON THE SUITABILITY OF CROWN LAND IN THE MANJIMUP SHIRE FOR RELEASE TO AGRICULTURE OR CONVERSION TO PINE PLANTATION

These terms were qualified by the following conditions

(i) It was understood that further release for agriculture would be to maintain the current area of agricultural land within the Manjimup Shire in response to the conversion of existing agricultural land to pine plantations. The study was hence restricted to land within the Shire boundaries.

(ii) Only non-forest or areas of dedicated forest land of marginal productivity would be considered for conversion to pines or agriculture.

(iii) Crown land proposed for conservation purposes or National Parks, was exempt from the study.

(iv) An answer within a reasonable time frame was required. Although most sites were inspected in the field, boundary, soil and economic surveys adequate to finalise evaluations for release were not conducted.

(v) It was assumed that further action on the Group recommendations would be referred to the Environmental Protection Authority's Working Group on Land Release. Hence no special effort was made by the Group to evaluate the ecological significance of the release proposals.

STUDY PROCEDURE

Vacant Crown Land (VCL) Areas for Examination

The areas of the many land tenures involved in the Manjimup Shire were obtained from the Forest Management Information System (FMIS) as set out in Table 1. Of approximately 700 000 hectares total land area in the Shire, 419 000 hectares is reserved as State Forest and Forest Act Timber Reserves and 125 000 hectares is private property. The total area of VCL recorded for the Shire is 63 800 hectares.

It will be seen from Tables 2 and 3 however, that 47 400 hectares of this VCL is proposed for inclusion in the South Coast National Park and a further 8 700 hectares have been included in the proposed Shannon Basin National Park.

Thus there remained some 7 600 hectares of VCL to be considered by the Study Group.

Printouts from the FMIS system provided the location of the specific areas to be examined.

State Forest Areas Requiring Examination

The FMIS System contains coded data referring to all non-forest and poor forest types (Appendix 1) on Crown land in the Manjimup

TABLE 1

LAND TENURES IN THE MANJIMUP SHIRE

Crown Tenures

State Forest	414 891
Timber Reserve 25 (Forest Act)	4 105
Timber Reserve (Land Act)	12 286
Conservator of Forests	3 146
Vacant Crown Land	63 772
Temporary Timber Reserves	946
National Park	39 794
Flora and/or Fauna Reserves	17 190
Recreation and/or Camping Reserves	3 362
Water Reserves	3 008
Other Reserves	7 263
Commonwealth	118
Government Requirements	1 119
	571 000

Private Property*	125 000
Townsite Reserves	2 380

*Includes former Private Property now owned by the Minister for Water Resources.

TABLE 2

TENURES IN PROPOSED SOUTH COAST NATIONAL PARK IN MANJIMUP SHIRE

State Forest	3 337
Timber Reserve 25 (Forest Act)	110
Timber Reserve (Land Act)	11 309
Vacant Crown Land	47 358
Temporary Timber Reserves	410
Private Property	43
National Park	34 474
Flora and/or Fauna Reserves	5 005
Recreation and/or Camping Reserves	2 573
Water Reserves	69
Townsite Reserves	12
Other Reserves	6 053
Government Requirements	335
Total	111 088

TABLE 3

TENURES IN SHANNON BASIN OUTSIDE PROPOSED SOUTH COAST NATIONAL PARK (IN MANJIMUP SHIRE)

State Forest	42 790
Conservator of Forest	185
Vacant Crown Land	8 734
Temporary Timber Reserves	234
Private Property	847
National Park	356
Recreation and/or Camping Reserve	10
Townsite Reserve	221
Other Reserves	12
Total	53 389

TABLE 4

NON FOREST AREAS IN MANJIMUP SHIRE UNENCUMBERED* WITHIN RAINFALL AND TENURE TYPES (HECTARES)

TENURE	ANNUAL RAINFALL			TOTAL
	<700 mm	700-1000 mm	>1000mm	
State Forest and Timber Reserves (Forest Act)	146	6 244	17 405	23 795
Vacant Crown Land and Timber Reserve (Land Act)	Nil	532	3 713	4 245
	146	6 776	21 118	28 040

*Excluded (i) Proposed Shannon National Park.
(ii) Proposed South Coast Park.
(iii) Other National Parks and Flora and Fauna Reserves.
(iv) Conservation and Recreation Management Priority Areas.

Shire. These are referred to further in this report as non-forest areas. Data is recorded on a 2 hectare cell basis and accuracy of printouts must be accepted within this limit. The areas of non-forest types on State Forest and VCL tenures were extracted and are shown as Table 4. This extraction excludes State Forest and VCL areas in

(i) The Shannon Basin Park

(ii) The proposed South Coast National Park

(iii) All other National Park and Flora and Fauna Reserves in the Shire

(iv) Conservation and Recreation management priority areas in State forest.

Some 23 795 hectares of dedicated forest land and 4 245 hectares of VCL were associated with this non forest category. Most of this area is not affected by clearing controls under the Country Areas Water Supplies Act (Table 5).

Specific Locations for Examination

To allow for the inspection of suitably concentrated areas of poor or non-forest country, a print-out of the distribution of the types was obtained. An example is attached as Figure 2. An interpreter experienced in the Manjimup area, delineated those aggregations of suitable size and location to warrant further consideration. A list of the initial target areas selected for inspection is attached as Appendix 2 of this report. These target areas (Figure 2) together with an air photo plan of the area which details the actual assessed forest types in the area (Figure 3) were forwarded to Manjimup for detailed local evaluation.

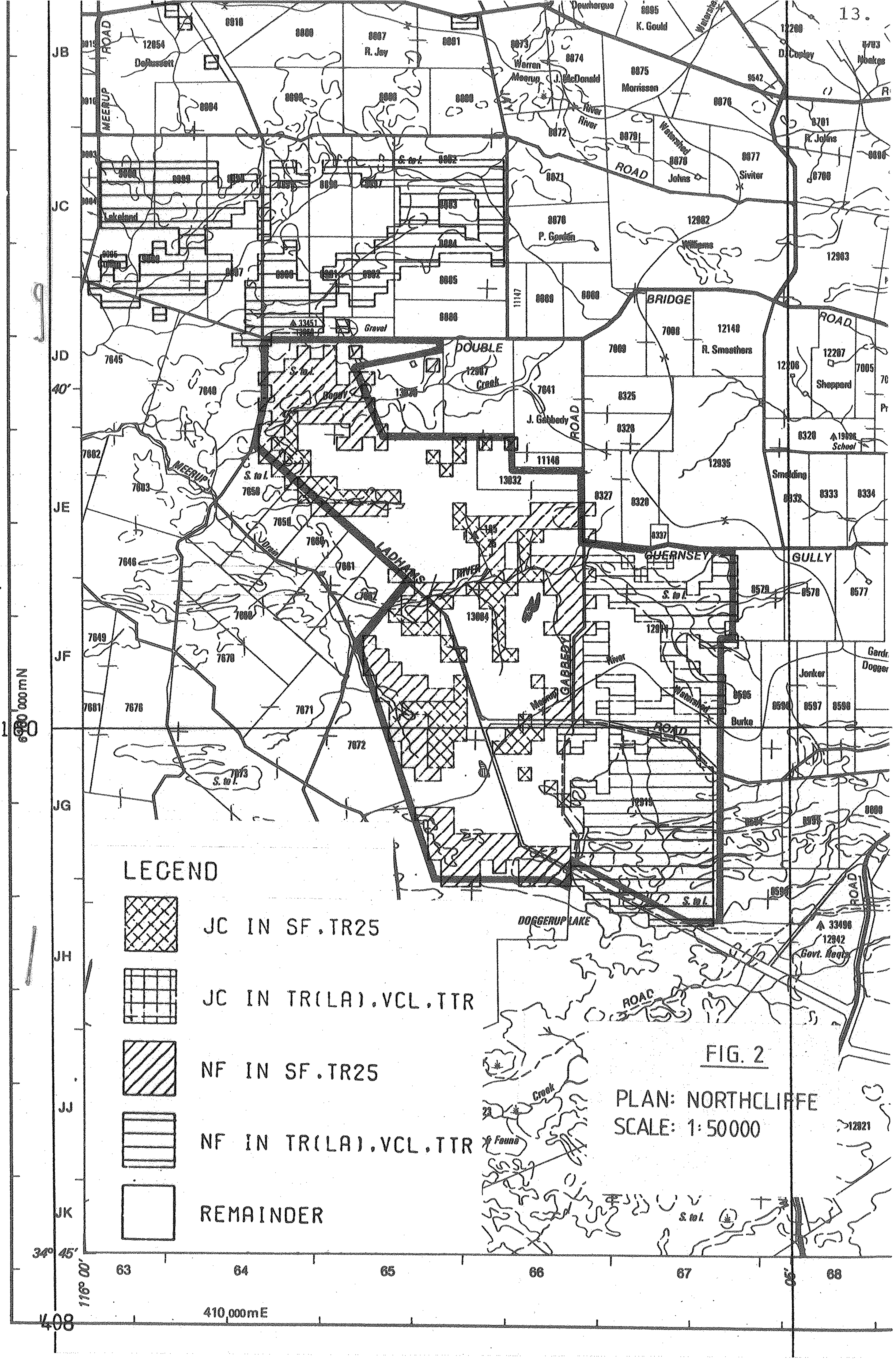


FIG. 2

PLAN: NORTHCLIFFE
SCALE: 1:50000

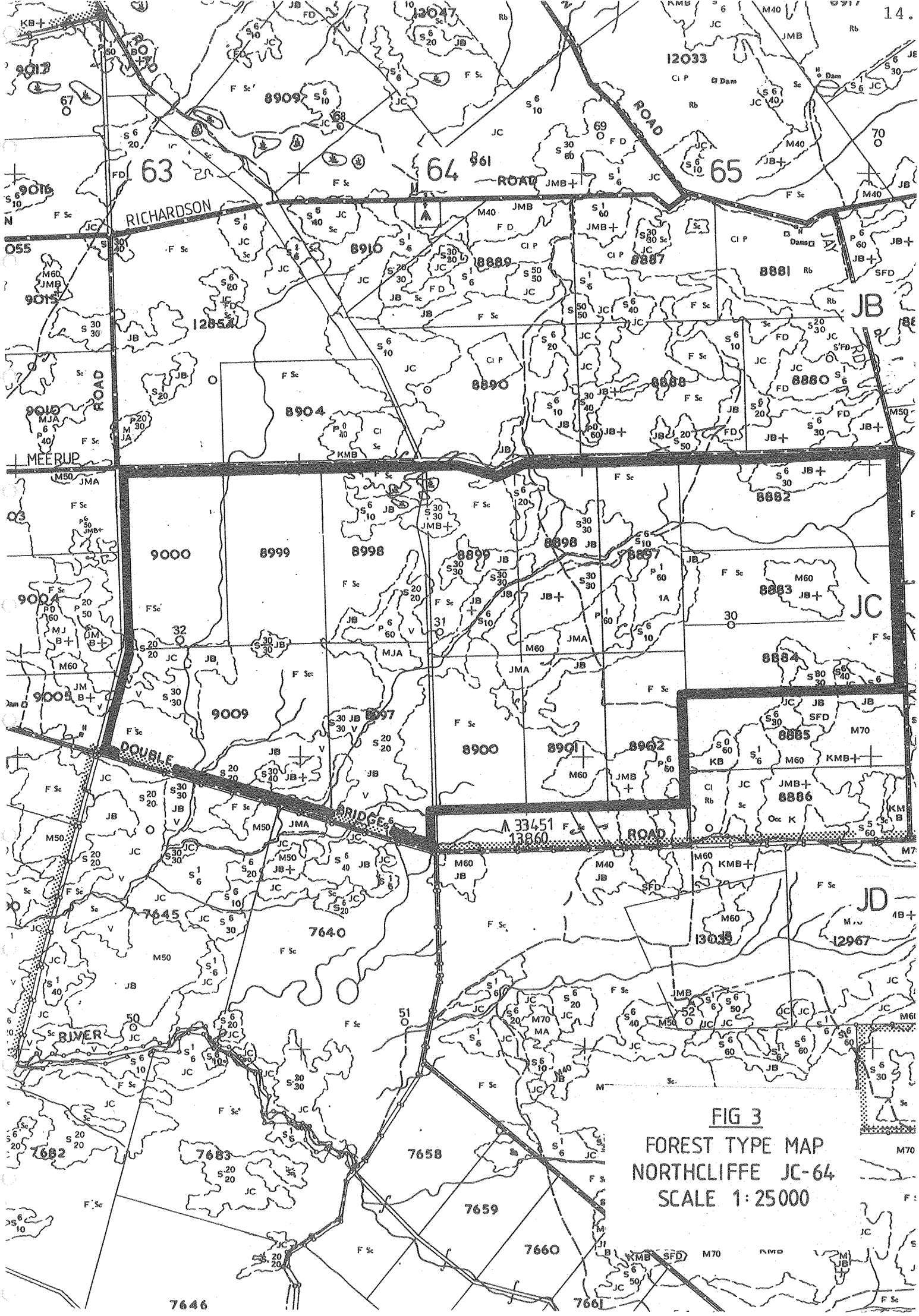


FIG 3

FOREST TYPE MAP

NORTHCLIFFE JC-64

SCALE 1:25000

TABLE 5

NON FOREST AREAS UNENCUMBERED* IN MANJIMUP SHIRE WITHIN PUBLIC WORKS DEPARTMENT CLEARING ZONES IN THE WARREN CATCHMENT (HECTARES)

TENURE	WARREN CATCHMENT ZONE			TOTAL
	PWD A	PWD B	PWD C	
State Forest and Timber Reserve (Forest Act)	784	1 625	152	2 561
Vacant Crown Land and Timber Reserves (Land Act)	Nil	Nil	8	8
Total	784	1 625	160	2 569

*Excluded (i) Proposed Shannon National Park.
(ii) Proposed South Coast Park.
(iii) Other National Parks and Flora and Fauna Reserves.
(iv) Conservation and Recreation Management Priority Areas.

Field Checking

At Manjimup soil, topography, tenure plans and local knowledge were used to assess the potential of each target area for agricultural use or pine plantation establishment.

Wherever possible all relevant areas were inspected in the field by both agricultural and forestry experts. The locations of areas inspected are shown in Figure 4. Field notes and area designations for the 24 areas inspected in the field are set out in Appendix 3.

It must be emphasized that the areas stated are approximate. The boundaries serve to delineate target areas with suitable concentrations of non forest types to warrant inspection. They do not represent practical farm or plantation boundaries which can only be obtained from detailed survey.

EVALUATION FOR AGRICULTURE

Nine Vacant Crown Land areas (approximately 3 520 hectares) and twenty one State forest areas (approximately 19 400 hectares) were assessed for their agricultural potential.

The location of these areas ranged from the vicinity of the Donnelly River in the west to Walpole in the east. Most are on the south coastal strip, north of the D'Entrecasteaux National Park. Two sites in the Donnelly River area were subsequently found to be outside the Shire and are not included in the area totals.

When inspecting the sites a number of physical characteristics were considered. These were soil type, drainage, area, location in relation to other agricultural holdings and availability of facilities such as electricity, telephone and road access.

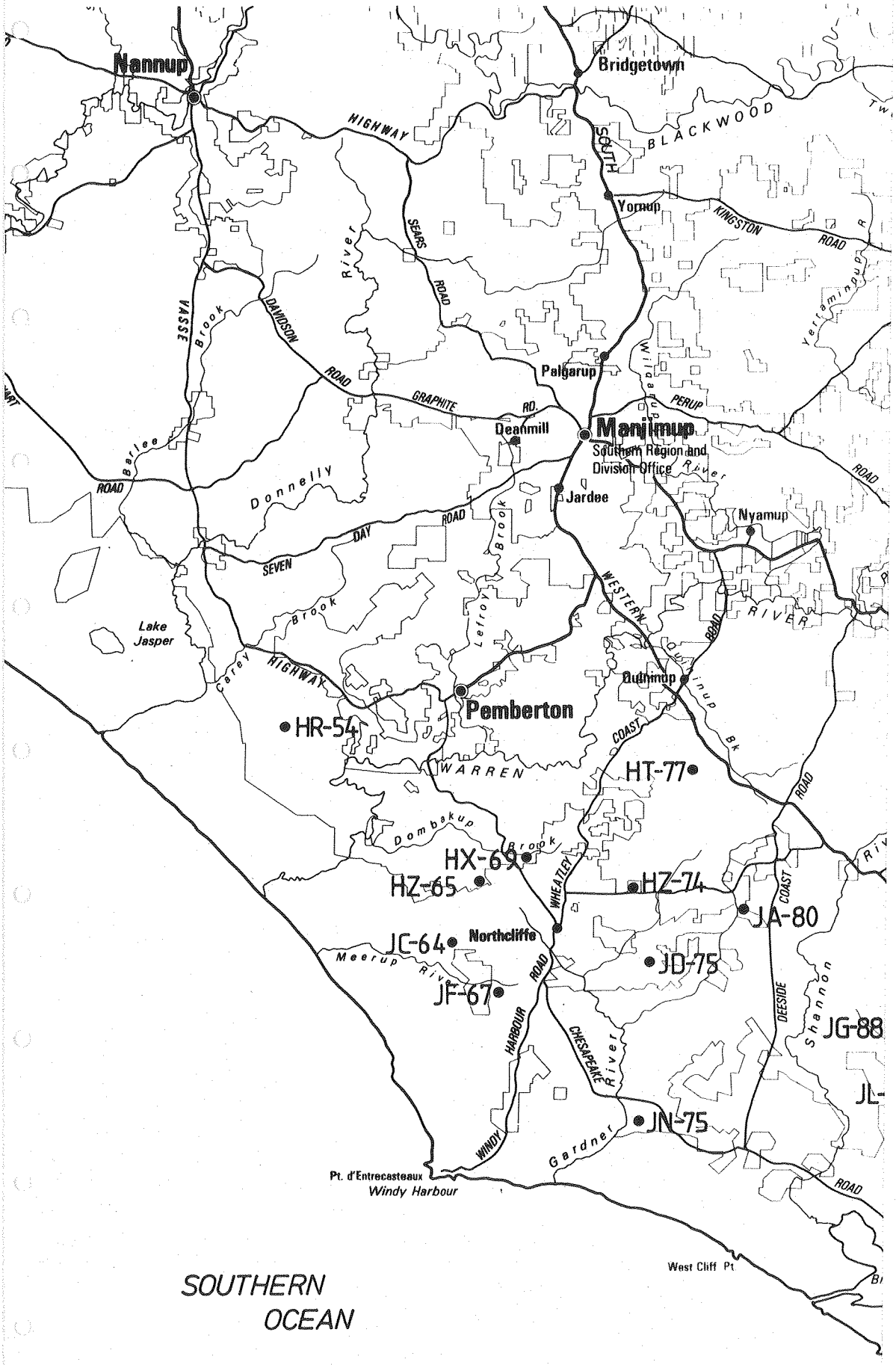


FIG 4

LOCATION OF AREAS INSPECTED

SCALE 1:500 000

Several budgets were constructed to assess the viability of agriculture on these areas.

Four areas were under Forests Department quarantine and due to seasonal conditions permits to visit the sites could not be obtained. For these, assessments were derived from aerial photographs and soil maps obtained from the Forests Department.

Physical Characteristics

Soil type has a major impact on the assessed production potential. The most commonly occurring soils are:

(a) Gravelly loams, usually in elevated situations, and

(b) deep grey sands, usually acid and seasonally waterlogged - some of these areas can be improved by surface drainage schemes, others cannot.

Stocking rates on the loams are approximately twice those on the grey sands, with consequential effects on farm profitability as discussed in the following section.

Table 6 summarises the agricultural potential of the areas studied. All sites are identified by the grid references from Forests Department maps.

It can be seen that the majority of the land is described as unsuitable for agriculture because it cannot be drained, because it is isolated or because it is not a large enough block of suitable land.

Detailed reports and maps of each area are given in Appendix 3.

TABLE 6

SUITABILITY OF VACANT CROWN LAND AND NON FOREST AREAS FOR AGRICULTURE BASED ON PHYSICAL CHARACTERISTICS

LOCATION	LAND TENURE	AREA HA	MAJOR SOIL TYPE	DRAINAGE	COMMENT FOR AGRICULTURE
Northcliffe					
JG 88 (1)	SF	1250	Loam/Acid Grey Sand	Require some work	Due to isolation is unsuitable
HT 77 (2)	SF	900	Acid Grey Sand/ sandy gravel loam	Require some work	Suitable for viable farms could be extended
HX 69 (3)	SF	200	Acid Grey Sand/ Gravelly Loam	Some work required	Suitable for run-off block
HZ 65 (4)	SF	300	Acid Grey Sand	Poor	Waterlogged, Unsuitable
HZ 74 (5)	SF	350	Acid Grey Sand	Requires work	Suitable for run-off block
HZ 74 (5)	VCL	150	Acid Grey Sand	Requires work	Suitable for run-off blocks
JA 80 (6)	VCL	300	Acid Grey Sand/ Sandy Loam	Requires work	Can be drained, suitable for release to adjoining farms
JC 64 (7)	VCL	650	Acid Grey Sand	Poor	Waterlogged, unsuitable
JD 75 (8)	VCL	710	Gravelly loam	Good	Suitable for release as viable farms
JF 67 (9)	VCL	630	Acid Grey Sand	Poor	Waterlogged, unsuitable
Broke Inlet					
JN 75 (10)	SF	2400	Gravelly loam/ acid grey sand	Requires work	Due to isolation is unsuitable
JL 90 (11)	VCL	500	Acid grey sand	Poor	Waterlogged, unsuitable

Walpole					
JN 94 (12)	SF	800	Acid grey sand	Poor	Waterlogged, unsuitable
JM 102 (13)	SF	2850	Acid grey sand	Poor	Waterlogged, unsuitable
JP 99 (14)	SF	300	Acid Grey Sand	Poor	Can be drained, suitable for grazing. Too small.
JR 99 (15)	SF	2450	Acid Grey Sand	Good	Suitable for grazing
JR 105 (16)	SF	250	Acid Grey Sand	Poor	Can be drained suitable for release to adjoining farms
JS 95 (17)	SF	440	Acid Grey Sand to sandy loam	Some work required	Suitable if extended
JU 98 (18)	SF	120	Acid Grey Sand	Poor	Waterlogged, unsuitable
JY 101 (19)	SF	160	Acid Grey Sand	Poor	Requires enlargement to make viable
JZ 103 (20)	SF	250	Gravelly Loam	Some work required	Suitable but needs enlargement
JV 97 (21)	SF	450	Acid Grey Sand	Some work required	Suitable if enlarged
JX 97 (22)	VCL	450	Acid Grey Sand	Poor	Waterlogged, unsuitable
Lake Jasper					
HR 54 (23)	SF	880	Acid Grey Sand/ sandy loam	Poor	Waterlogged, not suitable.
Frankland					
JF 104 (24)	SF	1200	Grey Sand	Poor	Waterlogged, unsuitable
JH 108 (25)	SF	980	Grey Sand	Poor	Waterlogged, unsuitable
HV 104 (26)	SF	1540	Grey Sand	Poor	Waterlogged, unsuitable
HR 94 (27)	SF	1950	Grey Sand	Poor	Waterlogged, unsuitable

Economic Characteristics

There are great differences in the profitability of agriculture on the different soil types, reflecting differences in productivity and land use options.

