DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

POLICY STATEMENT NO. 40

CALM ROAD MANAGEMENT

JUNE 1997

OBJECTIVES

- Integrate and apply appropriate standards to all roads on CALM managed public lands *including* roads are managed by CALM, *and* other agencies or authorities *whenever possible.*

- Maintain the conservation, social and economic values of CALM lands while providing public and management access.

DEFINITIONS

CALM roads are those roads on lands which are managed by the Department of Conservation and Land Management and which may be used by the public unless closed for a particular reason. Other roads gazetted for public use that occur within lands managed by CALM, are controlled by either Main Roads Western Australia or a local government authority.

Conservation and environmental values include viewscapes, water quality and quantity, threatened flora *and other* vegetation, *fauna, heritage and recreational opportunities.*

BACKGROUND

The amalgamation of three authorities to form CALM in 1985 meant that varying standards had been applied to the design, construction and maintenance of roads on the estate now managed by the Department. This estate comprises State forest, timber reserves, nature reserves, national parks, conservation parks, *marine parks*, other reserves and freehold land, *and pastoral leases held in the name of the Executive Director CALM.*

Roads in nature reserves primarily provide access for management and research; roads in national parks provide public access to areas of interest and to other locations for management and research purposes; roads in State forests provide access for fire protection, timber harvesting, regeneration, public recreation, conservation management and research; *roads on the coastal margin of marine parks provide access for recreation management.* Maintaining these roads involves substantial resources.

Roads affect the natural *and cultural* values, management costs and public use of lands managed by CALM. Local government authority and Main Roads Western Australia roads located on CALM managed lands impinge either directly or indirectly on land management and the allocation of resources. They also impact on an area's flora, fauna and landscape values and on the protection of these values.

The construction *and maintenance standards* of roads on CALM managed lands varies according to their planned use. With the increase in visitor numbers to popular locations some roads are physically incapable of coping with increased traffic loads and visitor amenity is being impaired. In some cases new roads will have to be built and existing roads upgraded to meet increased use of CALM managed lands over the foreseeable future.

Planning and construction of roads on CALM managed lands will take into account *public safety*, conservation *and heritage* values such as viewscapes, fauna and flora populations (particularly of *threatened ecological communities and* threatened species) and potential direct or indirect impacts of the spread or introduction of plant diseases (especially dieback) and on water quality and flow.

CALM's road construction program is financed from three sources. Roads for management purposes are funded by CALM; roads for public access to parks and forests are funded by Main Roads Western Australia tourist road grants, Local Government Authorities and CALM in some instances; and roads for timber harvesting are funded by log buyers. *CALM also constructs and maintains roads located on pastoral leases and vacant Crown land for the purpose of harvesting and management of sandalwood. In some instances road maintenance is funded by private organisations (eg Rally Australia, mining companies) for specified uses of these roads.*

POLICIES

In pursuit of the objectives outlined in this policy the Department will:

1. Ensure that during all road construction and maintenance activities on CALM managed lands, *safety and* the protection of conservation and environmental values is given due consideration.

2. Locate and design roads to minimise visual impact on the areas they traverse and to maximise their scenic appeal for road users, subject to policy 1 above.

3. Ensure the construction of new roads is kept to a minimum and that all proposals and requirements for roads are included as an integral part of the strategic planning for CALM managed lands.

4. In the construction, upgrade and maintenance of roads apply a standard appropriate to the immediate purpose for which the road is constructed and its anticipated long term use.

5. Inspect and maintain bridges, culverts and crossings under CALM control in a safe and trafficable condition, for their intended use. *All CALM staff to be responsible for reporting, and marking if necessary of road hazards (eg. washaways).*

6. Where appropriate erect directional signs to assist navigation on CALM managed lands and erect advisory signs on sections of roads that may be a safety hazard to drivers. Road signs used by CALM will conform to Australian Standards Association *standards* or will be approved by Main Roads Western Australia.

7. Train staff to ensure they possess adequate knowledge and skills to be able to oversee construction of and to manage and maintain CALM roads effectively in line with the appropriate technical and management guidelines.

8. Establish guidelines to ensure that currency and consistency of all road information is maintained and as appropriate, exchange data with Main Roads Western Australia as the State's custodian of the Road Database.