1. Karri-Jarrah loam: These soils are highly productive and able to support a number of agricultural enterprises including horticulture, sheep and cattle grazing and agro-forestry. Horticulture, involving such crops as potato, cauliflower and onion, is by far the most profitable agricultural use of this land.

   The budget for potato farming (Appendix 4, Table 1) indicates the profitability of horticultural crops. Potato farming is highly profitable, providing a net return to capital and labour of over $800/ha/year. If labour costs are imputed at average wage rates the net return to capital is $230/ha/year, which provides an internal rate of return above 9%, a relatively high return for agriculture. Other horticultural enterprises, such as cauliflower and onion, are equally profitable.

   By comparison the profitability of livestock is low, (Appendix 4, Table 2) generating a net return to the operator's labour and capital of $12859/year for a 600 ha property (around $20/ha/yr). Whether or not this is enough to support a viable farm depends on one's definition of viability. Using a literal interpretation of viability, a net return of $12859/year could support a viable farm because it would be possible to continue farming. If viability is defined more broadly to include providing the operator with sufficient income for a reasonable standard of living, then $12859/year is not enough for farm viability.

It could be argued that this net return is pessimistic because contract charges are assumed for clearing and development costs and by doing some of the work himself the farmer would save some of these expenses and therefore have to service less debt. Thus it is possible that the farm could generate a higher net income although it is unlikely to be a sufficient income for a reasonable standard of living unless the farmer has low expectations.

2. Well drained acid grey sands: These soils are not highly productive and have only one land use option - beef cattle grazing.

Clearing and development of beef is highly expensive in relation to the returns from beef on this soil type. The expense of clearing and development is shown in the development budget of Appendix 4, Table 3.

Development of an 800 ha beef farm over 5 years would lead to a total indebtedness exceeding half a million dollars. Even if it is possible to borrow the money to repay this debt, the large repayment to service the loan would make the farm unviable. This is illustrated in Appendix 4, Table 3, where it can be seen that annual loan repayment above $90 000/year is a major cause of the year in year out loss of $50 000/year. Expressed in terms of cost benefit analysis, conversion of this land to whole beef farms has a net present value of -$200/ha.

It could be argued that this budget is pessimistic for some farmers because it allows contracting costs for clearing and development, whereas some farmers would save by carrying out

part of this work themselves. On the other hand assumptions that the farmer has $100 000 to invest in the property and that he is not charged for the land, could be seen as optimistic assumptions, so that the budget is not overly pessimistic.

In spite of the unviability of whole beef farms on this soil type, it is possible that it could be developed as a viable part of an existing beef enterprise. It still could not be a highly profitable use of the land and conclusions on the viability of such 'run-off' blocks would have to be made on the basis of case by case assessments.

Reasons why this land may possibly be profitably used as run-off blocks, and yet could not sustain a viable whole farm, are that an established nearby farmer may be in a position to clear, develop and stock the farm more cheaply using machinery, labour and stock, from the established property. Furthermore, the established farmer may not need to purchase any additional machinery for the run-off block nor count on the block to generate any income for several years. Thus development and operation of a run-off block could be considerably less expensive, even to the extent of making the block a viable addition to existing farms. In view of the importance of proximity of run-off blocks to the main farm enterprises and the borderline viability of this land use, only blocks close to existing farms are worth considering.

3. Poorly drained acid grey sands: The productivity of this land is low, well below that of well drained acid grey sands, and beef cattle is the only land use option. It follows that this land could not be developed as viable farms.

Table 4, Appendix 4, indicates the losses involved in developing these soils for agriculture. Development of an 800 ha beef property results in indebtedness of over $700,000 and a year in year out loss of more than $100,000/year. Cost benefit analysis indicates a net present value of the order of -$500/ha for agricultural development.

These results not only indicate that poorly drained sand is unable to support viable whole farms, but that it is extremely unlikely that it could sustain viable run-off blocks for farm build up.

Recommendations

Based on the physical and economic characteristics, six areas are recommended for further consideration for agricultural release. These are divided into two categories.

1. Land which could certainly be used profitably in agriculture - either as viable farms or run-off blocks for farm build up. This land is predominantly loamy soil suitable for horticulture or beef.

   Areas in this category are shown in Table 7. After removing from this category blocks inspected outside the Manjimup Shire and one block adjacent to a Tingle reserve, 1610 ha remain. Although further detailed investigation is required, initial examination suggests that the 1610 ha could be subdivided into 9 viable horticultural farms. At an average of almost 200 ha each these would be relatively large horticultural farms. The reasons why this might be appropriate are that the blocks are not wholly loamy soils and a larger block allows diversification into a livestock sideline.

TABLE 7

AREAS RECOMMENDED FOR FURTHER CONSIDERATION FOR AGRICULTURAL RELEASE

Category (i) - Areas suitable as viable farms or run-off blocks

Site*	Tenure	Area (ha)	Viable farms (No.)	OR	Run-off blocks (No.)
JD75	(VCL)	710	4		4
HT77	(SF)	900	5		5
Total		1 610	9		9

Category (ii) - Areas warranting further consideration as run-off blocks

Site	Tenure	Area (ha)	Viable farms (No.)	Run-off blocks (No.)
JA80	(VCL)	300	-	1
HZ74	(SF,VCL)	500	-	2
HX69	(SF)	200	-	1
JR105	(SF)	250	-	1
Total		1 250	-	5

*JZ103 would be in this category except that it is adjacent to a Tingle forest.

NOTE (i) All the viable farms have a relatively large area of loam soils.

(ii) Run-off blocks are all adjoining existing farmland.

(iii) If any areas are to be considered for release a further more detailed study should be conducted on the areas recommended.

It is recommended that areas JD75 and HT77 be released to agriculture subject to:

a) Detailed investigation confirming that the soil is predominantly loam suitable for horticulture.

b) Release being in accord with environmental policy.

2. Land which could not sustain viable farms but which could possibly support viable run-off blocks. The areas selected in this category are all well drained acid sands situated close to existing farms.

Table 7 shows the blocks selected in this category. The total area of these blocks is 1250 ha. It is suggested that this 1250 ha could provide 5 run-off blocks, at most.

It is recommended that the areas JA80, HZ74, HX69 and JR105, or parts thereof, be released for agriculture subject to:

a) Nearby farmers seeking the land for farm buildup.

b) Case by case economic assessment indicating that buildup improves farm profitability.

c) The release being consistent with environmental policy.

EVALUATION FOR PINE PLANTATION

Areas inspected were originally selected from FMIS printouts as indicative of reasonable aggregations of poor quality forest. Table 8 lists the results of inspections and has been based upon soil maps, aerial photos, Air Photo Interpretation plans, and field reconnaissance of the areas concerned.

TABLE 8

SUITABILITY OF VACANT CROWN LAND AND NON FOREST TYPES IN STATE FOREST AREAS WITHIN THE MANJIMUP SHIRE FOR P. RADIATA PRODUCTION

LOCATION	AREA	TENURE	ADJACENT TENURE	ROAD DISTANCE FROM MANJIMUP (KM)	CATCHMENT AND ZONE	APPROXIMATE AREA OF SOIL TYPE		DISTRIBUTION OF SUITABLE SOILS	OTHER COMMENTS	OVERALL RATING FOR PINE
						Marginal or Better for P. radiata	Unsuitable for P. radiata			
Northcliffe										
JG 88 (1)	1250	SF	SF/ Shannon Nat.Park	75	Weld/ Shannon Basin	1000	250	Continuous Tracts		Fair
HT 77 (2)	900	SF	SF/ South West Hwy.	36	Warren D	530	420	Wide Belts	High quality forest J,K over suitable soils	Fair
HX 69 (3)	200	SF	SF/PP	45	Warren D	240		Continuous	Could extend within SF	Good
HZ 65 (4)	300	SF	SF/PP	54	Warren D	50	250	Isolated Pockets	Within 8km of Dombakup Pltn.	Poor
HZ 74 (5)	350	SF	SF/PP	58	Gardiner	350		Continuous	Adjoins VCL block, also suitable for pine	Excellent
HZ 74 (5)	150	VCL	SF/PP	58	Gardiner	150		Continuous	Adjoins SF block also suitable for pine	Excellent

TABLE 8 Continued

JA 80 (6)	300	VCL part in Nat. Park	SF/PP/ Shannon Nat.Park	56	½ Gardner ½ Shannon	300		Continuous	Over 100 ha quality Karri forest	Good
JC 64 (7)	650	VCL	PP/South Coast Nat.Park	68	Meerup	200	450	Small pockets		Poor
JD 75 (8)	710	VCL	SF/PP	68	Gardner	710		Continuous	All high quality forest	Excellent
JF 67 (9)	630	VCL	PP/SF/ South Coast Nat.Park	75	½ Meerup ½ Doggerup	230	400	Continuous		Poor
Broke Inlet										
JN 75 (10)	2400	SF	SF/ South Coast Nat.Park	75	Gardner	2000	400	Continuous	High quality karri over large tracts	Good
JL 90 (11)	500	VCL	SF/VCL/ Shannon Nat.P ark	78	Weld, Shannon Basin	280	220	Continuous		Good
Walpole										
JN 94 (12)	800	SF	SF	82	Weld/ Deep	290	510	Dispersed pockets	Extensive water-logged flats	Poor
JM 102 (13)	2850	SF	SF Quaran-tine	98	Deep	800	2050	Dispersed pockets	Waterlogged flats with 'islands' of J,M,K	Poor

TABLE 8 Continued

Walpole										
JP 99 (14)	300	SF	SF	90	Deep	260	40	Continuous		Fair
JR 99 (15)	2450	SF	SF	98	Deep	1670	780	Continuous	Over 1000 ha Continuous	Excellent
JR 105 (16)	250	SF FFL buffer	Sf	105	Frankland	80	170	Small pockets	Depth to clay limiting	Poor
JS 95 (17)	400	SF	SF/VCL	93	Deep/ Broke Inlet	320	80	Continuous	Boundary could be 100 x ha into SF	Good
JU 98 (18)	120	SF	SF	100	Deep/ Broke	35	85	Narrow belts		Poor
JY 101 (19)	160	SF FFL Buffer	SF	108	Deep	160		Continuous	Boundary could be extended	Good
JZ 103 (20)	250	SF/ Silv & Scient MPA	SF FFL Buffer	112	Deep	190	60	Narrow belts		Fair
JV 97 (21)	450	VCL	SF/VCL	102	Broke Inlet	200	250	Continuous	Boundary could be extended 100 x ha into SF	Fair
JX 97 (22)	450	VCL	SF/VCL	102	Deep/ Broke Inlet	20	430	Pocket	Waterlogged Flats	Poor

TABLE 8 Continued

Lake Jasper										
HR 54 (23)	880	SF Quaran tine	SF/Quaran tine FFL Reserve	45	½ Donnelly ½ Warren D	370	510	Narrow belts	Waterlogged Flats	Fair
JF 104 (24)	1200	SF Quaran tine	SF/Quaran tine	90	Deep/ Frankland	620	560	Narrow belts		Fair
JH 108 (25)	980	SF Quaran tine	SF/Quaran tine	98	Frankland	340	640	Narrow belts		Poor
HV 104 (26)	1540	SF	SF/VCL Quaran tine	67	Lake Muir Frankland	1040	500	Isolated Belts	Could extend boundary into SF by approx. 150 ha	Fair
Frankland										
Hr 94 (27)	1950	SF Quaran tine	SF/Quaran tine	54	Deep	700	1250	Scattered Pockets	Waterlogged flats dominant	Poor

The following conditions apply to Table 8.

1. All boundaries and associated area statements are approximate .

2. Soil classed as 'marginal or better' for P. radiata include red, brown, yellow to grey loamy, sandy, gravelly duplex soils. The area statement can only serve as a rough guide as detailed survey would be required to delineate areas of adequate soil depth (90 cm).

3. With minor exceptions, all areas listed would require appropriate fertiliser regimes due to limited natural fertility.

4. Soils categorised as 'unsuitable' for P. radiata include shallow gritty yellow duplex soils, leached sands and podzols, humus podzols, peaty swamps and coastal dunes. Rocky sites are also unsuitable.

5. The 'overall rating' for pine has been subjectively allocated as follows:

   a) Poor - area does not warrant further consideration.

   b) Fair - portions of the area could be worthy of further attention.

   c) Good - area generally suitable, worthy of detailed examination.

   d) Excellent - area deserves detailed examination.

A summary of the evaluation is contained in Table 9

TABLE 9

SUMMARY OF AREAS OF NON-FOREST TYPES AND VACANT CROWN LAND SUITABLE FOR PINE PLANTING

CLASS	BULK RATING AREA (HA)	SUITABILITY FOR P.RADIATA AREA (HA)
Poor	8 890	-
Fair	6 960	-
Good	4 250	3 140
Excellent	3 660	2 830
Total	23 760	6 020

SUITABILITY OF AREAS FOR RELEASE

The purpose of the study was to determine the areas of VCL and State Forest that may be made available to assist the objective of establishing 15 000 ha of pine plantation in the Shire.

From Table 10 it will be seen that up to 2 860 ha could be suitable for agricultural development. This area is somewhat constrained, in that much of it is only suitable for run-off blocks, the demand for which depends on the viability of the adjacent farms. Of this area, the VCL portion is equally acceptable for pine forest development, while 1 100 ha (JR105, HT77) of the State Forest content is rated suitable for agriculture but not suited to pine plantation. Other than this 1100 ha, State forest areas considered suitable for agriculture are also suited to pine plantation development (Table 11).

Hence, generally the two land uses considered are not mutually exclusive and release to agriculture or conversion to pine would depend on political rather than physical or economic reasons. Several other specific points arising from this study are relevant to any further consideration for release or conversion to pine.

1. The area of VCL most suitable for agriculture, JD75, (approximately 710 ha) is good quality land currently held to supply timber for settlers requirements. This land is of a quality suitable for agriculture, hardwood forest management or pine plantation development. Size and location also favours any of these uses. Comparison of this site and its suitability with the other VCL and non forest types on State Forest examined, indicates that if any significant further release for agriculture is to be made within the Shire, it will have to be from better quality forest.

TABLE 10

AREAS WORTHY OF DETAILED CONSIDERATION FOR RELEASE

LAND USE	NUMBER OF UNITS	AREA (HECTARES)		
		V.C.L.	STATE FOREST	TOTAL
Viable Farms	9	710	900	1 610
Run-off Blocks	5	450	800	1 250
Pine Plantation	-	1 760	4 260	6 020

This study can only confirm the obvious fact that good agricultural land is also good forest land; whether used for hardwood or pine management. The forest types involved are also often those considered to have the greatest conservation value by the public.

2. Economic analyses carried out for agricultural land (Appendix 4) and local knowledge of pine growth indicate that apart from the few good sites in 1 above, all other areas will be economically marginal, unless attached to adjacent areas of reasonable quality soil. Hence some sites can be considered for farm build up where established farms carry most of the capital burden of new development. For farms or effective pine plantations, additional areas of better soils may have to be added to create viable unit sizes and this consideration will have an influence on the selection of areas for further study.

3. The non forest types delineated are adequately represented in the Shannon Park, the South Coast National Park and the several conservation Management Priority Areas in the Shire. There is little risk that the release of the non forest areas considered in the study would influence the overall conservation reserves of these types. Individual areas may have local values as ecologic reserves as for JZ103 associated with the Tingle sites.

4. It is significant that the largest area of State forest considered suitable for agriculture (HH49 Appendix 2) located west of Pemberton adjacent to the Donnelly River was subsequently found to be outside the Shire and study limits. This area, equally suited to pine plantation, is representative of the Donnybrook Sunklands and reasonably similar to the soils and forest types previously planned for pine development in that region. It is clear that if a balance between agriculture and forestry is to be maintained in the region, options for both agriculture and pines exist beyond the boundaries of the Shire of Manjimup.

TABLE 11

SUITABILITY OF INSPECTED AREAS FOR BOTH AGRICULTURAL AND PINE PLANTATION PURPOSES

LOCATION	LAND TENURE	AREA HA	AGRICULTURAL SUITABILITY	PINE SUITABILITY
Walpole				
JS 95 (17)	SF/VCL	320	Yes	Yes
JR 99 (15)	SF	1 670	Yes	Yes
JY 101 (19)	SF	160	No	Yes
JR 105 (16)	SF	200	Yes	No
Northcliffe				
HX 69 (3)	SF	200	Yes	Yes
HZ 74 (5)	SF	350	Yes	Yes
HZ 74 (5)	VCL	150	Yes	Yes
JD 75 (8)	VCL	710	Yes	Yes
JA 80 (6)	VCL	300	Yes	Yes
HT 77 (2)	SF	900	Yes	No
Broke				
JN 75 (10)	SF	2 000	No	Yes
JL 90 (11)	VCL	280	No	Yes

NOTE: JZ 103 (20) omitted due to its association with a proposed Management Priority Area for Tingle conservation.

5. Critical size is a relevant factor in pine plantation practice and approximately 20 ha is the minimum plantation area that would be considered on good sites. The acceptable minimum is completely dependent on local factors such as distance to market, soil fertility, availability of cleared land, rainfall and fire hazard.

6. It is believed that if pines are to be successfully established on the 4 900 ha of sites inspected in State Forest (Table 10) extensive use of fertilisers and legumes will be required. The possibility of these areas being developed for agroforestry, is worthy of consideration. This is in accord with the Shires objective of maintaining a high level of agricultural production and may even permit purchase of further farmland for plantation purposes.

CONCLUSIONS

The study has revealed that a limited part of the remaining Vacant Crown Land and non-forest areas of State Forest in the Shire is suitable for agriculture or pine plantation purposes.

To contribute to the 15 000 ha of pine plantation projected for the Shire the following options are offered:

1. Release to agriculture of those areas of Vacant Crown Land which would support viable farms or profitable run-off blocks. This could be up to 1160 ha and would allow an equal area of pine plantation to be obtained by farm repurchase without a net reduction in the area of agricultural land.

2. Directly plant the Vacant Crown Land suited to pine plantation (1 760 ha) to provide approximately 3 years planting requirement.

3. Exchange for farming the 1 700 ha of non forest on State Forest suitable for agricultural development to allow the repurchase of suitably located farmland for approximately 3 to 4 years planting of pines.

4. Convert the remaining non forest suited only to pine plantation (3 460 ha) to pine to meet approximately 7 years planting requirements.

5. In lieu of 3 and 4 convert 4 260 ha of State Forest suited to pines to plantations to provide 8 years of the required planting quota.

6. Further requirements for farmland or pines in the Shire must come from better quality State Forest or agroforestry on existing farms.

RECOMMENDATION

It is recommended that conclusions 1, 3 and 4 be pursued to provide

1. Up to 2 860 ha to be released for agriculture enabling an equivalent area of suitable farmlandto be purchased for pine plantation. This would provide for an immediate start to the pine programme.

2. A further 3 460 ha of non forest on State Forest to be converted to pine plantation. This would accommodate up to 7 years of the pine planting programme.

It is suggested that these recommendations provide for best land use in the region with respect to meeting both agricultural and pine plantation objectives.

APPENDIX 1

FOREST VEGETATION TYPES DELINEATED

Non Forest	=	X	= Non forest, flats, scrub, cedar, swamps, rocky outcrops.
Poor Forest	=	Jc	= Jc types S 1/1, S 1/6, S 1/10, P 1/1, P 1/6, P 1/10.

Coding is standard for Forests Department Air Photo Interpretation (API) Plans.

APPENDIX 2

MANJIMUP SHIRE - NON PRODUCTIVE CROWN LAND

Areas selected by Kelmscott I & P from FMIS Printouts as Indicative of Reasonable Aggregation of Poor Quality Forest

VACANT CROWN LAND		STATE FOREST	
Location	Area ha	Location	Area ha
Northcliffe Map Sheet			
JA 80	300	JG 88 (Dixie Road)	1 250
JC 64	650	HT 77 (Beggs Road)	900
JD 75	450	HX 69 (Orchard Road)	200
JF 67	630	HZ 65 (Rifle Range)	300
HZ 74	100	HZ 74 (Jane)	270
Broke Map Sheet			
JL 90 (Dixie Road)	300	JN 75 (Chesapeake Road)	1 600
Walpole Map Sheet			
JV 97 (T.R.14145)	440	JN 94 (Wye)	800
JX 97 (T.R.14145)	450	JM 102 (Sharpe MPA?)	2 850
		JP 99 (Bandicoot Road)	300
		JR 99 (Ordinance)	2 450
		JR 105 (Copeland Road)	200
		JS 95 (Burnett)	400
		JU 98 (Deep Road)	120
		JY 101 (Compass Road)	160
		JZ 103 (Angove Road)	250
Jasper Map Sheet			
HL 50 (Jasper Road)	200	HH 49 (Cleave-Starry Road)	800
		HR 54 (Charley)	880
Frankland Map Sheet			
		JF 104 (Roe Road)	1 200
		JH 108 (Claud Road)	980
		HV 104 (Porginup)	1 540
		HR 94 (Boydaminup)	1 950
Approximate Area	3 520		19 400

NOTE: Copies of the computer printout are held as roll plans in Forests Department Headquarters, Como.

APPENDIX 3

REPORTS ON INDIVIDUAL AREAS INSPECTED

Land Classifications Used for Reporting

1. Land suitable for intensive agriculture; suitable for horticulture; well drained; low erosion hazard.

2. Good arable land suitable for cropping and grazing. Not flood prone.

3. Arable land suitable for grazing; some limited inundation.

4. Not suitable for agriculture.

1. NORTHCLIFFE: JG 88

AREA: State forest.

LAND TENURE: Map: Northcliffe
Map ref: JG 88
44900 mE 6159000 mN

GENERAL: Access is gained off South West Highway by turning south west on Nelson Road.

Area is bounded by Null road to North, Bull, Link and Dixie Roads to west. Part of Nelson Road is southern boundary, then the boundary moves south along a creek to Weld River to a point east of 4.6 km down Dixie Road from Nelson Road.

LANDFORMS AND SOILS: A mixture of soil types ranging from loams to grey sands.

Landforms would be Boorara.

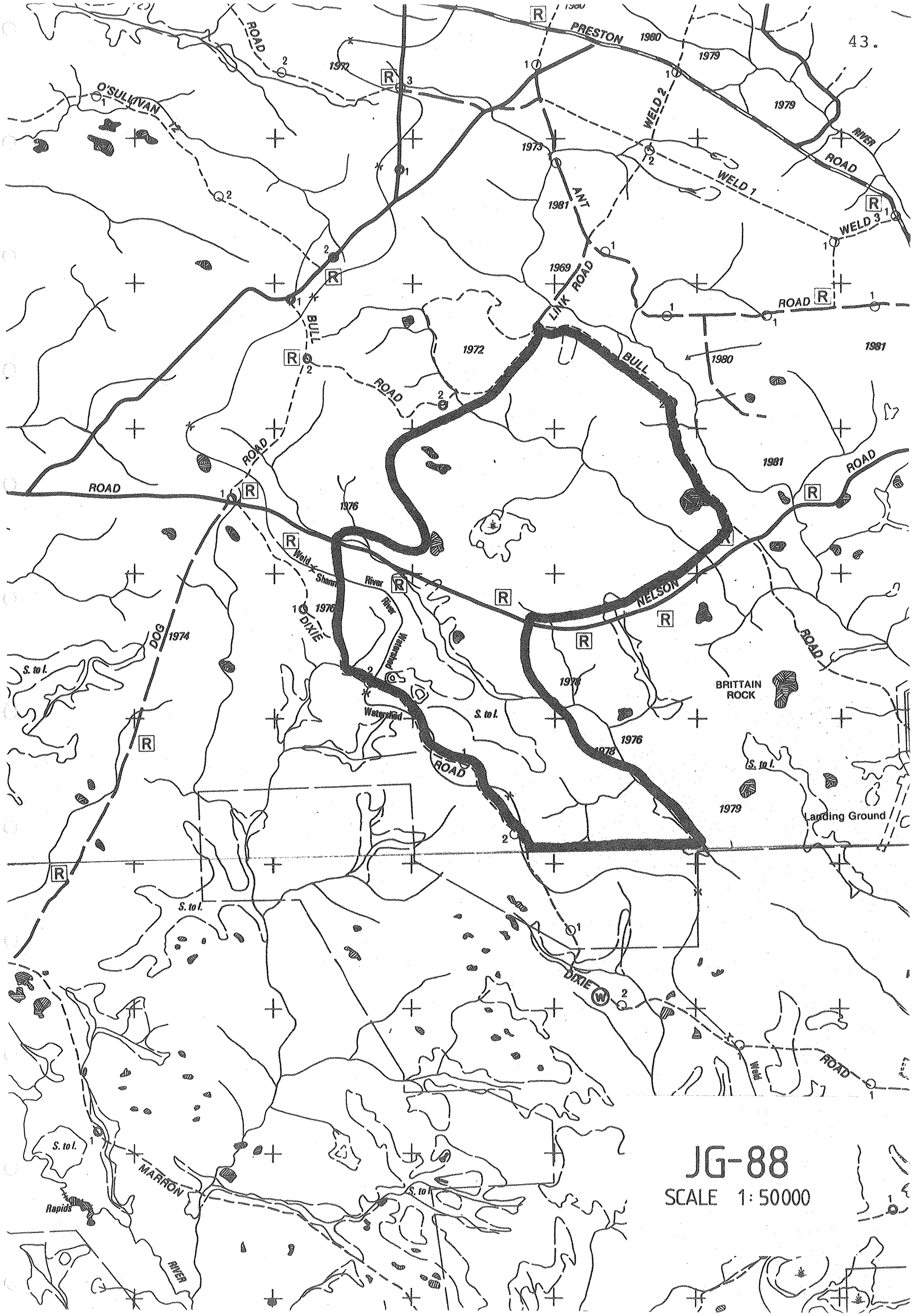
VEGETATION: Mixture of Karri, Jarrah and Marri on higher areas.

Ranging down to Ti-Tree scrub on the low lying wet area.

LAND CLASSES: Land can be classified as a class 2 in pockets with a land class of 3 for the majority of the area.

SUITABILITY TO AGRICULTURE: Area is of a size and soil type which would be suitable for agricultural enterprises, ranging from cropping to grazing.

RECOMMENDATION: Though the area inspected is suitable for agricultural production, isolation would render it a non-viable proposition.


PRESTON
ROAD
O'SULLIVAN
WELD 2
WELD 1
WELD 3
RIVER
ROAD
ANT
LINK ROAD
BULL
ROAD
BULL
ROAD
ROAD
ROAD
NELSON
DIXIE
DOG
Watershed
S. to l.
BRITTAIN
ROCK
Landing Ground
DIXIE
ROAD
Weld
MARRON
RIVER
Rapids
1980
1979
1973
1981
1969
1972
1976
1974
1978
JG-88
SCALE 1: 50000

2. NORTHCLIFFE: HT 77

AREA: 900 ha

LAND TENURE: State Forest

LOCALITY: Map: Northcliffe
Map ref: HT 77
432000 mN
Aerial Photography ref. - Pemberton Run 8. Photo nos. 5132; 5133.

GENERAL: Off the South West Highway bounded by Beggs Road and Nairn Road. Distance from Manjimup is 36 km.

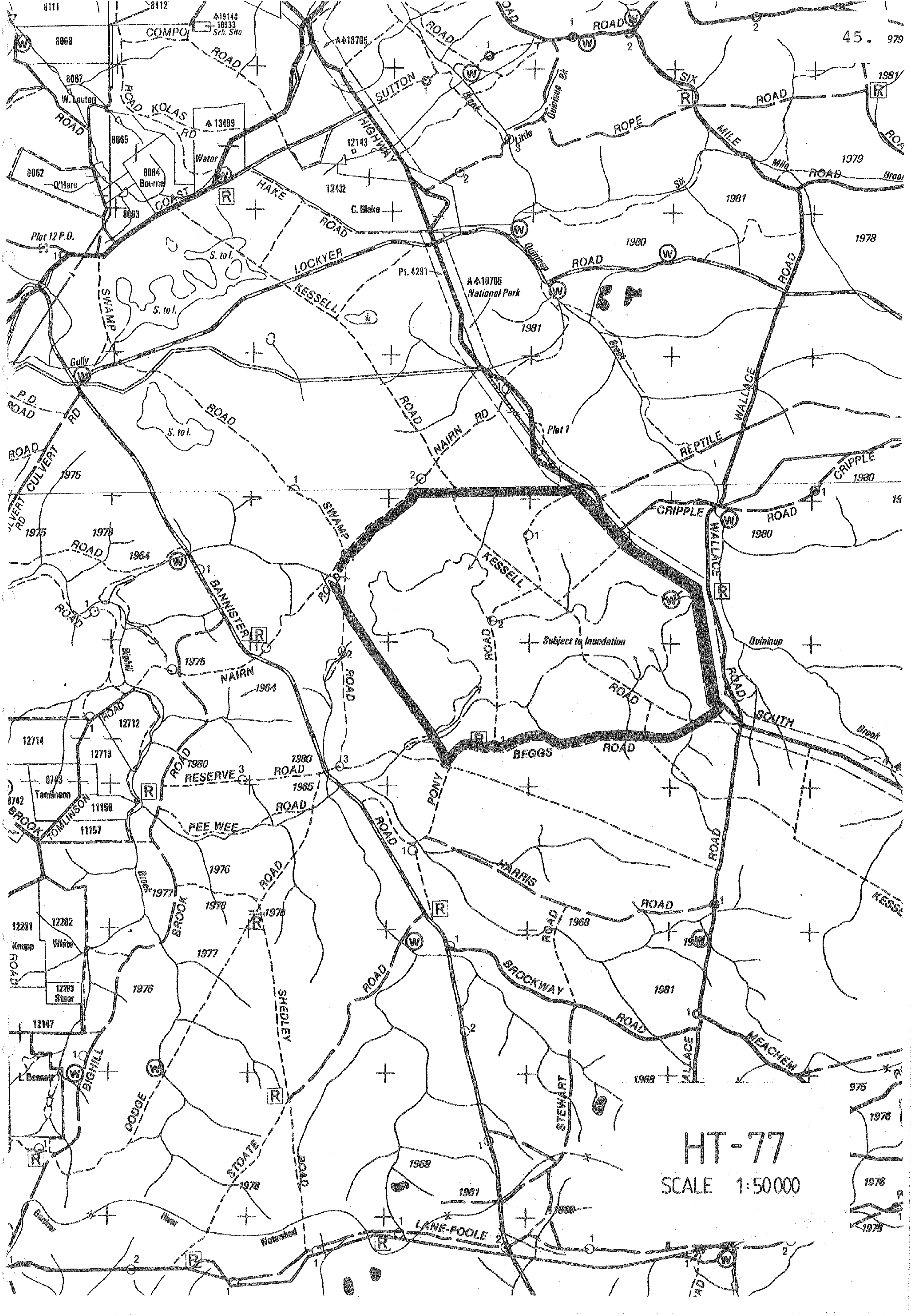
LANDFORMS AND SOILS: Mainly Pemberton with Quagering to the south and east of the block. Soils are mainly gravelly loam running down to acid grey sands through the centre of the blocks.

VEGETATION: Jarrah and Marri with Ti-Tree and associated scrub on the grey sandy flats.

LAND CLASSES: This block has land classes 1, 2 and 3.

SUITABILITY TO AGRICULTURE: This block is suited to a range of agricultural enterprises.

RECOMMENDATIONS: This block could be divided into 2 units down Pony Road.


HT-77
SCALE 1:50000
Subject to Inundation
COMPO ROAD
KOLAS RD
COAST ROAD
HAKE ROAD
LOCKYER ROAD
KESSELL ROAD
SWAMP ROAD
SUTTON ROAD
HIGHWAY
ROPE ROAD
SIX MILE ROAD
Quininup Brook
Quininup ROAD
WALLACE ROAD
REPTILE ROAD
CRIPPLE ROAD
NAIRN RD
NAIRN ROAD
BANNISTER ROAD
BEGGS ROAD
PONY ROAD
SOUTH
RESERVE ROAD
PEE WEE ROAD
TOMLINSON
BROOK ROAD
CULVERT RD
P.D. ROAD
HARRIS ROAD
BROCKWAY ROAD
MEACHEM
STEWART ROAD
SHEDLEY ROAD
STOATE ROAD
DODGE ROAD
BIGHILL
LANE-POOLE
Gardner River
Watershed
A 18705 National Park
Plot 1
Plot 12 P.D.
S. to I.
Gully
C. Blake
Pt. 4291
W. Leuten
O'Hare
Bourne
Tomlinson
Knopp
White
Steer
L. Bennett
Sch. Site

3. NORTHCLIFFE: HX 69

AREA: 200 ha

LAND TENURE: State Forest

LOCALITY: Map: Northcliffe
Map ref: HNX 69
417000 mE 6173000 mN
Aerial Photography ref. - Pemberton. Run 9. Photo nos. 5170; 5171.

GENERAL: Entry is gained via Wheatley Coast Road along Crowea to Orchid Road, turn south. 1.5 km down Orchid Road area starts and is bounded to the east and south by Orchid Road.

Block is some 1 km wide, from Orchid Road in the east.

LANDFORMS AND SOILS: Quagering land form dominates this area. Soil types are gravelly loam to the north and south of the area, with acid grey sand in the centre.

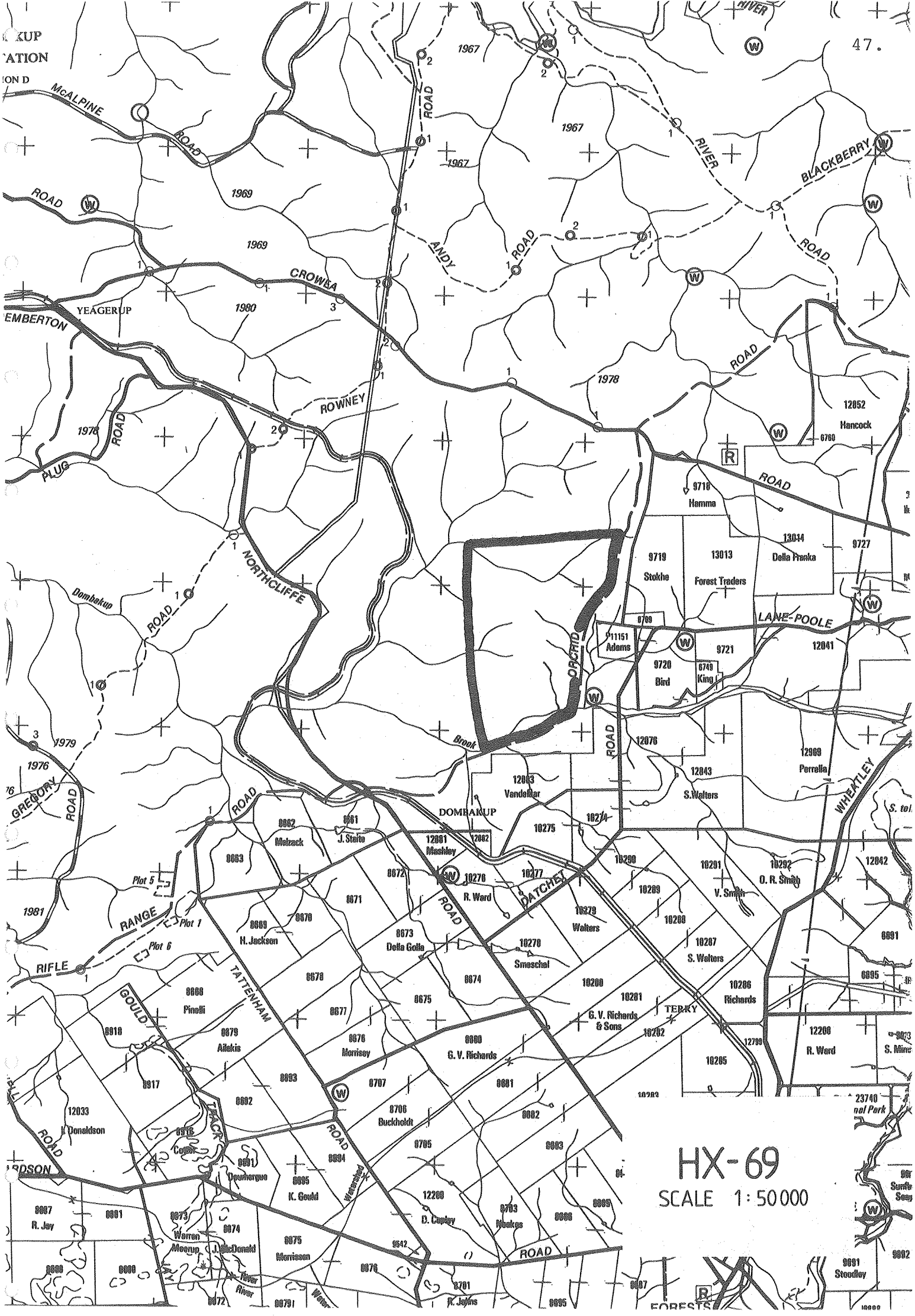
Some waterlogging occurs but can be overcome.

VEGETATION: This varies from Karri, Marri or Jarrah. Marri on the loam soils to Ti-tree scrub on the sand.

LAND CLASSES: This block falls in the land class 3 with some small areas of land class 2.

SUITABILITY TO AGRICULTURE: Block size is the main problem for release of this area for viable farms. However it would be suitable for a run-off block as soil types are useful for agriculture, and it is adjoining existing farmland.

RECOMMENDATION: This block could be released to agriculture as one block to farmers with properties close by, as the size (200 ha) is too small for a separate farm. It is an ideal size for a run-off block.



HX-69

SCALE 1:50000

4. NORTHCLIFFE: HZ 65

AREA: 300 ha

LAND TENURE: State Forest

LOCALITY: Map: Northcliffe
Map ref: HZ 65
412000 mE 6171000 mN
Aerial Photography ref: - Pemberton, Run 9. Photo nos. 5171; 5170

GENERAL: Access is gained from the main Pemberton-Northcliffe Road on to Rifle Range Road which passes through the block. Proximity to Northcliffe is about 8 km and the south side adjoins rural land.

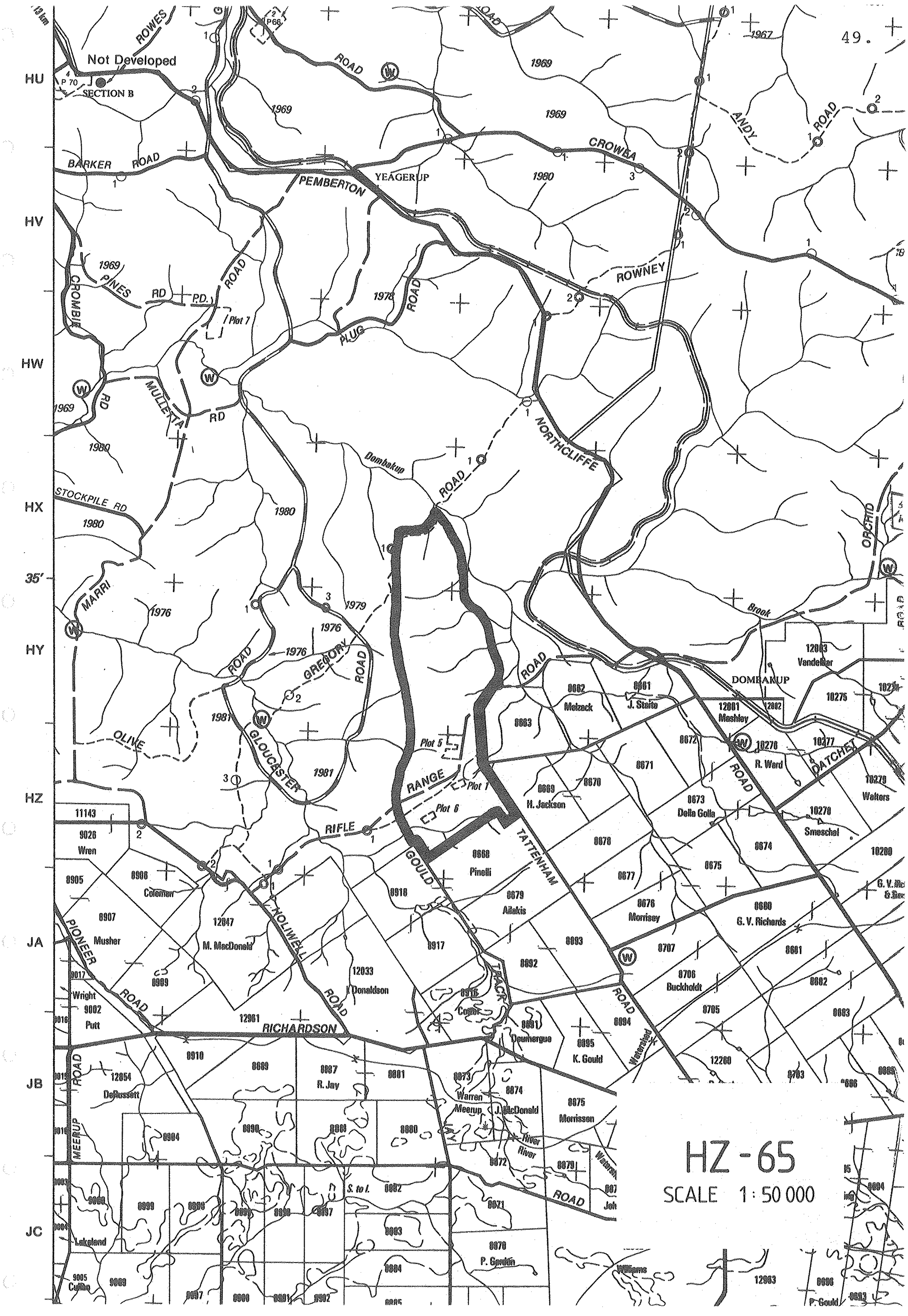
LANDFORMS AND SOILS: Quagering landforms.

VEGETATION: Ti-Tree scrub and stunted Jarrah.

LAND CLASSES: Class 3.

SUITABILITY TO AGRICULTURE: The land is suitable for grazing and would require some drainage for it to realize its full potential.

RECOMMENDATION: That the block be increased to Gloucester Road on the west to provide adequate area to be a viable unit.


HZ - 65
SCALE 1 : 50 000
Not Developed
SECTION B
HU
HV
HW
HX
35'
HY
HZ
JA
JB
JC
BARKER ROAD
PEMBERTON
YEAGERUP
CROWEA
ANDY ROAD
ROWNEY
ROWES
PINES RD
CROMBIE
PLUG ROAD
MULLETTA RD
NORTHCLIFFE
Dombakup
ROAD
STOCKPILE RD
MARRI
GREGORY ROAD
OLIVE
GLOUCESTER
RANGE
RIFLE
GOULD
TATTENHAM
Plot 1
Plot 5
Plot 6
Plot 7
Brook
DOMBAKUP
DATCHET
ORCHID
HOLIWELL ROAD
PIONEER ROAD
RICHARDSON
MEERUP ROAD
TRACK
Warren
Meerup
River
Melzack
J. Staite
Meshley
Vandeller
R. Ward
H. Jackson
Della Golla
Smeschel
Walters
Pinelli
Ailakis
Morrisey
G. V. Richards
Buckholdt
Wren
Coleman
Musher
M. MacDonald
I. Donaldson
Wright
Putt
Doumergue
K. Gould
R. Jay
DeRussett
J. McDonald
Morrissen
Lakeland
P. Gordon
Williams
P. Gould

5. NORTHCLIFFE: HZ 74

AREA 500 ha

LAND TENURE: State Forest, 2 areas totalling 350 ha. Crown land 150 ha.

LOCALITY: Map: Northcliffe
Map ref: HZ 74
426000 mE 6170000 mN
Aerial Photography ref. - Pemberton - Run 9. Photo nos. 5168; 5167; 5166.

GENERAL: Access is gained across Middleton Road. The block is 7.5 km by road ENE of Northcliffe.

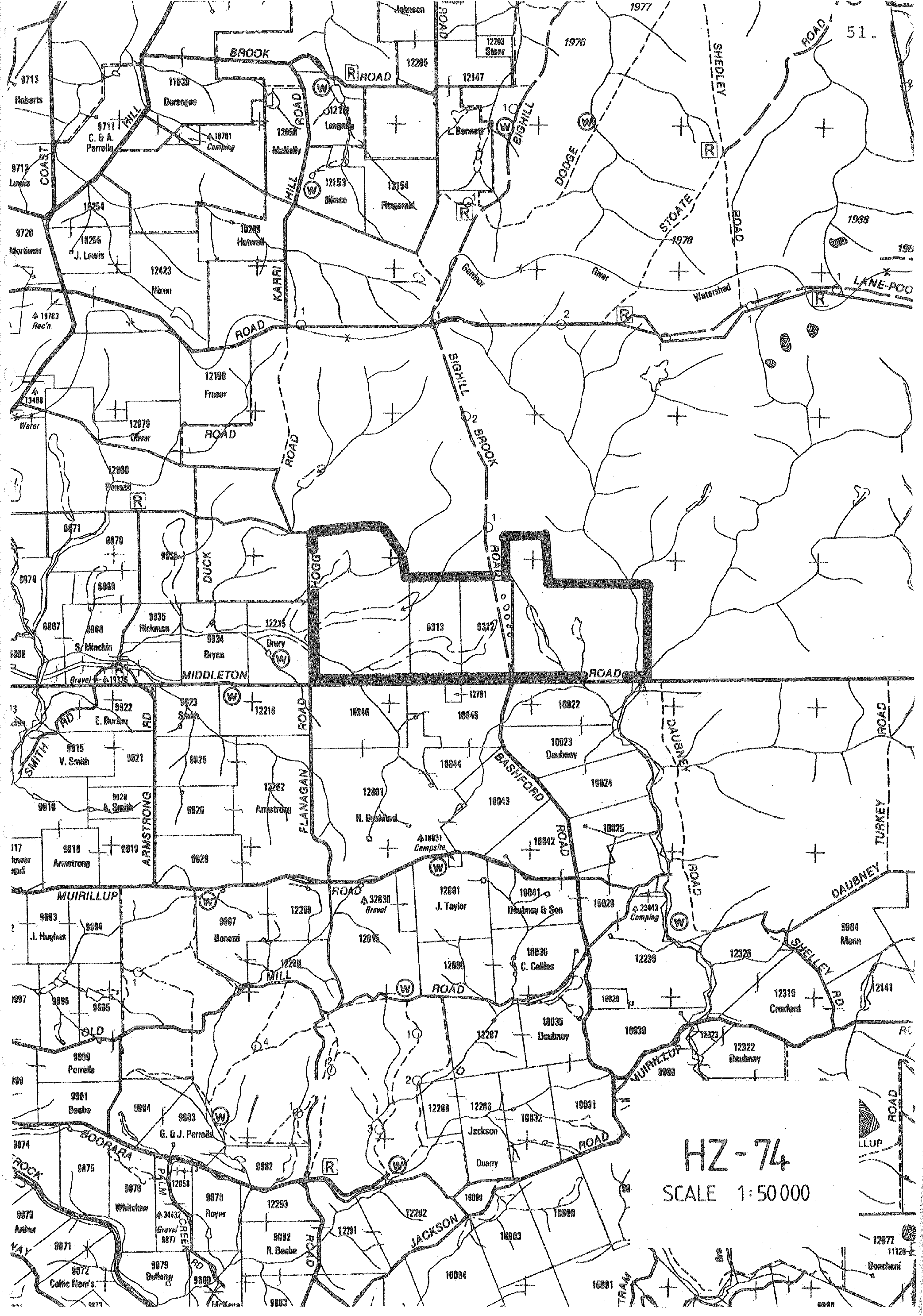
LANDFORM AND SOILS: The block is gently undulating with Quagering the dominant landform. Soils are mainly deep acid grey sands which have reasonable drainage.

VEGETATION: Mainly Ti-Tree scrub with small areas of Jarrah and Marri.

LAND CLASSES: Mainly Class 3 with small areas of 2.

SUITABILITY TO AGRICULTURE: Suitable for grazing.

RECOMMENDATION: To be allocated as one 500 ha property.


HZ - 74
SCALE 1:50 000
BROOK ROAD
COAST HILL
KARRI HILL ROAD
BIGHILL
BIGHILL BROOK ROAD
DODGE
STOATE
SHEDLEY ROAD
LANE-POO
Gardner River
Watershed
DUCK ROAD
HOGG ROAD
MIDDLETON ROAD
FLANAGAN ROAD
BASHFORD ROAD
DAUBNEY ROAD
TURKEY ROAD
DAUBNEY
SHELLEY RD
SMITH RD
ARMSTRONG RD
MUIRILLUP
MUIRILLUP ROAD
MILL ROAD
OLD
BOORARA ROAD
PALM CREEK RD
JACKSON
TRAM
1976
1977
1978
1968
9713 Roberts
9711 C. & A. Perrella
9712 Lewis
9720 Mortimer
11939 Dersogna
12059 McNelly
12112 Longmia
12153 Bilinco
12154 Fitzgerald
12203 Steer
12205
12147
L. Bennett
Johnson
10254
10255 J. Lewis
10269 Hatwell
12423 Nixon
18781 Camping
19783 Rec'n.
13498 Water
12188 Fraser
12979 Oliver
12990 Bonozzi
8671
8870
8874
8869
8867
8868 S. Minchin
9935 Rickman
9934 Bryan
12215 Drury
8313
8312
Gravel 19336
9923 Smith
12216
9922 E. Burton
9915 V. Smith
9921
9925
12262 Armstrong
9920 A. Smith
9916
9926
9918 Armstrong
9919
9929
12791
10046
10045
10022
10023 Daubney
10044
10024
12691 R. Bashford
10043
18031 Campsite
10025
10042
12081 J. Taylor
32630 Gravel
10041 Daubney & Son
10026
23443 Camping
9904 Mann
9893 J. Hughes
9894
9907 Bonazzi
12209
12045
12080
10036 C. Collins
12239
12320
12319 Croxford
12141
12288
10029
10035 Daubney
10039
12323
12322 Daubney
9897
9896
9895
12287
9900 Perrella
9901 Beebe
9904
9903 G. & J. Perrella
12288
12286
10032
10031
Jackson
Quarry
9874
9875
9876 Whitelaw
12058
34432 Gravel 9877
9878 Royer
9882
12293
12292
12291
10009
10008
10003
9870 Arthur
9871
9879 Bellamy
9872 Celtic Nom's.
9882 R. Beebe
9883
9880
10004
10001
McKena
12077
Bonchoni

6. NORTHCLIFFE: JA 80

AREA: 300 ha

LAND TENURE: Vacant Crown Land

LOCALITY: Map: Northcliffe
Map ref: JA 80
436000 mE 616800 mN

GENERAL: Access is from either Deeside Coast Road or Bannister Road.

Area is bounded by Preston Road (from Deeside Coast Road) in the south, and stretches for some 500 m north of Preston Road to farmland in the west.

LANDFORMS AND SOILS: Major landform in this area is Boorara with some Quagering in the southern end.

VEGETATION: The north western end is dominated by Karri Marri vegetation, and falls away to Jarrah in the centre and Ti-Tree scrub to the eastern half (some Jarrah outcrops).

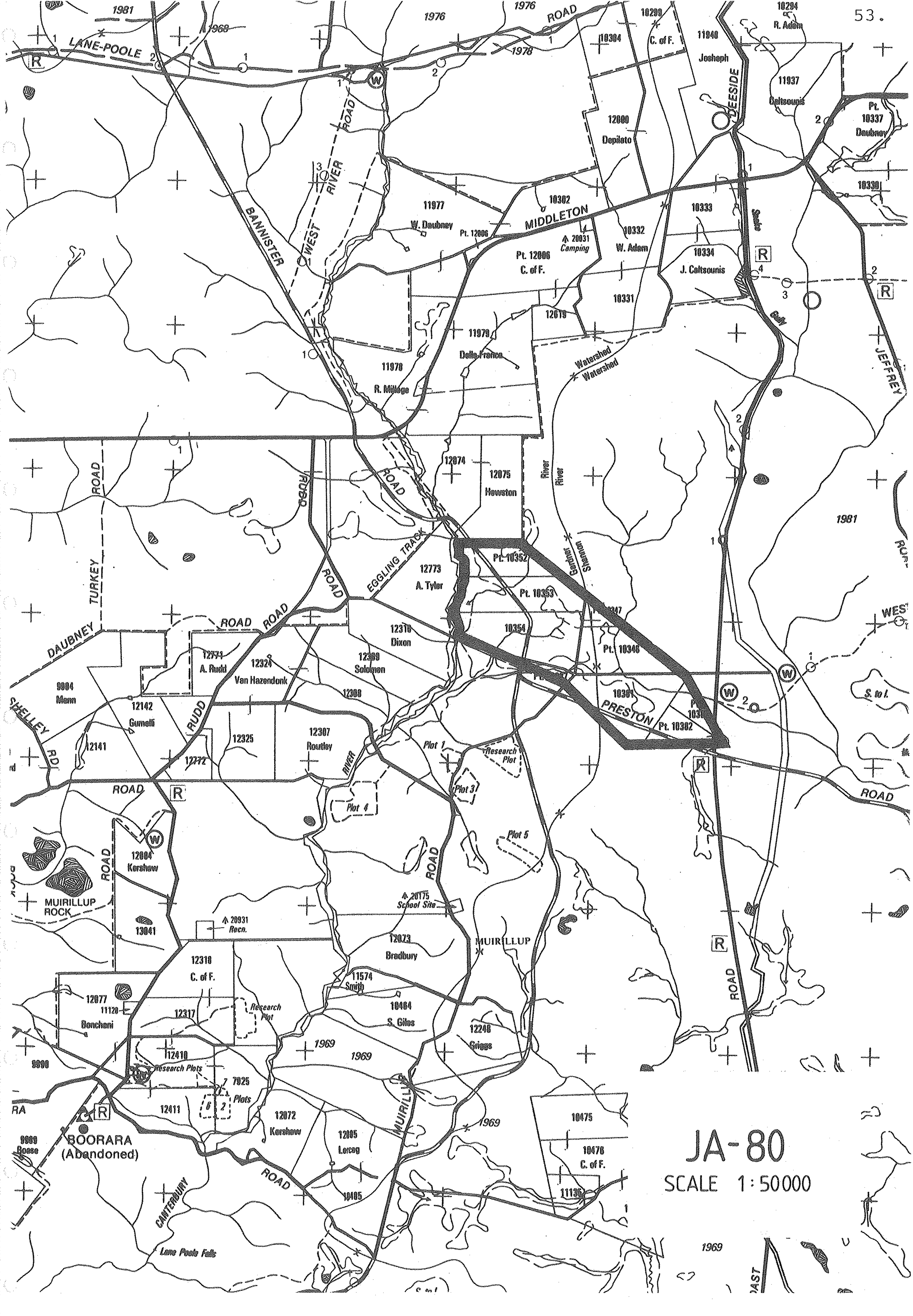
LAND CLASSES: The north western end could be classed as land class 1, however due to size this would be inappropriate as one farm.

When including all of the area, the land class would be 3 for most of the block, and 2 for the western end.

SUITABILITY TO AGRICULTURE: Due to its size (300 ha) this block is only suitable for release as run-off blocks to farms in the area.

Soil types are a good mixture for agriculture.

RECOMMENDATION: The block be released as a run-off block to a farmer in the immediate vicinity.



JA-80
SCALE 1:50000
LANE-POOLE
ROAD
MIDDLETON
BANNISTER
WEST RIVER ROAD
RUDD ROAD
TURKEY ROAD
DAUBNEY ROAD
EGGLING TRACK
PRESTON
DEESIDE
JEFFREY
SHELLEY RD
MUIRILLUP ROAD
CANTERBURY
MUIRILLUP ROCK
MUIRILLUP
BOORARA
(Abandoned)
Lane Poole Falls
Watershed
Gardner River
Shannon River
1981
1976
1978
1969
11940 Joseph
11937 Caltsounis
Pt. 10337 Daubney
12000 Depilato
10382
10333
10332 W. Adam
10334 J. Caltsounis
10331
11977 W. Daubney
Pt. 12006 C. of F.
20931 Camping
12619
11979 Della-Franca
11978 R. Millage
12074
12075 Hewston
Pt. 10352
Pt. 10353
10354
Pt. 10346
10301
Pt. 10302
12773 A. Tyler
12310 Dixon
12309 Solomon
12308
12771 A. Rudd
12324 Van Hazendonk
9984 Mann
12142 Gumeli
12141
12325
12307 Routley
12772
Plot 1
Research Plot
Plot 3
Plot 4
Plot 5
20175 School Site
12004 Kershaw
13041
20931 Recn.
12073 Bradbury
12318 C. of F.
11574 Smith
12077
11120
Bonchani
12317
Research Plot
10464 S. Giles
12246 Griggs
12410
Research Plots
7025
Plots
12411
12072 Kershaw
12005 Lercag
10485
10475
10476 C. of F.
11136

7. NORTHCLIFFE: JC 64

AREA: 650 ha

LAND TENURE: Crown Land

LOCALITY: Map: Northcliffe
Map ref: JC 64
410000 mE 6165000 mN
Aerial Photography ref. - Pemberton. Run 9. Photo nos. 5171; 5172

GENERAL: Access from Double Bridge Road.

LANDFORMS AND SOILS: The block is predominantly flat with undulating areas of land through the centre of the block.

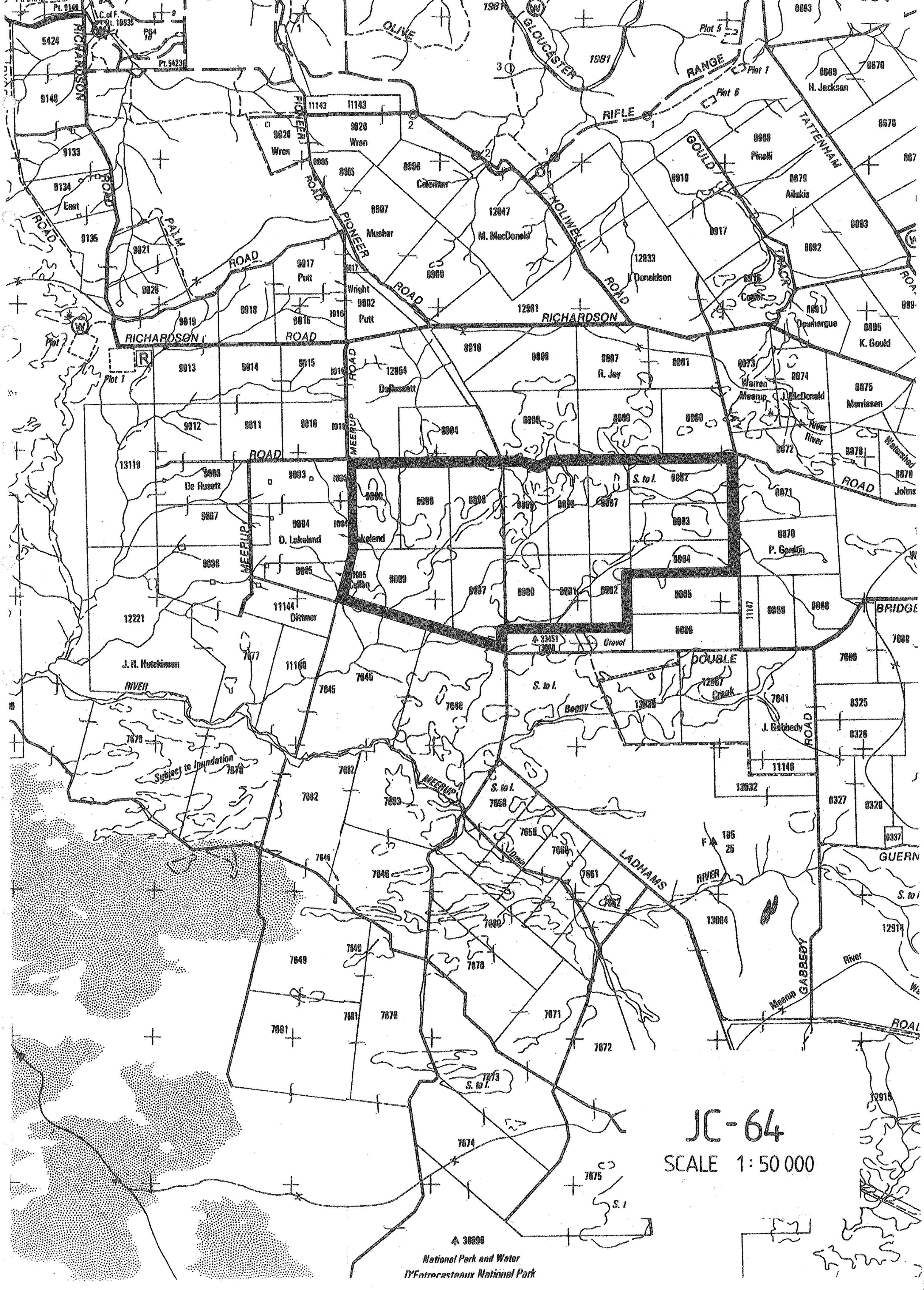
Mainly Chudalup - 450 ha of acid grey sands. North east corner gravelly sandy loam.

VEGETATION: Mainly Ti-Tree and associated scrub and brush on the flats with Jarrah and Marri on the better drained areas.

LAND CLASSES: Class 3 and 4.

SUITABILITY TO AGRICULTURE: Class 3 area (shown on plan) northern section of block. Remainder of block is too wet for easy development and would make grazing country only, (a land class 4 area).

RECOMMENDATION: This block should not be released for agriculture.


JC-64
SCALE 1:50 000
RICHARDSON ROAD
PIONEER ROAD
OLIVE
GLOUCESTER
RIFLE RANGE
HOLIWELL ROAD
GOULD
TATTENHAM
TRACK
PALM ROAD
MEERUP ROAD
BRIDGE
DOUBLE
Boggy
Creek
RIVER
Subject to Inundation
LADHAMS
GABBEDY ROAD
GUERN
Watershed
ROAD
S. to l.
Gravel
Drain
Wren
Coleman
Musher
M. MacDonald
I. Donaldson
Putt
Wright
Pinelli
Ailakis
H. Jackson
K. Gould
Doumergue
R. Jay
DeRussett
De Rusett
D. Lakeland
Cullen
Dittmer
J. R. Hutchinson
Warren
Meerup
J. McDonald
Morrissen
P. Gordon
J. Gabbedy
Johns
East
National Park and Water
D'Entrecasteaux National Park

8. NORTHCLIFFE: JD 75

AREA: 710 ha

LAND TENURE: Crown Land

LOCALITY: Map: Northcliffe
Map ref: JD 75
426000 mE 616200 mN
Aerial. Photography ref. - Pemberton. Run 10. Photo nos. 5185; 5186.

GENERAL: From Northcliffe along Boorara Road and the block is bounded by Jackson and Mottram Roads. The block is 8 km by road SE of Northcliffe.

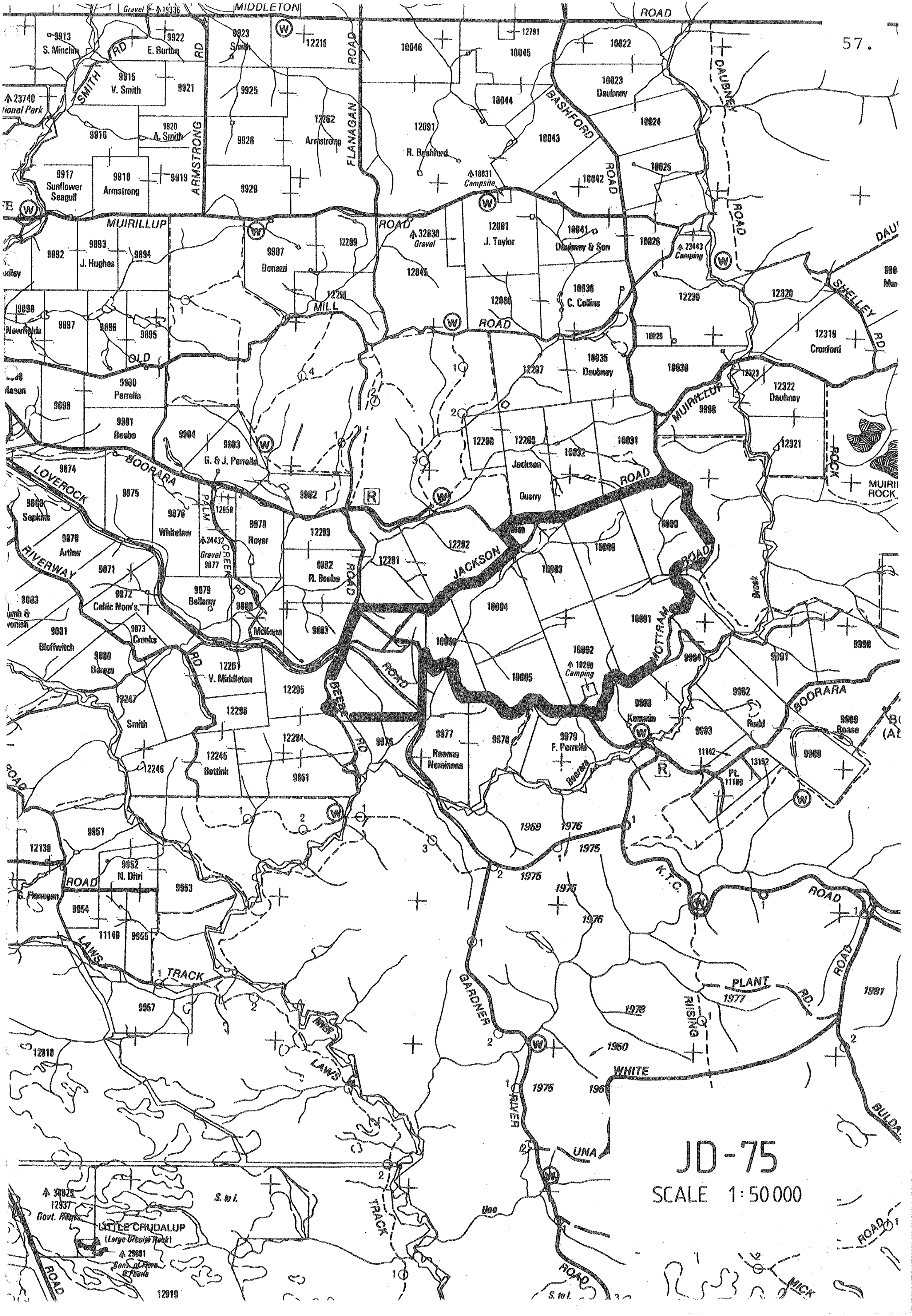
LANDFORMS AND SOILS: Mainly Pemberton, - the southern section of the block is gravelly loam, undulating and well drained. While the northern section falls away to flatter areas of acid grey sands.

VEGETATION: Mainly jarrah and marri.

LAND CLASSES: Land classes 1, 2 and 3.

SUITABILITY TO AGRICULTURE: The block is well suited to a range of agricultural enterprises. Some areas on the Mottram Road or southern side are suitable for intensive agriculture.

RECOMMENDATION: This block should be released for agriculture.


JD-75
SCALE 1:50 000
MIDDLETON ROAD
MUIRILLUP ROAD
MILL ROAD
BOORARA ROAD
JACKSON ROAD
MOTTRAM ROAD
BEEBE RD
LOVEROCK
RIVERWAY
DAUBNEY ROAD
BASHFORD ROAD
ARMSTRONG RD
FLANAGAN ROAD
SMITH RD
SHELLEY RD
GARDNER RIVER
LAWS TRACK
K.T.C. ROAD
PLANT RD.
RISING
WHITE
UNA
LITTLE CRUDALUP
(Large Granite Rock)

9. NORTHCLIFFE: JF 67

AREA: 630 ha.

LAND TENURE: Vacant Crown Land

LOCALITY: Map: Northcliffe
Map ref: JF 67
415000 mE 616100 mN
Aerial Photography ref. - Pemberton. Run 10. Photo nos. 5182; 5183.

GENERAL: Access is obtained from Wheatley Coast Road (South of Northcliffe townsite) turning west down Guernsey Gully Road.

Area is bounded by Guernsey Gully Road to the north. Gabbedy Road in the west and south and farmland to the east.

LANDFORMS AND SOILS: Landform is Chudalup with isolated islands of gravelly red earths and podzolic soils emerging from broad sandy plains of humus podzols.

Soil type is predominantly acid grey sand, which is mostly waterlogged.

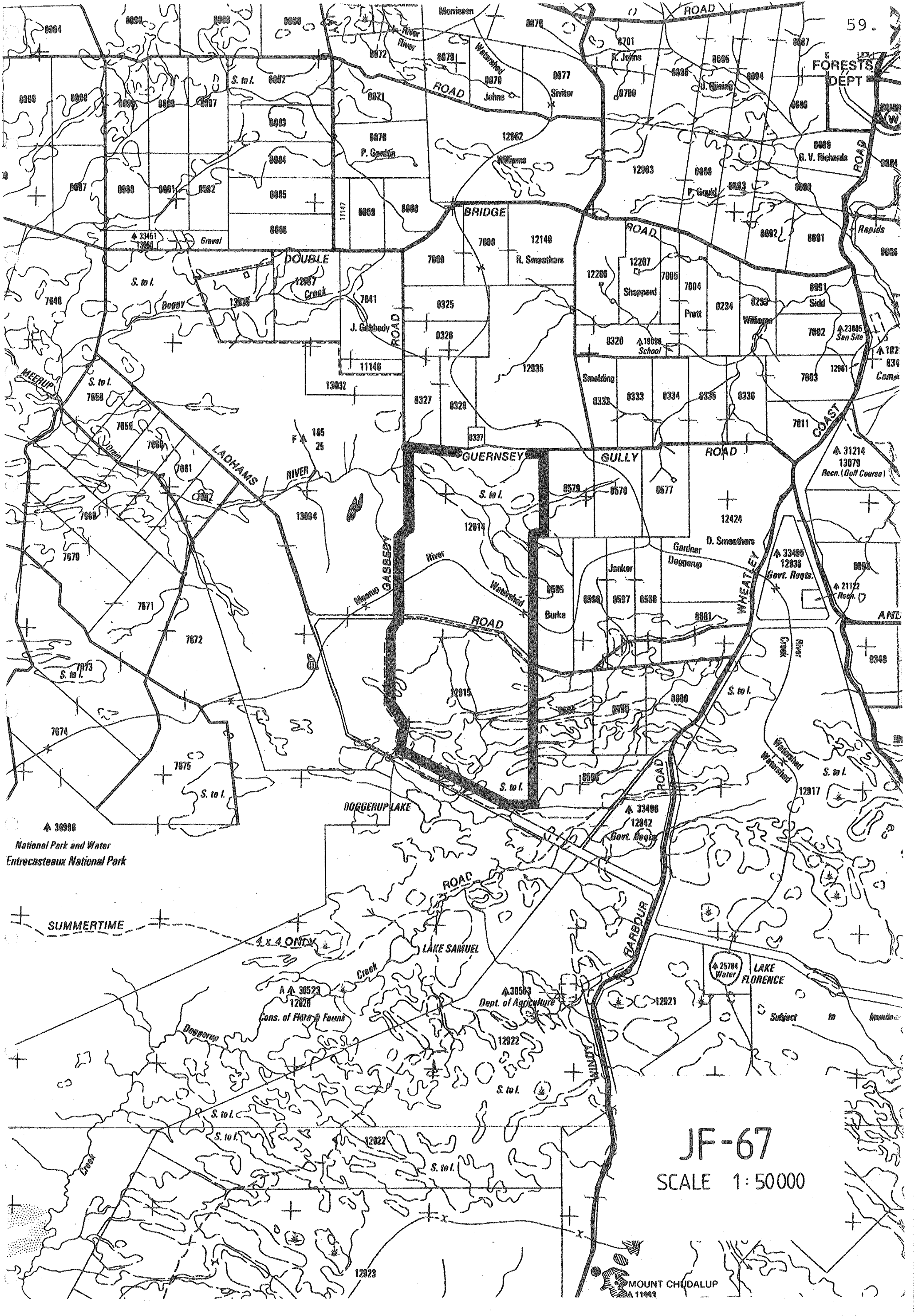
VEGETATION: Stunted jarrah scattered throughout, with Ti-Tree areas in the lower waterlogged areas.

Some karri and marri and jarrah are the high loam islands, mainly to the central western portion.

LAND CLASSES: Mainly land class 4 due to waterlogging.

SUITABILITY TO AGRICULTURE: Due to the extensive waterlogging of this area this area would be too difficult to develop for agriculture.

RECOMMENDATION: Due to waterlogging and the extensive areas of acid grey sand, this area should not be released for agriculture at present.


FORESTS DEPT
BRIDGE ROAD
DOUBLE ROAD
GUERNSEY GULLY ROAD
LADHAMS
MEERUP
GABBEDY ROAD
WHEATLEY COAST ROAD
HARBOUR ROAD
WINDY
SUMMERTIME
4 x 4 ONLY
DOGGERUP LAKE
LAKE SAMUEL
LAKE FLORENCE
MOUNT CHUDALUP
National Park and Water
Entrecasteaux National Park
Dept. of Agriculture
Cons. of Flora & Fauna
Govt. Reqts.
Recn. (Golf Course)
School
Subject to Inundation
JF-67
SCALE 1:50000

10. BROKE JN: 75

AREA: 1600 ha

LAND TENURE: State forest

LOCALITY: Map: Broke Inlet
Map ref: JN 75
427000 mE 6153000 mN

GENERAL: From the South West Highway south on the Deeside Road then west along the Chesapeake Road provides access to the southern end of the blocks.

LANDFORMS AND SOILS: Boorara landform to south, changing to Quagering to centre, and changes to Pemberton landform to the northern half of area.

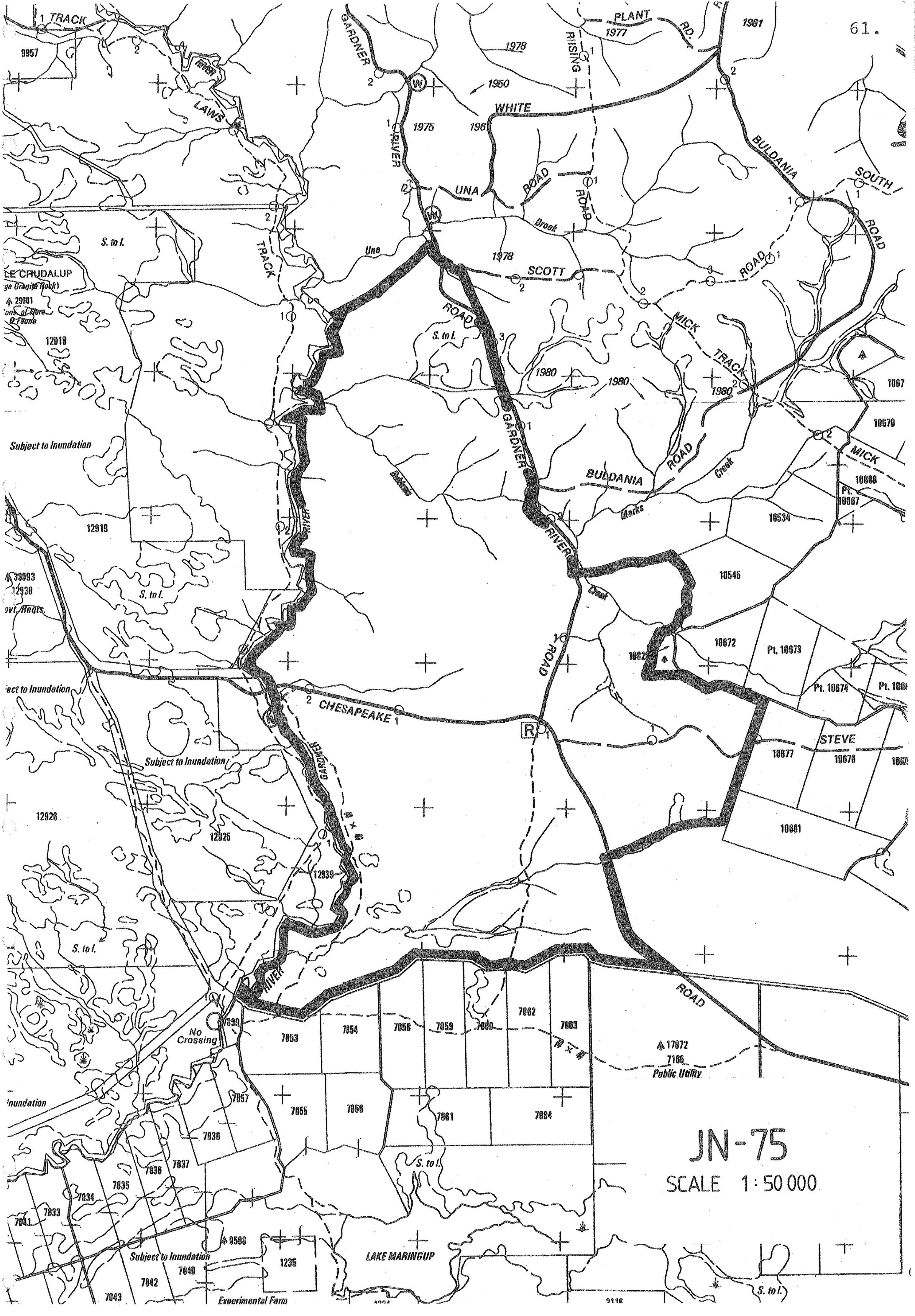
Soil types are mainly gravelly loams to acid grey sand in low lying area.

VEGETATION: Variable from karri, jarrah, marri on islands. to Ti-Tree scrub and stunted jarrah on sandy flats.

LAND CLASSES: Land classes 2 and 3 are predominant.

SUITABILITY TO AGRICULTURE: This area would be a suitable size and soil types for agricultural use, being classified as land class 2 to 3.

RECOMMENDATION: Even though this block would be suited to agriculture, due to isolation, it cannot be recommended for release.


TRACK
9957
LAWS
RIVER
GARDNER
RIVER
1975
1950
1978
RISING
PLANT
RD.
1977
1981
WHITE
UNA
ROAD
ROAD
Brook
BULDANIA
SOUTH
ROAD
S. to I.
TRACK
Una
1978
SCOTT
ROAD
MICK
TRACK
ROAD
S. to I.
1980
1980
1980
LE CRUDALUP
29691
12919
Subject to Inundation
GARDNER
BULDANIA
ROAD
Creek
Marks
MICK
10670
10668
Pt. 10667
10534
12919
RIVER
39993
12938
S. to I.
RIVER
ROAD
10545
10672
Pt. 10673
Pt. 10674
CHESAPEAKE
Subject to Inundation
GARDNER
STEVE
10677
10676
12926
12925
10681
12939
S. to I.
RIVER
ROAD
No Crossing
7839
7853
7854
7858
7859
7860
7062
7063
17072
7166
Public Utility
7857
7855
7856
7861
7064
7838
7837
7836
7835
7834
7833
S. to I.
9580
Subject to Inundation
7840
1235
LAKE MARINGUP
7842
7843
Experimental Farm
S. to I.
JN-75
SCALE 1 : 50 000

11. BROKE: JL 90

AREA: 500 ha

LAND TENURE: Crown land

LOCALITY: Map: Broke Inlet
Map ref: JL 90
453000 mE 6153000 mN
Aerial Photography ref. - Pemberton Run 12. Photo nos. 5313; 5314.

GENERAL: Adjacent to the South West Highway with Pungerup Road to the south of the block. Dixie Road roughly bisects the block.

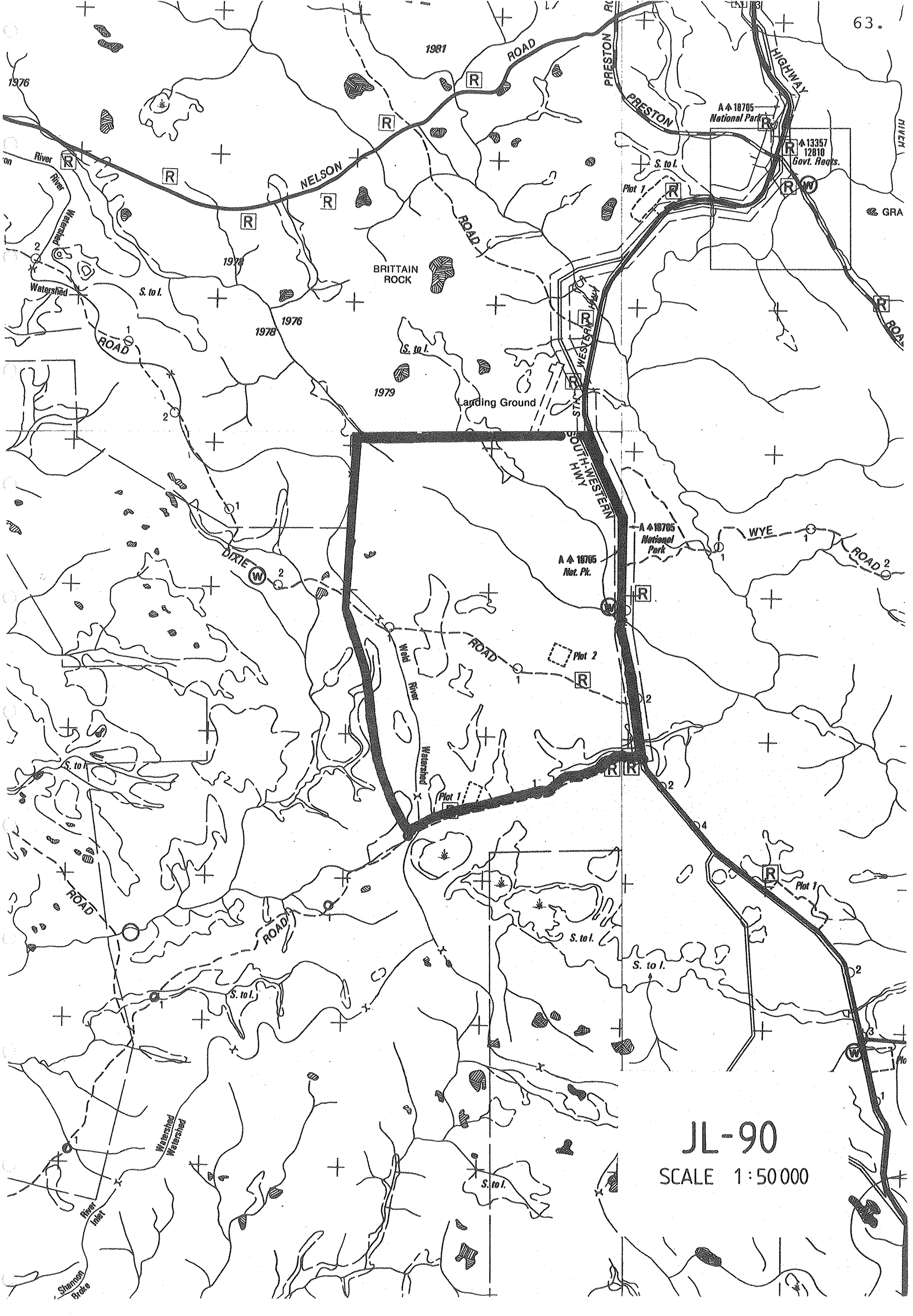
LANDFORMS AND SOILS: Extensive flats with numerous swamps. The northern section of the block drains to the Deep River. Soils on the flats are grey sands with better class of grey sandy loams to the south east of the block.

VEGETATION: Jarrah and marri along the eastern side of the block with non forested areas through the centre of the block being mainly scrub and associated brush common to sandy waterlogged areas.

LAND CLASSES: The block is mainly class 3 with the swampy areas class 4.

SUITABILITY TO AGRICULTURE: This block could possibly be used for agriculture however further investigation is necessary.

RECOMMENDATION: Due to its proximity to the coast and isolation from other agricultural land this should not be released without first assessing the impact on the surrounding coastal land.


NELSON ROAD
PRESTON ROAD
PRESTON
HIGHWAY
A 18705 National Park
13357 12810 Govt. Reqts.
S. to l.
Plot 1
BRITTAIN ROCK
Watershed
River
ROAD
S. to l.
Landing Ground
SOUTH-WESTERN HWY
SOUTH-WESTERN HWY
A 18705 National Park
A 18705 Nat. Pk.
WYE ROAD
DIXIE
ROAD
Plot 2
Weld River
Watershed
Plot 1
Plot 1
S. to l.
S. to l.
ROAD
ROAD
S. to l.
Watershed
Watershed
River Inlet
Shannon Brook
S. to l.
GRA
RIVER
JL-90
SCALE 1:50000

12. WALPOLE: JN 94

AREA: 800 ha

LAND TENURE: State forest

LOCALITY: Map: Walpole
Map ref: JN 94
Aerial Photography ref. - Pemberton. Run 11. Photo nos. 5217; 5216

GENERAL: Area is off the South Coast Highway with Beardmore Road passing through the centre of the area.

Area is approximately 1 km wide (500 m either side of Beardmore Road) and extends approximately 2.3 km down Beardmore Road.

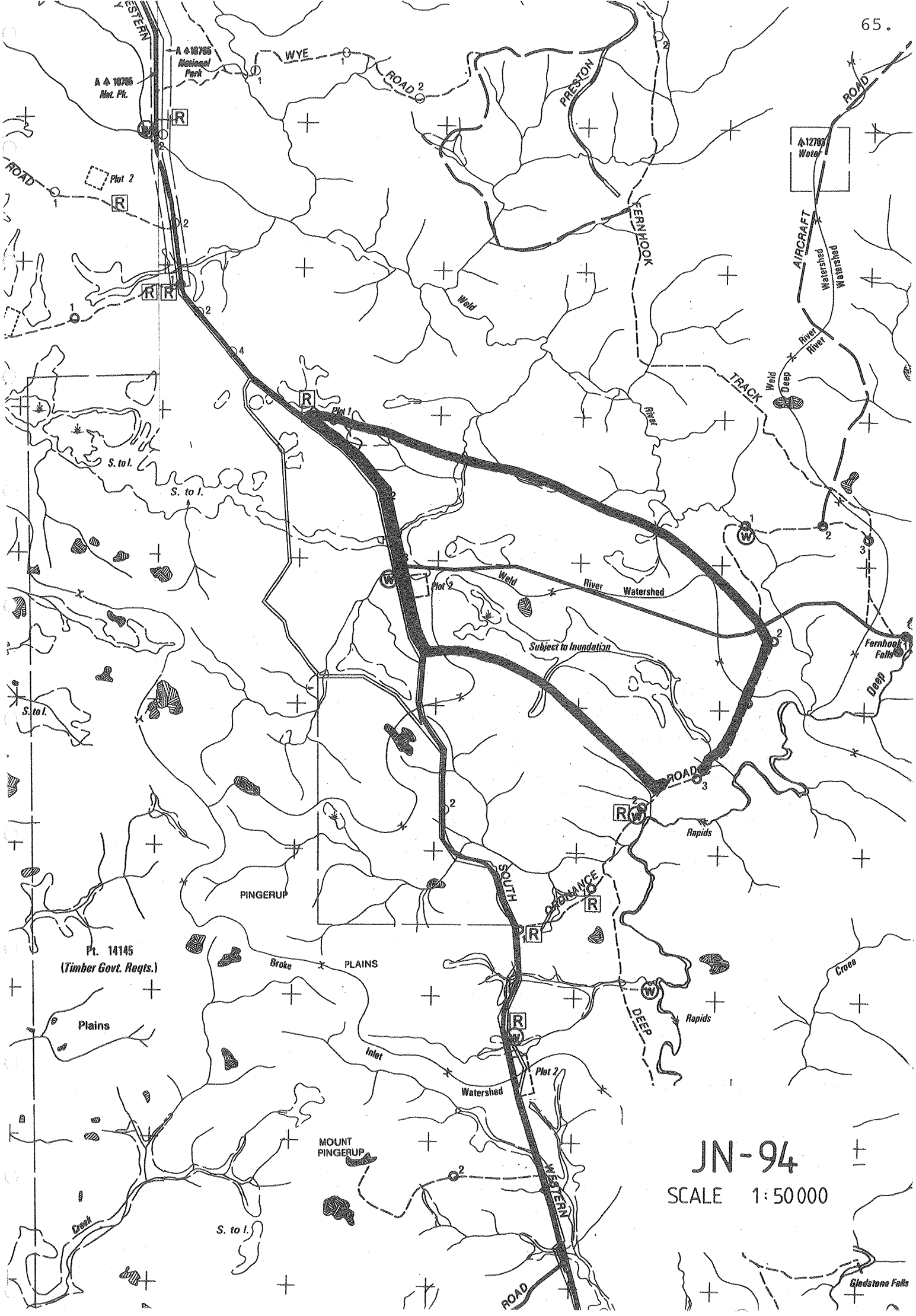
LANDFORMS AND SOILS: Landform is of the Chudalup group, with a predominance of acid grey sand soil type with islands of loam and gravelly loam, as well as some granite outcrops.

LAND CLASSES: Block would be classified as a land class 4.

SUITABILITY TO AGRICULTURE: This area is extensively waterlogged and would be difficult to drain.

Land would only be suited to grazing at very low stocking rates.

RECOMMENDATIONS: Due to waterlogging and soil types this area is not suitable for agriculture under the present economic climate.


WESTERN
A 18765
National Park
A 18765
Nat. Pk.
WYE
ROAD
PRESTON
ROAD
A 12782
Water
ROAD
Plot 2
FERNHOOK
AIRCRAFT
Watershed
Watershed
Weld
River
River
Weld
Deep
TRACK
Plot 1
River
S. to I.
S. to I.
Plot 2
Weld
River
Watershed
Subject to Inundation
Fernhook Falls
Deep
S. to I.
ROAD
Rapids
SOUTH
PINGERUP
Pt. 14145
(Timber Govt. Reqts.)
Broke
PLAINS
Plains
Inlet
Plot 2
Watershed
Rapids
DEEP
Creek
MOUNT PINGERUP
S. to I.
WESTERN
ROAD
Gladstone Falls
JN-94
SCALE 1:50000

13. WALPOLE: JM 102

AREA: 2850 ha

LAND TENURE: State forest (quarantine area)

LOCALITY: Map: Walpole
Map ref: JM 102
470000 nE 6150000 mN
Aerial Photographny ref. - Pemberton Run 12. Photo nos. 5317; 53418.

GENERAL: Access from Thompson Road and Beardmore Road from the South West Highway.

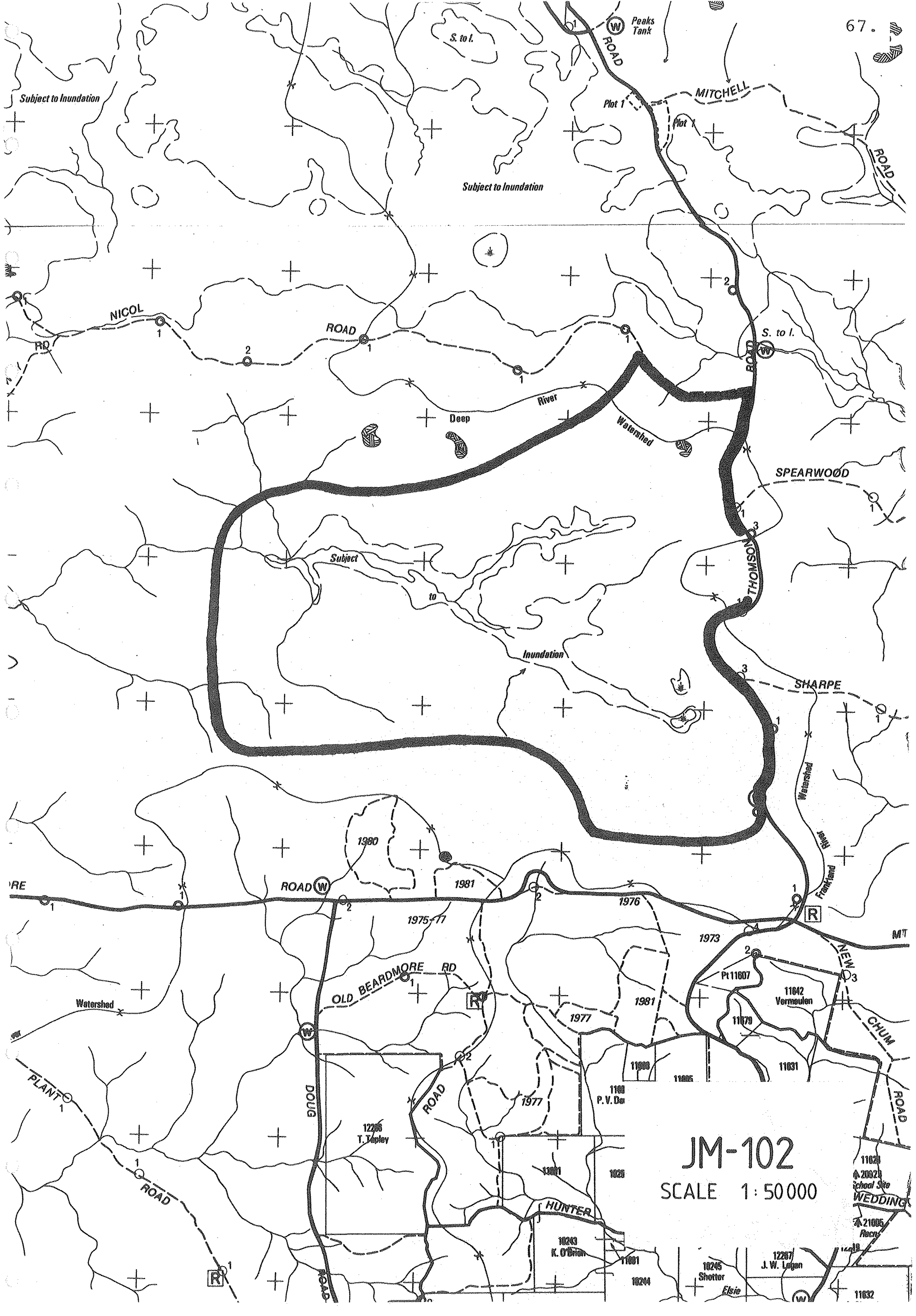
LANDFORMS AND SOILS: Mainly waterlogged acid grey sands with isolated areas of gravelly loams.

LAND CLASSES: 3 and 4.

VEGETATION: Marri and jarrah confined mainly to the south coast and north east areas of the block. The remainder of the block is Ti-Tree and associated scrub.

SUITABILITY TO AGRICULTURE: Would require extensive drainage before it is suitable to agriculture.

RECOMMENDATION: Should not be released for agriculture as it is waterlogged and has large areas of poor soils.


Peaks Tank
S. to I.
ROAD
Subject to Inundation
MITCHELL
Plot 1
Plot 1
ROAD
Subject to Inundation
NICOL
RD
ROAD
S. to I.
ROAD
Deep
River
Watershed
SPEARWOOD
THOMSON
Subject
to
Inundation
SHARPE
Watershed
Frankland
River
1980
1981
ROAD
1976
1975-77
1973
NEW
OLD BEARDMORE RD
Watershed
Pt 11607
11642
Vermeulen
11679
1981
1977
CHUM
11631
PLANT
DOUG
ROAD
1977
12286
T. Tapley
P.V. Da
ROAD
ROAD
JM-102
SCALE 1:50000
School Site
WEDDING
Recn
HUNTER
10243
K. O'Brien
11601
10244
10245
Shotter
12287
J. W. Logan
Elsie
11632

14. NORTHCLIFFE: JP 99

AREA: 300 ha

LAND TENURE: State forest

LOCALITY: Map: Walpole
Map ref: JP 99
467000 mE 6145000 mN
Aerial Photography ref. - Pemberton. Run 12. Photo nos. 5315; 5316.

GENERAL: Access can be gained from the South West Highway along Beardmore Road.

LANDFORMS AND SOILS: The area is flat to undulating. Drainage from most of the block is to the south to Cross Brook. The remainder drains to the west into other smaller brooks which are also tributaries of the Deep River.

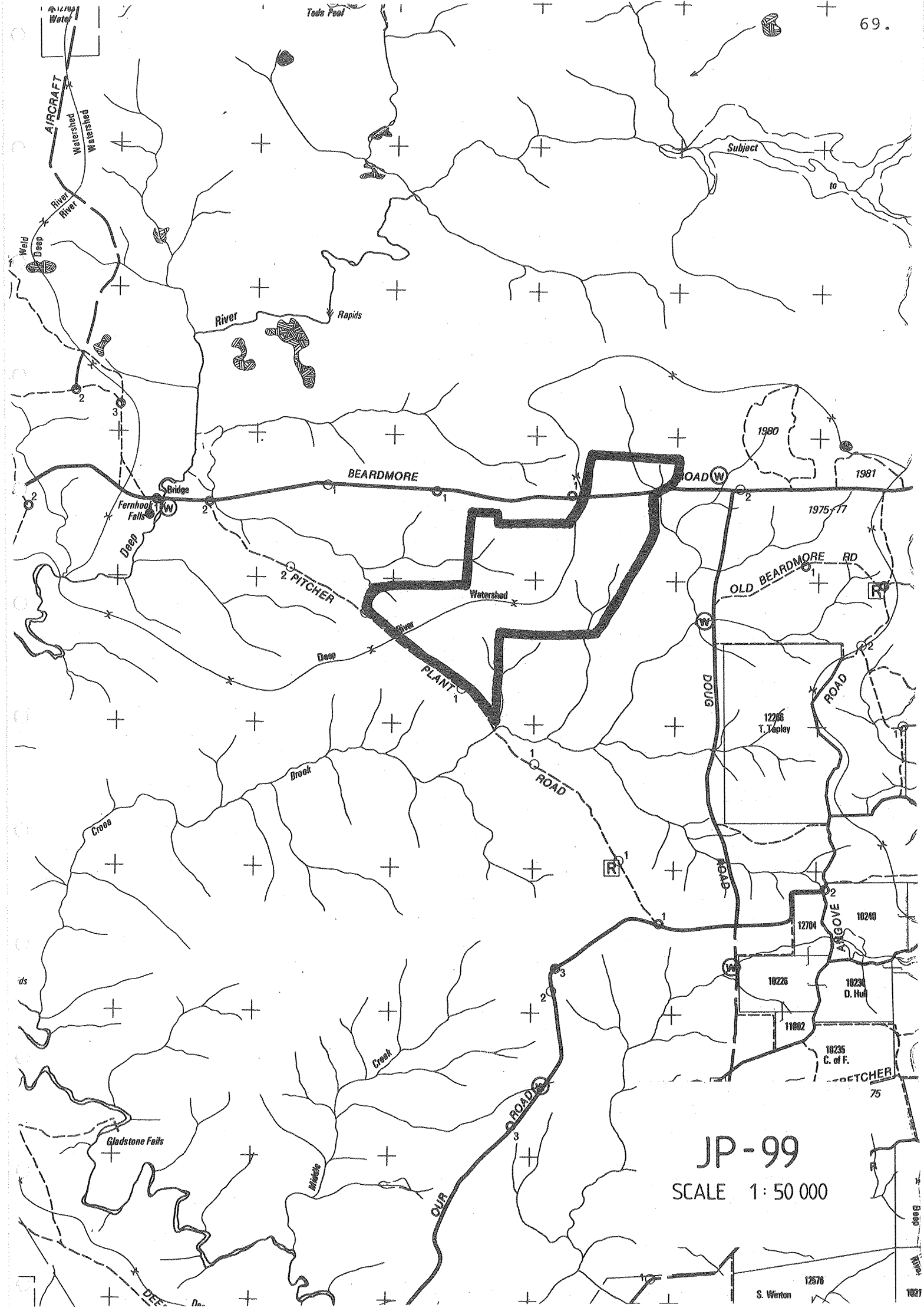
Soils are mainly acid grey sands with some gravelly loams on the higher ground.

VEGETATION: Small isolated stands of stunted jarrah on the higher ground with extensive flats of Ti-Tree scrub and associated brush.

LAND CLASSES: Small areas of land class 2 the bulk of the block being land class 3 with some areas of class 4.

SUITABILITY TO AGRICULTURE: With drainage the block could be suitable for grazing.

RECOMMENDATION: On its own the block is too small and as the area would require extensive drainage to bring the flats into production, we would not recommend this block for release for agriculture.


Teds Pool
AIRCRAFT
Watershed
Watershed
River
River
Weld
Deep
Subject
to
River
Rapids
1980
1981
1975-77
BEARDMORE
ROAD
Bridge
Fernhook
Falls
Deep
PITCHER
Watershed
River
Deep
PLANT
OLD BEARDMORE RD
DOUG
ROAD
12266
T. Tapley
Brook
ROAD
Creek
ROAD
12704
16240
ARGOVE
16226
16238
D. Hull
11892
16235
C. of F.
FLETCHER
75
Gladstone Falls
Middle
OUR
ROAD
12578
S. Winton
1827
JP-99
SCALE 1:50 000

15. WALPOLE: JR 99

AREA: 2450 ha

LAND TENURE: State forest

LOCALITY: Map: Walpole
Map ref: JR 99
468000 mE 6142000 mN
Aerial Photography ref. - Pemberton. Run 12. Photo nos. 5316; 5317.

GENERAL: Access from South West Highway along Centre Road to Our Road.

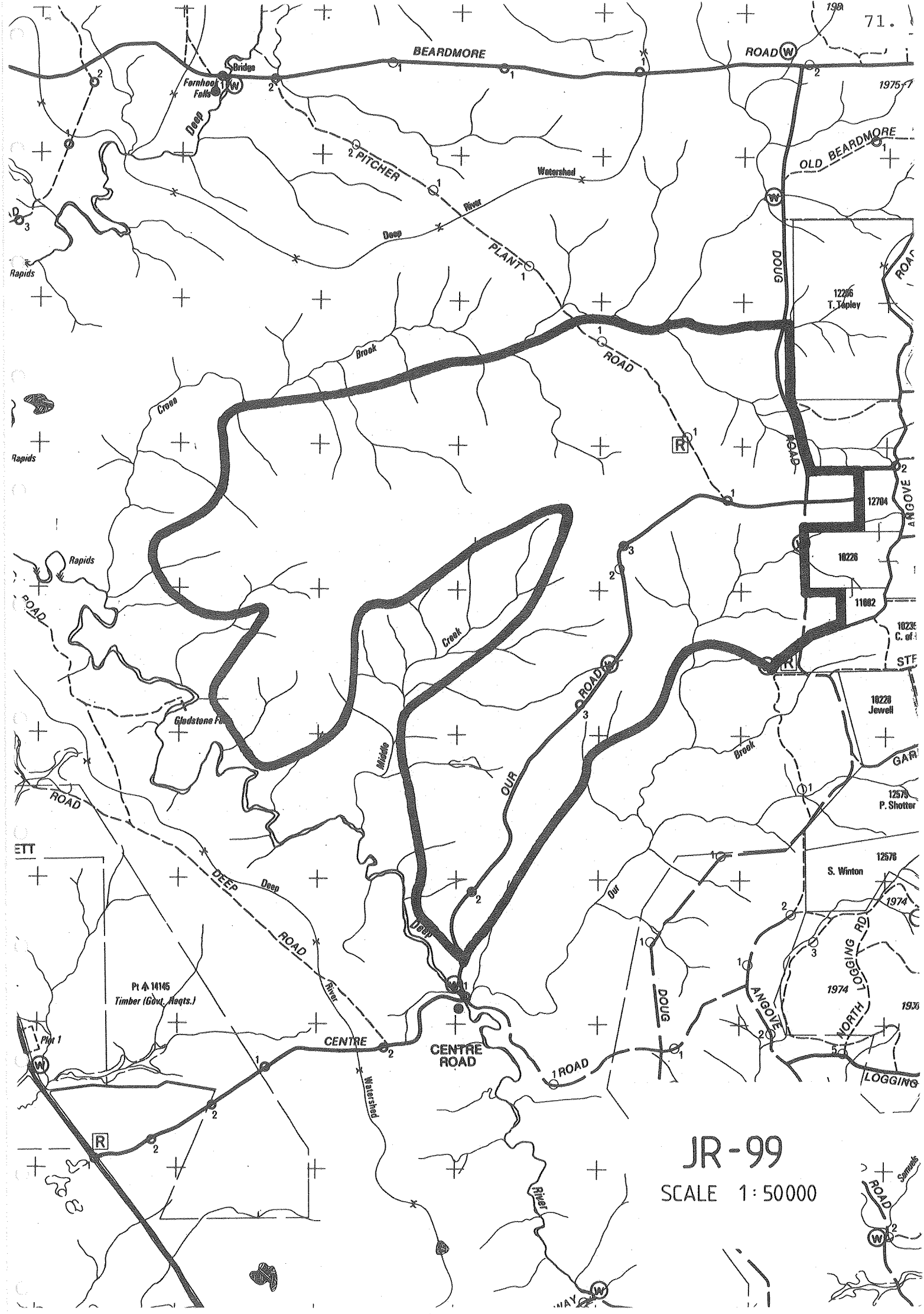
LANDFORMS AND SOILS: Flat to slightly undulating with quite large areas of well drained non forested flats. These flats are mainly acid grey sandy soils; on the higher ground are gravelly duplex soils.

VEGETATION: Jarrah and stunted jarrah with Ti-Tree and associated scrub on the flats.

LAND CLASSES: Mainly 2 and 3.

SUITABILITY TO AGRICULTURE: This large block would be suitable to agriculture. The class 3 area which is dominant means it is mainly suited to grazing.

RECOMMENDATION: JR 99 is large enough that it could be developed as 3 holdings each of 800 ha.


BEARDMORE
ROAD
Bridge
Fernhook Falls
Deep
PITCHER
Watershed
River
Deep
PLANT
Rapids
OLD BEARDMORE
DOUG
ROAD
12286
T. Tapley
Brook
ROAD
Creek
Rapids
12704
ANGOVE
10226
11682
Rapids
ROAD
Creek
Gladstone Fo
ROAD
Middle
OUR
ROAD
Brook
10228
Jewell
GARR
12575
P. Shotter
ROAD
DEEP
Deep
ROAD
River
Deep
Our
12576
S. Winton
1974
1974
LOGGING RD
NORTH
Pt 14145
Timber (Govt. Reqts.)
Pit 1
CENTRE
CENTRE ROAD
ROAD
DOUG
ANGOVE
LOGGING
Watershed
River
ROAD
Samuels
JR-99
SCALE 1:50000

16. WALPOLE: JR 105

AREA: 250 ha

LAND TENURE: State forest

LOCALITY: Map: Walpole
Map ref: JR 105
477000 mE 6142000 mN
Aerial Photography ref. - Pemberton Run 13. Photo nos. 5332; 5331.

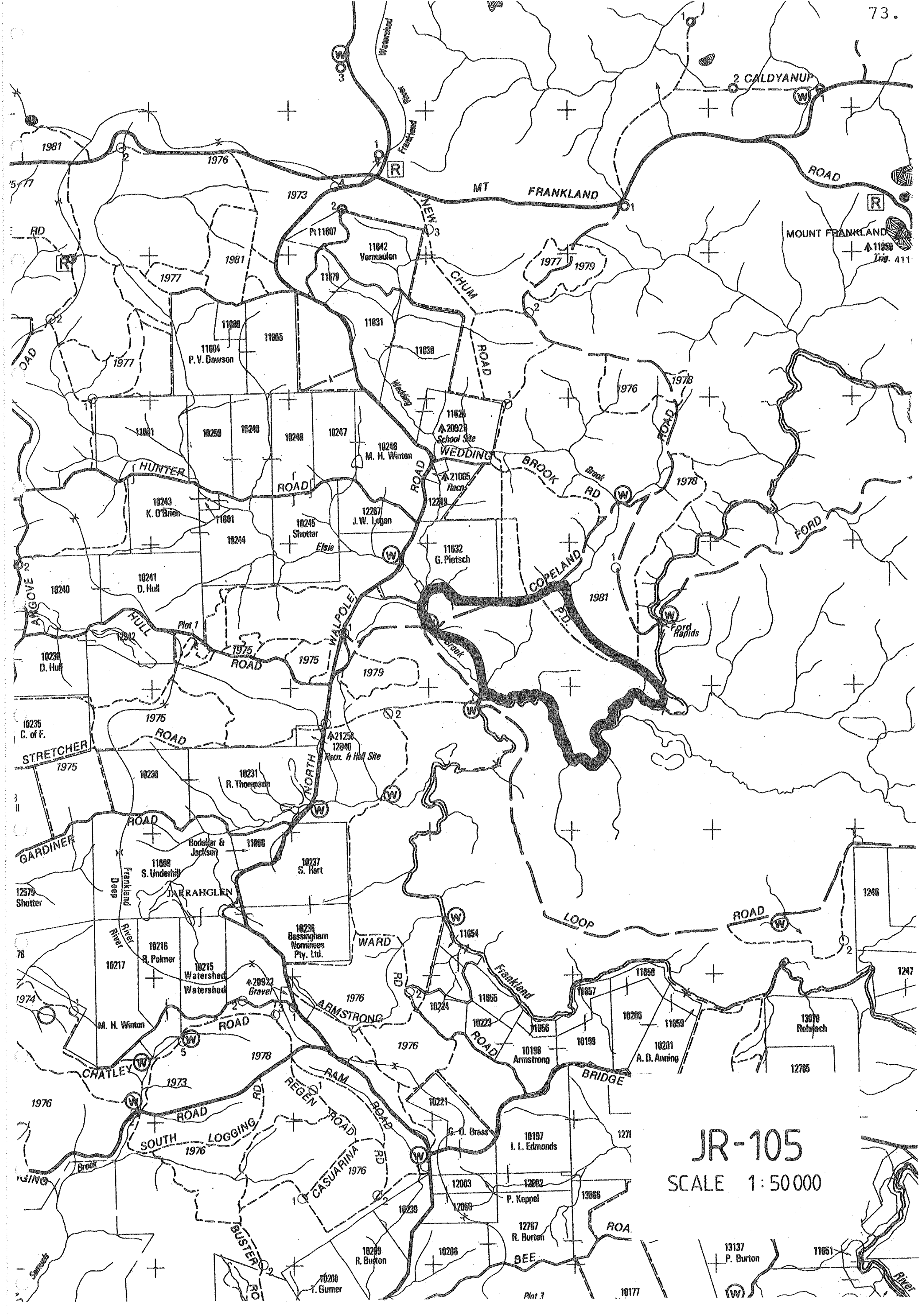
GENERAL: From the South West Highway north along the Walpole-North Road to Copeland Road.

LANDFORMS AND SOILS: Flats rising to undulating mainly to the south and east of the block. Acid grey sandy soils on the flats (pH 5.0) to grey the yellow brown loam on the perimeter of most of the block.

LAND CLASSES: Small areas of land class 2, most of the block land class 3 with small areas of 4.

SUITABILITY TO AGRICULTURE: The land is suitable for grazing.

RECOMMENDATION: This block should only be released to landholders in the area if the total is greatly increased to provide a viable unit.


JR-105
SCALE 1:50000
MT FRANKLAND ROAD
MOUNT FRANKLAND
CALDYANUP
NEW CHUM ROAD
WEDDING BROOK RD
HUNTER ROAD
HULL ROAD
NORTH WALPOLE ROAD
COPELAND P.D.
FORD
Ford Rapids
STRETCHER ROAD
GARDINER ROAD
JARRAHGLEN
Frankland River
Deep River
WARD RD
ARMSTRONG ROAD
LOOP ROAD
CHATLEY ROAD
SOUTH LOGGING ROAD
REGEN RD
RAM ROAD
CASUARINA RD
BUSTER ROAD
BRIDGE
BEE
11604 P. V. Dawson
11642 Vermeulen
10246 M. H. Winton
10243 K. O'Brien
10245 Shotter
12267 J. W. Logan
11632 G. Pietsch
10241 D. Hull
10231 R. Thompson
10237 S. Hart
11669 S. Underhill
10236 Bassingham Nominees Pty. Ltd.
10216 R. Palmer
10215 Watershed
M. H. Winton
10198 Armstrong
10201 A. D. Anning
13070 Rohrlach
10197 I. L. Edmonds
G. D. Brass
P. Keppel
12767 R. Burton
13137 P. Burton
10209 R. Button
10208 T. Gumer

17. WALPOLE: JS 95

AREA: 400 ha

LAND TENURE: State forest

LOCALITY: Map: Walpole
Map ref: JS 95
460000 mE 6140000 mN
Aerial Photography ref. - Pemberton Run 13. Photo nos. 5335; 5336.

GENERAL: Access - adjacent to the South West Highway.

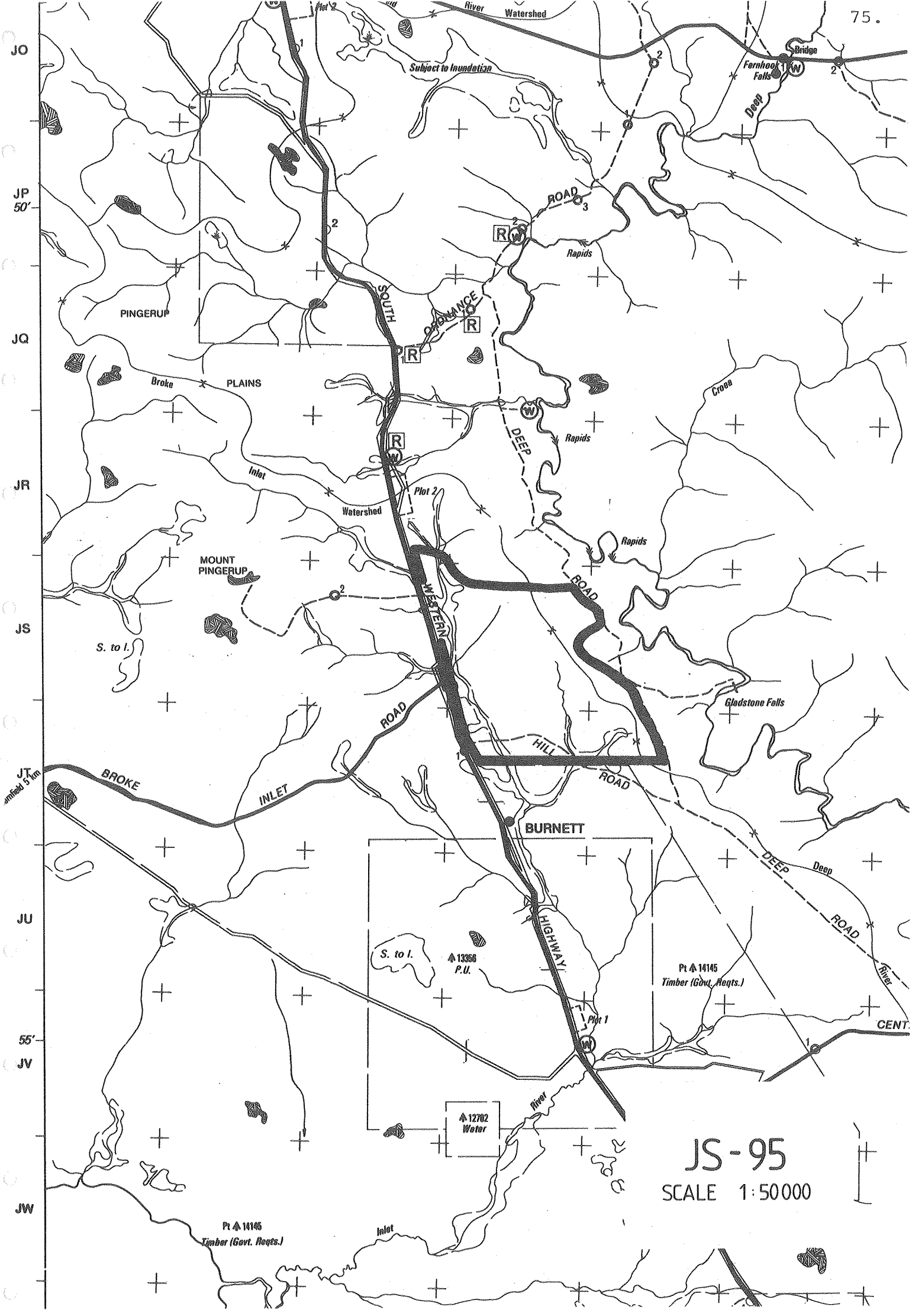
LANDFORMS AND SOILS: Extensive areas of flats with grey sandy soils. Gravelly sandy loams on the better drained areas.

VEGETATION: Ti-Tree and scrub on the flats with stunted jarrah on the higher ground.

LAND CLASSES: 3 and 4.

SUITABILITY TO AGRICULTURE: This block would need extensive drainage to be suitable for agriculture.

RECOMMENDATION: This block should not be released for agriculture unless it is to include better drained country further along Hill Road and more area east of Deep Road.


JO
JP
50'
JQ
JR
JS
JT
JU
55'
JV
JW
River
Watershed
Subject to Inundation
Bridge
Fernhook Falls
Deep
ROAD
Rapids
PINGERUP
SOUTH
ORDNANCE
PLAINS
Broke
Inlet
Watershed
Plot 2
DEEP
Rapids
Cross
MOUNT PINGERUP
WESTERN
ROAD
S. to I.
Gladstone Falls
HILL
ROAD
BROKE
INLET
ROAD
BURNETT
DEEP
Deep
ROAD
River
HIGHWAY
S. to I.
A 13356
P.U.
Pt A 14145
Timber (Govt. Reqts.)
Plot 1
CENT.
A 12702
Water
River
Pt A 14145
Timber (Govt. Reqts.)
Inlet
JS-95
SCALE 1:50000

18. WALPOLE: JU 98

AREA: 120 ha

LAND TENURE: State forest

LOCALITY: Map: Walpole
Map ref: JU 98
465000 mE 6137000 mN
Aerial Photography ref. - Pemberton Run 14. Photo nos. 5352; 5351,

GENERAL: Access is off South West Highway along Centre Road to Deep Road which runs through the blocks.

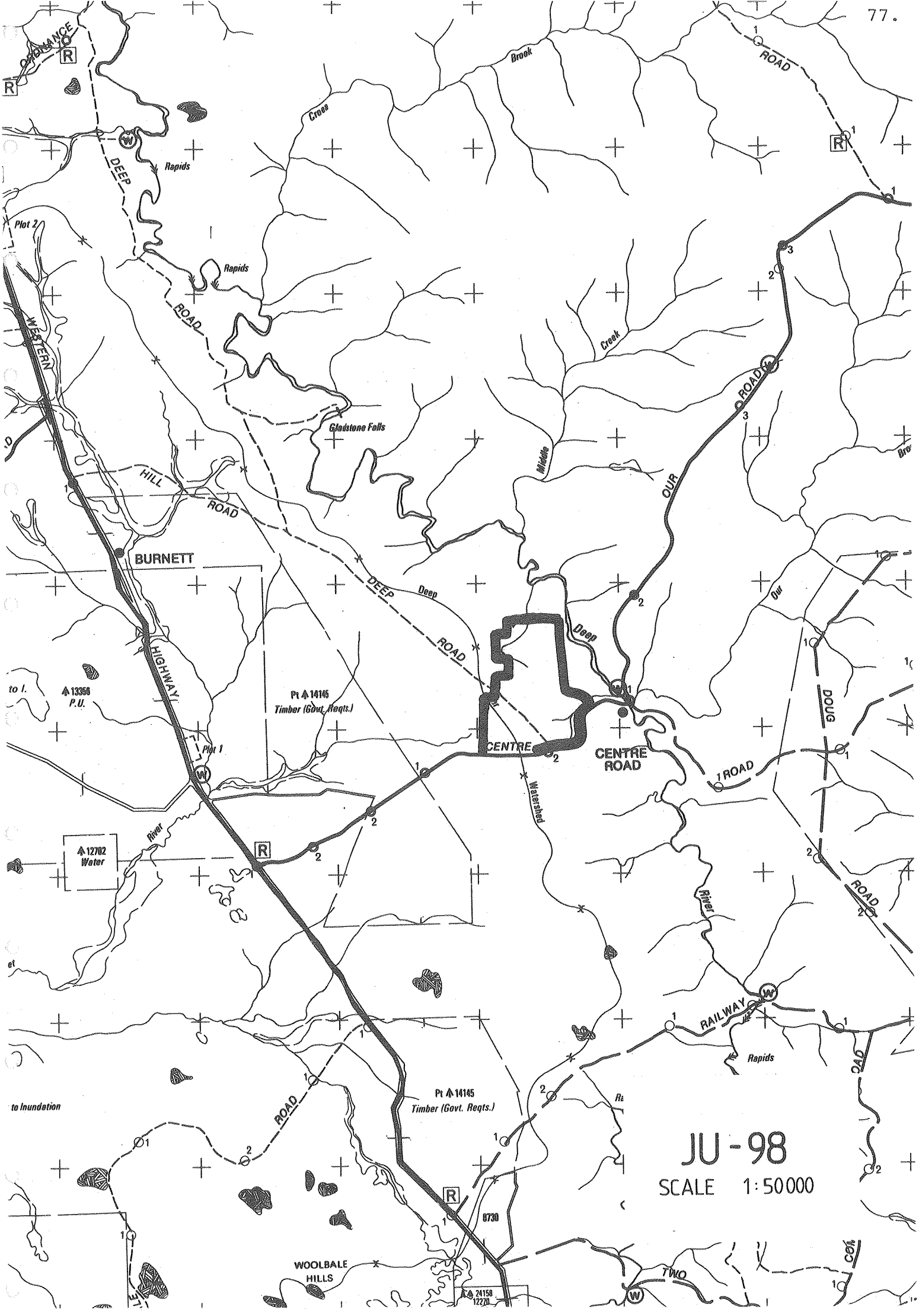
LANDFORMS AND SOILS: Flat, undulating with drainage to the east into the Deep River. Soils are mainly acid grey sands.

VEGETATION: Most of the block is non forested and supports brush and associated scrub which can handle the waterlogged conditions.

LAND CLASSES: Because of waterlogging the block is land class 4.

SUITABILITY TO AGRICULTURE: This block has insufficient area to be viable. Waterlogging makes it not suited to agriculture.

RECOMMENDATION: This block should not be released to agriculture.


CHURCH
Brook
Creek
ROAD
DEEP
Rapids
Plot 2
WESTERN
HILL
ROAD
Gladstone Falls
Middle
Creek
OUR
ROAD
BURNETT
DEEP
Deep
ROAD
HIGHWAY
Deep
Our
to I.
13358
P.U.
Pt 14145
Timber (Govt. Reqts.)
CENTRE
CENTRE
ROAD
DOUG
ROAD
Plot 1
Watershed
River
12782
Water
River
ROAD
RAILWAY
Rapids
to Inundation
Pt 14145
Timber (Govt. Reqts.)
ROAD
JU-98
SCALE 1:50000
WOOLBALE
HILLS
TWO

19. WALPOLE: JY 101

AREA: 160 ha

LAND TENURE: State forest

LOCALITY: Map: Walpole
Map ref: JY 101q
468000 mE 6131000 mN
Aerial photographby ref. - Pemberton Run 14. Photo nos. 5350; 5351.

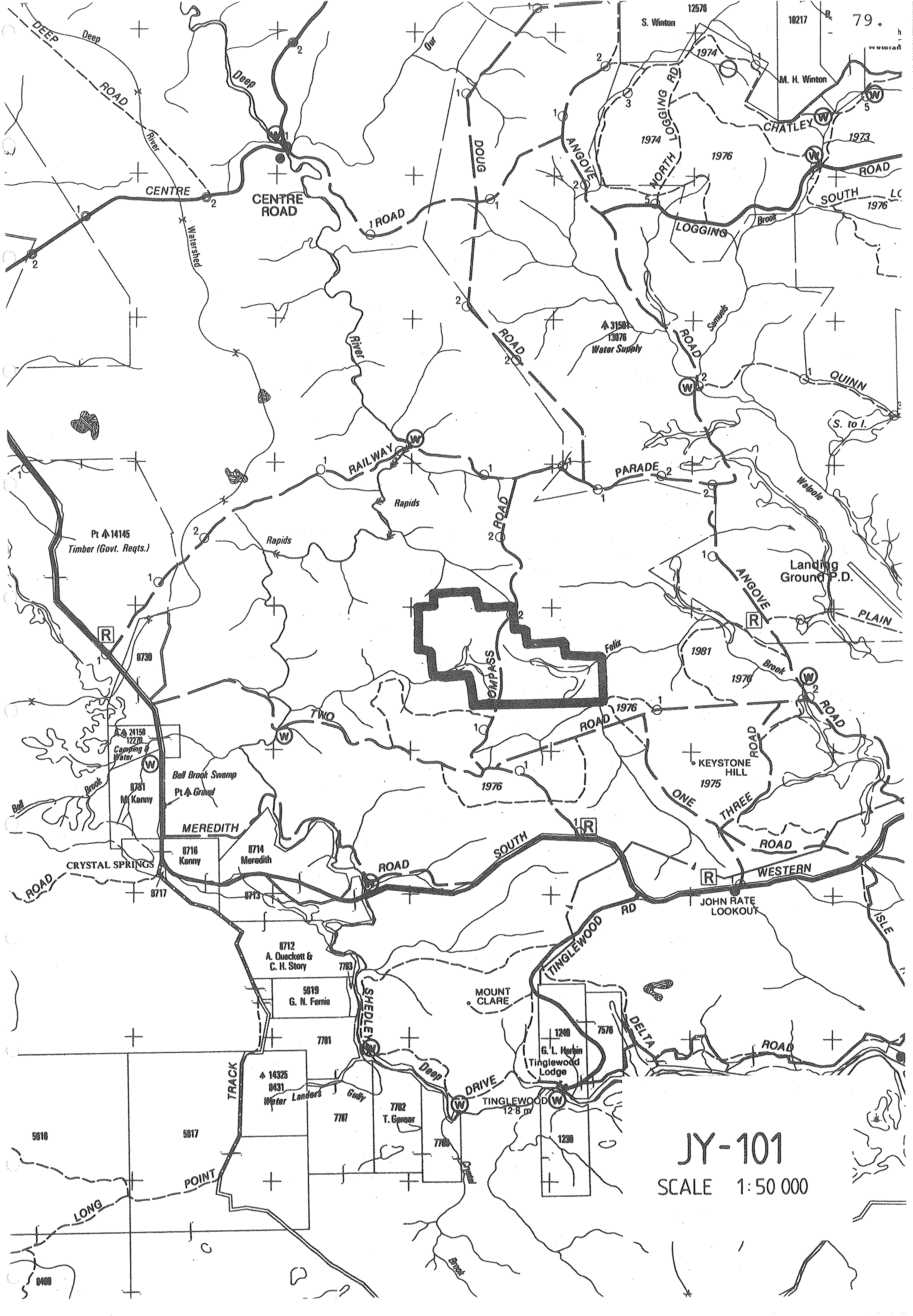
LANDFORMS AND SOILS: Flat to undulating with drainage to the Felix Brook to the east, and drainage to the Deep River on the west side. Soils are mainly grey sandy loam and grey sandy soil.

VEGETATION: The block is largely non forest area of Ti-Tree and associated brush and scrub, with small areas of stunted jarrah to the south side of the block.

LAND CLASSES: Predominantlty land class 3.

SUITABILITY TO AGRICULTURE: This block would be suitable to agriculture provided its size was increased to at least 400 ha. The block is close to the South West Highway and near to existing power grid.

RECOMMENDATIONS: Provided the block can be enlarged, it is suitable for release.



DEEP ROAD
Deep River
CENTRE ROAD
CENTRE ROAD
Watershed
DOUG ROAD
ANGOVE ROAD
NORTH LOGGING RD
LOGGING
S. Winton
M. H. Winton
CHATLEY ROAD
SOUTH
Samuels
Water Supply
QUINN
S. to I.
RAILWAY
PARADE
Rapids
Rapids
River
Pt 14145
Timber (Govt. Reqts.)
Landing Ground P.D.
ANGOVE
PLAIN
Felix
COMPASS
Brook
TWO ROAD
ROAD
KEYSTONE HILL
ONE THREE ROAD
Camping & Water
Bell Brook Swamp
Pt Gravel
M. Kanny
Bell Brook
MEREDITH
CRYSTAL SPRINGS ROAD
Kanny
Meredith
SOUTH
WESTERN
ROAD
JOHN RATE LOOKOUT
TINGLEWOOD RD
ISLE
A. Quackett & C. H. Story
G. N. Fernie
SHEDLEY
MOUNT CLARE
DELTA ROAD
G. L. Harbin
Tinglewood Lodge
Deep
DRIVE
TINGLEWOOD
12·8 m
Water
Landers
Gully
T. Gerner
TRACK
POINT
LONG
Crystal
Brook
JY-101
SCALE 1:50 000

20. WALPOLE: JZ 103

AREA: 250 ha

LAND TENURE: State forest

LOCALITY: Map: Walpole
Map Ref: JZ103
472000 mE 6130000 mN
Aerial Photography ref. - Pemberton, Run 14. Photo nos. 5350; 5351

GENERAL: Access is off the South West Highway along Angove Road.

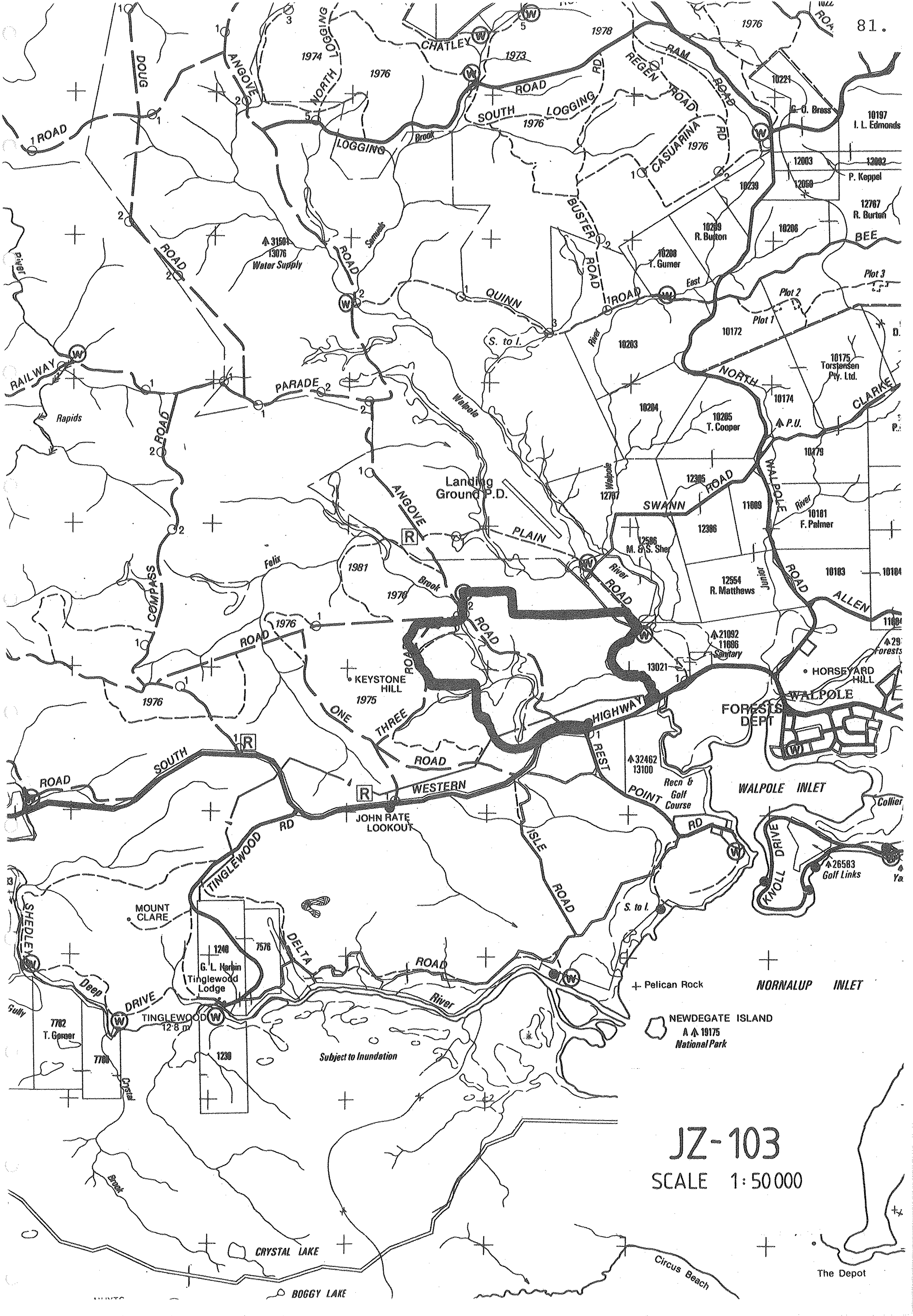
LANDFORMS AND SOILS: Undulating with quite steep rises to the west end of the block which run up to the Keystone Hill. Soils on the block are variable from red-brown gravelly loams to the south and west of the block.

VEGETATION: Areas of jarrah on the undulating and steeper areas of the block with scrub and associated brush on the flats.

LAND CLASSES: This block has land classes 1, 2 and 3.

SUITABILITY TO AGRICULTURE: This is an attractive block very well situated close to the Walpole townsite and should be suited to a range of agricultural pursuits.

RECOMMENDATIONS: This block should be released for agriculture. Amenities such as roads, power and proximity to Walpole are all in its favour.



CHATLEY
ROAD
RAM
REGEN
ROAD
NORTH LOGGING
ANGOVE
DOUG
1 ROAD
SOUTH LOGGING
LOGGING
CASUARINA
RD
BUSTER
ROAD
G. O. Bress
10197 I. L. Edmonds
10221
12003
12002
P. Keppel
12059
10239
12767 R. Burton
10209 R. Burton
10206
BEE
10208 T. Gumer
31501 13076 Water Supply
Samuels
ROAD
QUINN
ROAD
East
River
Plot 3
Plot 2
Plot 1
10172
10203
S. to l.
RAILWAY
PARADE
Rapids
10175 Torstensen Pty. Ltd.
NORTH
CLARKE
10174
P.U.
10204
10205 T. Cooper
Walpole
10179
12305
ROAD
SWANN
11009
WALPOLE
River
10181 F. Palmer
Landing Ground P.D.
ANGOVE
PLAIN
12767
12386
12586 M. & S. Sher
COMPASS
Felix
1981
Brook
1976
River
ROAD
12554 R. Matthews
Junior
ROAD
10183
ALLEN
ROAD
1976
ROAD
21092 11606 Sanitary
13021
KEYSTONE HILL
1975
HORSEYARD HILL
WALPOLE
FORESTS DEPT
HIGHWAY
ONE THREE
ROAD
1976
SOUTH
ROAD
REST
32462 13100
Recn & Golf Course
POINT
WALPOLE INLET
WESTERN
JOHN RATE LOOKOUT
RD
TINGLEWOOD
RD
ISLE
ROAD
KNOLL DRIVE
26583 Golf Links
Collier
SHEDLEY
MOUNT CLARE
1240 G. L. Harbin
Tinglewood Lodge
7576
DELTA
ROAD
S. to l.
Pelican Rock
NORNALUP INLET
Deep
DRIVE
River
Gully
7702 T. Gerner
TINGLEWOOD 12·8 m
NEWDEGATE ISLAND
A 19175 National Park
Subject to Inundation
1230
Crystal
JZ-103
SCALE 1:50 000
Brook
CRYSTAL LAKE
Circus Beach
The Depot
BOGGY LAKE

21. WALPOLE: JV 97

AREA: 450 ha

LAND TENURE: Crown land

LOCALITY: Map: Walpole
Map Ref: JV 97
463000 mE 6136000 mN
Aerial Photography ref. - Pemberton. Run 12. Photo nos. 5314; 5315.

GENERAL: Off South West Highway on Centre Road.

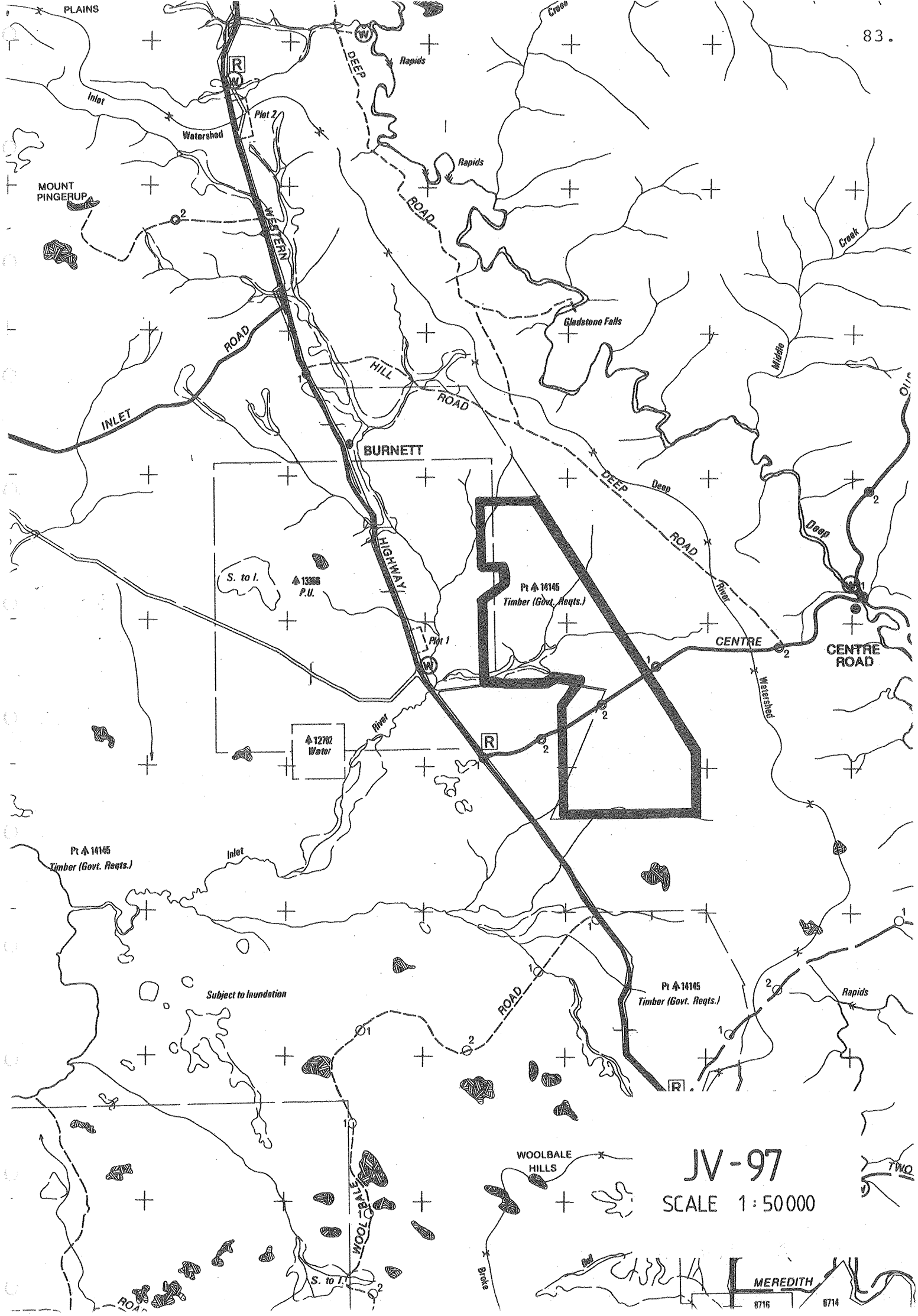
LANDFORMS AND SOILS: Flats with occasional granite outcrops on higher ground. Soils poorly drained acid grey sands. The area north of Centre Road has better drainage and soils than the area south of the road.

VEGETATION: The vegetation is predominently Ti-Tree and associated scrub on the flats with some stunted jarrah on the higher ground.

LAND CLASSES: 3 and 4.

SUITABILITY TO AGRICULTURE: This block would require extensive drainage to be suitable for agriculture.

RECOMMENDATION: This block should not be released for agriculture unless it was enlarged to include better drained land adjacent to the Deep River.


PLAINS
Inlet
Watershed
Plot 2
MOUNT PINGERUP
WESTERN
ROAD
INLET
ROAD
HILL
ROAD
DEEP
Rapids
Rapids
ROAD
Gledstone Falls
Creek
Middle
BURNETT
HIGHWAY
S. to I.
A 13356
P.U.
Plot 1
Pt A 14145
Timber (Govt. Reqts.)
DEEP
ROAD
Deep
Deep
River
CENTRE
ROAD
CENTRE
Watershed
A 12702
Water
River
Pt A 14145
Timber (Govt. Reqts.)
Inlet
Subject to Inundation
ROAD
Pt A 14145
Timber (Govt. Reqts.)
Rapids
WOOLBALE
WOOLBALE
HILLS
S. to I.
Broke
Bell
MEREDITH
8716
8714
JV-97
SCALE 1:50000

22. WALPOLE: JX 97

AREA: 450 ha

LAND TENURE: Crown land

LOCALITY: Map: Walpole
Map ref: JX 97
463000 mE 6132000 mN
Aerial photography ref. - Pemberton. Run 12. Photos nos. 5335; 5334.

GENERAL: Off South West Highway access can be gained from Twelve Road.

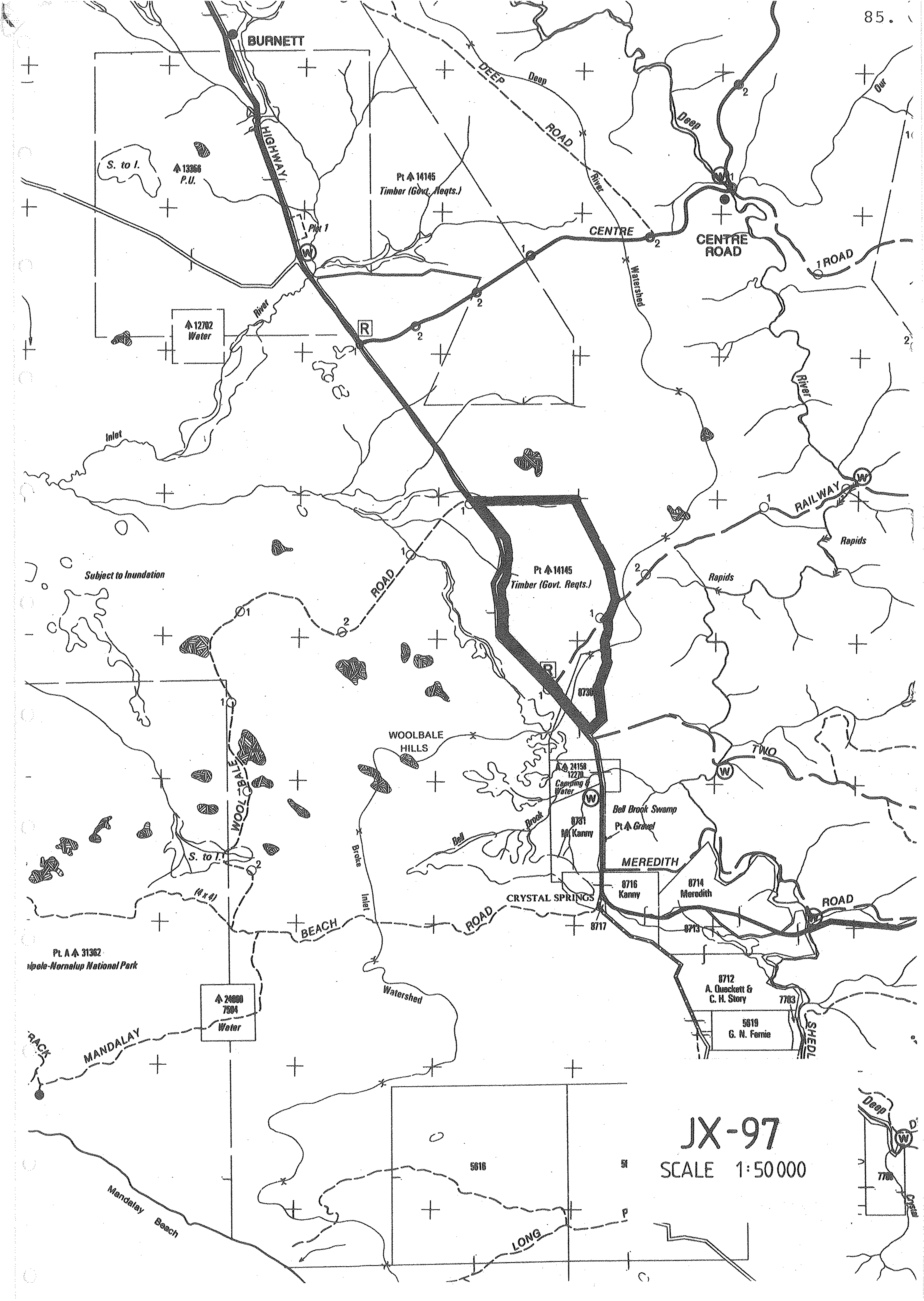
LANDFORMS AND SOILS: Large area of flat land with little or no relief. Soils are acid grey sands, much of which is waterlogged.

VEGETATION: Some small patches of stunted jarrah adjacent to the South West Highway. The predominant vegetation is brush and scrub capable of withstanding the waterlogged conditions.

LAND CLASSES: Land class 4.

SUITABILITY TO AGRICULTURE: This block is not suitable for agriculture.

RECOMMENDATION: Because of waterlogging and the small area involved this block should not be released for agriculture.


BURNETT
HIGHWAY
S. to I.
13356
P.U.
Pt 14145
Timber (Govt. Reqts.)
DEEP
ROAD
Deep
River
Plot 1
CENTRE
CENTRE
ROAD
ROAD
12702
Water
River
Watershed
Inlet
RAILWAY
Rapids
Rapids
Subject to Inundation
ROAD
Pt 14145
Timber (Govt. Reqts.)
WOOLBALE
HILLS
TWO
24158
12270
Camping & Water
Bell Brook Swamp
Bell
Brook
8731
Mt Kanny
Pt Gravel
WOOLBALE
S. to I.
MEREDITH
8716
Kanny
8714
Meredith
CRYSTAL SPRINGS
ROAD
BEACH
ROAD
8717
8713
Broke
Inlet
Pt. A 31362
Walpole-Nornalup National Park
8712
A. Queckett &
C. H. Story
7783
5619
G. N. Fernie
24880
7584
Water
Watershed
MANDALAY
SHEDL
Deep
5616
Mandalay
Beach
LONG
JX-97
SCALE 1:50000

23. LAKE JASPER: HR 54

AREA: 880 ha

LAND TENURE: Forestry quarantine area.

LOCALITY: Map: Jasper and Warren
Map ref: HR 54
395000 mE 6184000 mN
Aerial Photography ref. - Pemberton. Run 7. Photo nos. 5112; 5113.

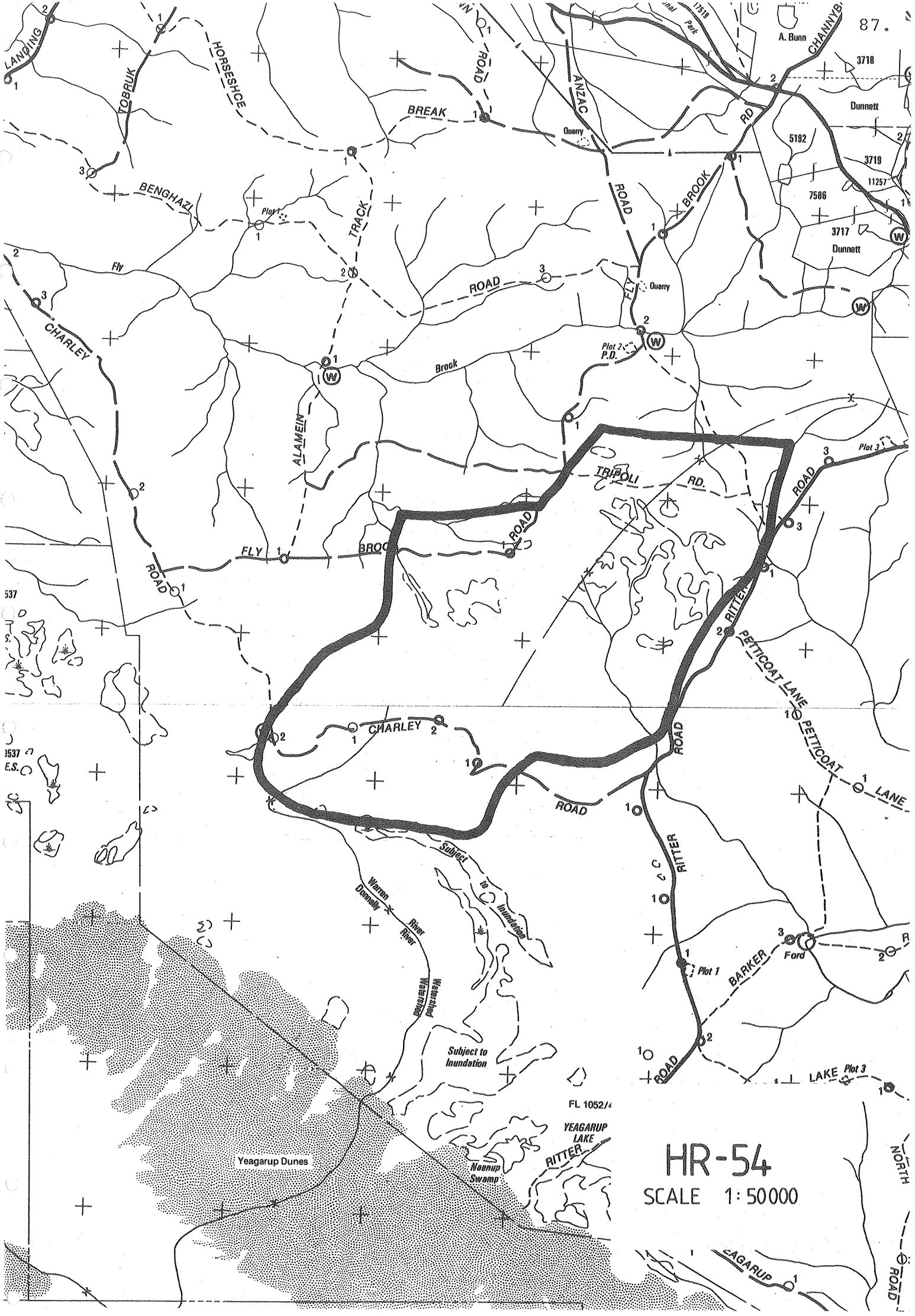
GENERAL: Access can be gained from Ralph Road to Ritter Road.

LANDFORMS AND SOILS: Flat to undulating with drainage into the Fly Brook. Landforms are a mixture of Chudalup and Cary with sandy soils predominantly.

VEGETATION: Jarrah, marri and occasional karri on the better drained soils. Scrub and brush on the flats.

LAND CLASS: Mainly land class 4.

RECOMMENDATION: Not to be released for agriculture as it is prone to flooding and isolated from other farmland.



HR-54

SCALE 1:50000

LOCATIONS 24 TO 27: FRANKLAND MAP

Map ref: JF 104, JH 108, HV 104 and HR 94.

All these areas are subject to Forests Department Quarantine.

As permits are not given during wet weather, we could not inspect these areas on the ground.

Aerial photography and soil maps were used for assessment.

Suitability to Agriculture

These areas were subject to large areas of inundation during winter, and as such are not suitable for agriculture.

APPENDIX 4

AGRICULTURAL BUDGETS FOR ASSESSMENTS OF VIABILITY

The following budgets are indicative of the profitability of agriculture on the three soil types.

TABLE 1

Horticultural Crops on Karri-Jarrah Loam

Income	$/ha
Potato sales	2075.8
Costs	
Fertiliser	97.05
Crop costs	158.24
Fuel	174.51
Non-farm labour	207.66
Repairs	152.07
Cartage, contracting	191.36
Insurance	29.66
License, phone	36.27
Accounting	24.81
Plant replacement, maintenance	135.59
	1207.22
Net return to capital and family labour	868.58
Net return to capital	230.41

Assuming an investment apart from plant of $2500/ha, the return is 9.2%.

APPENDIX 4

TABLE 2

Beef Cattle on Karri-Jarrah Loam

This is a year in year out budget for a hypothetical 600 ha farm. It is assumed that development of the block has been funded by $100 000 of the farmer's own capital and by development loans which are accounted for in the loan repayment category of this budget. The assumed stocking rate is 15 DSE/ha for a herd comprising 573 beef cows, 114 heifers and 14 bulls.

Income	$
105 cull cows @ $300	31 500
273 baby beef @ $250	68 250
158 baby beef @ $220	34 760
3 bulls @ $500	1 500
	136 010

Costs	
Rates and licenses	1 000
SEC and phone	2 000
Seed and sprays	750
Fuel and oil	3 750
Insurance	600
Non family labour	13 000
Fertiliser	21 750
Drenching	1 051
Dipping, jetting, etc.	350
Vaccination	350
Machinery replacement	4 000
Repairs and maintenance	4 000
Sundries	2 000
Stock replacement and fodder	20 588
Loan repayments	47 261
Net return to capital and labour	12 859

APPENDIX 4

TABLE 3

Farm Buildup and Year in Year Out Budgets for Well Drained Acid Soils

This budget is for an 800 ha beef farm developed over 5 years. It is assumed that the farmer starts with $100 000 of his own capital and that the land has no cost to him, two assumptions which are favourable to the profitability of the enterprise. The assumed stocking rate is 11.26 DSE/ha. Development loans are assumed to be repaid over 15 years and 15% interest.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year/ Year
INCOME						
CATTLE SALES	13650	27300	40950	79600	102790	104290
TOTAL INCOME	13650	27300	40950	79600	102790	136090
Costs						
Rates	1000	1000	1000	1000	1000	1000
SEC & Phone	2000	2000	2000	2000	2000	2000
Seed & Spray	200	400	600	800	1000	1000
Fuel	800	1600	2400	3200	4000	4000
Insurance	1000	1000	1000	1000	1000	1000
Labour	0	0	0	10400	13000	13000
Fertiliser	4640	9280	13920	18560	23200	23200
Stock Cost	491	981	1472	1962	2453	2453
Machinery Replacement	0	0	0	0	0	5000
Repairs	1500	3000	4500	6000	7500	7500
Sundry	400	800	1200	1600	2000	2000
Fodder	3218	6435	9653	12870	16088	16088
Development Cost	64000	64000	64000	64000	64000	0
Machinery Purchase	10000	10000	10000	10000	10000	0
Stock Purchase	36440	38940	21720	4500	4500	4500
Living	13000	13000	13000	13000	13000	13000
Taxation	0	0	0	0	0	0
Loan Repayments	0	4282	26412	48971	69536	92021
Total Costs	138688	156718	172876	199864	234277	187761
Net Return to Family Labour and Capital	-125038	-129418	-131926	-120264	-131487	-51671

APPENDIX 4

TABLE 4

Farm Buildup and Year in Year Out Budgets for Waterlogged Acid Sands

The assumptions for these budgets are the same as those for the well-drained acid sands except that the stocking rate is assumed to be 7.5 DSE/ha.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year/ Year
INCOME						
CATTLE SALES	9100	18200	27300	53120	68600	69600
TOTAL INCOME	9100	18200	27300	53120	68600	90600
Costs						
Rates	1000	1000	1000	1000	1000	1000
SEC & Phone	2000	2000	2000	2000	2000	2000
Seed & Spray	200	400	600	800	1000	1000
Fuel	800	1600	2400	3200	4000	4000
Insurance	1000	1000	1000	1000	1000	1000
Labour	0	0	0	10400	13000	13000
Fertilizer	4640	9280	13920	18560	23200	23200
Stock Cost	327	653	980	1306	1633	1633
Machinery Replaclement	0	0	0	0	0	5000
Repairs	1500	3000	4500	6000	7500	7500
Sundry	400	800	1200	1600	2000	2000
Fodder	2145	4290	6435	8580	10725	10725
Development Cost	86400	86400	86400	86400	86400	0
Machinery Purchase	10000	10000	10000	10000	10000	0
Stock Purchase	23920	25920	14450	3000	3000	3000
Living	13000	13000	13000	13000	13000	13000
Taxation	0	0	0	0	0	0
Loan Repayments	0	6538	31791	59559	89191	123399
Total Costs	147332	165881	189686	226405	268649	211457
Net Return to Family Labour and Capital	-138232	-147681	-162386	-173286	-200049	-120857

APPENDIX 5

LAND FORMATIONS OF THE PEMBERTON AREA FEATURED IN AREAS INSPECTED

PEMBERTON: Dissected lateritic country with steep slopes; podzolic soils (Dy 3.6) on upper slopes and gravelly red earth (Gn 2.15) on lower slopes; associated are sandy colluvium (Uc 4.2) in gullies and alluvium (Um, 5.2) along major streams.

BOORARA: A pattern of islands of gravelly red earths and podzolic soils separated by narrow sand-filled drainage lines: interfluves have sandy Dy s5.81 developed from quartzite.

QUAGERING: Gently undulating drainage divides developed on quartzite; soils are podzolic (Dy 5.81) and podzols (Uc 2.3) often associated with deep deposits of water worn quartz sand and grit. Laterites (Ks - Uc 4.2) are also sometimes associated.

CARY: Undulating and low hilly country on the seaward edge of the Pemberton Association. Chief soils are podzols (Uc 2.21) often overlying red earth; minor occurrences of gravelly podzolic soils (Dy 5.6) and laterites and very minor areas of red earths (Gn 2) on basalt. Water worn pebbles are common throughout the unit.

CHUDALUP: Isolated islands of gravelly red earths (Gn 2.15) and podzolic soils (Dy 3.6, Dy 5.6) emerging from a broad sandy plain of humus podzols (Uc 2.3); also some hummocks of sand (Uc 1.2).

BLACKWATER: Flat swampy country with peaty humus podzols (Uc 2.33) and a few small hummocks of grey sand (Uc 1.21).

BALBARRUP: Block lateritic on tops of rises, colluvial pisolitic gravel (Is-Uc 4.2) on slopes merging with brown sands (Uc 5.2). Associated soils are the swampy heads of drainage lines (Dy 3.4, Dy 3.8) and sometimes minor areas of grey sands of the Quagering Asociation.