9. On roads not controlled by CALM but that traverse or influence CALM managed lands, liaise with Main Roads *Western Australia,* relevant Local Government Authorities *and relevant private companies (eg, mining companies)* to ensure that agreed engineering and environmental standards are applied.

STRATEGIES

In order to achieve its objectives and implement its roading policies the Department will adopt the following strategies:

A Road Management Manual will be compiled to provide comprehensive guidelines on:

1. Each Program Director will be responsible for *approving* the appropriate standards for roads constructed to achieve their program objectives. These standards must take into consideration the following factors:

   - road planning and design principles;
   - road engineering specification and methods for selection, design construction and maintenance;
   - visual resource management;
   - *nature conservation*;
   - environmental protection and dieback disease management;
   - user safety;
   - access to sensitive areas, *including sites of cultural and heritage significance;*
   - administration and funding programs;
   - access for fire control;
   - suitable signage;
   - *economic costs and benefits of road maintenance and construction.*

2. *Regional Managers will be responsible for ensuring that* a strategic *roading* plan which integrates CALM requirements will be prepared for each region *in consultation with* program representatives *and Regional/District Operations staff.* All *road* construction *and upgrading* proposals will be considered in the light of the strategic roading plan.

   Within the framework of this program a road classification system which identifies such issues as road status (permanent or temporary), need for upgrading, maintenance and signposting will be developed. *Where applicable, the strategic plan will incorporate roading requirements as outlined in the management plans, interim management guidelines, and recreation master and site development plans.*

3. The Department will arrange training programs for CALM staff to acquire the necessary skills and knowledge to effectively implement and manage its roading program.

4. Where road use is predicted to increase but current needs and funding are limited, the road alignment should be selected for a higher standard of road, but clearing and pavement can be constructed to lesser specifications. This will ensure that future upgrading of roads utilises previous work.

MONITORING

Successful implementation of this policy will be assessed on the basis of the extent to which:

1. *Nature conservation values are maintained and enhanced.*

2. *Visual resource values are maintained and enhanced.*

3. *Any other values specified in the purpose of the reserve are maintained and enhanced.*

4. *Road accidents cannot be attributed to either inconsistent and unsafe conditions of roads or the absence of signs and other information.*

5. *Dieback disease introduction and spread, soil erosion, and spread of weeds cannot be attributed to road construction and maintenance operations.*

6. *Road programs follow Departmental priorities as laid down by corporate objectives in policies and plans.*

Syd Shea
EXECUTIVE DIRECTOR

Distribution Lists: A, B, D, E & L

RELEVANT LEGISLATION, STANDARDS AND POLICIES

1. LEGISLATION

1.1 CALM Act: Forest *Management* Regulations *1993 - Part 12 in "Restricted Areas".*

Regulations in Part 12 refer to Section 62 of the CALM Act which allows CALM to classify areas as "prohibited" or "restricted", but only after Ministerial approval and gazettal. Advice from Crown Solicitor's Office indicates that CALM can close or block roads for safety purposes, in particular during logging and haulage operations.

1.2 CALM Act: *Part VIII* Control and Eradication of Forest Diseases *and Part 16 Forest Management Regulations 1993*

Control on lands vested in the National Parks and Nature Conservation Authority and the Lands and Forest Commission is possible through Part VII (Sections 79-86) of the CALM Act.

Part VII of the Act can also be applied to any other Crown land with the permission of the vested authority.

Sections 82 and 83 allow for Risk or Disease Risk Areas to be constituted for the protection of lands from disease. This is restricted to disease control.

The Forest Management Regulations supports this point above with:

> *Part 16 - Control and Eradication of Forest Diseases. Regulations 104 - 125 all deal with controlling access, obtaining owners details, signage, barricades and minimising the potential risk from diseases in the forest.*

1.3 CALM Act: Necessary and Compatible Operations Sections 33 and 33A

Roading in national parks and nature reserves not covered by a management plan is subject to the *"compatible operations" and* "necessary operations" *provisions* in Sections 33 (3) and *33A and "compatible operations" provision in Section* ..... This clause can be used to authorise maintenance work on existing roads. Construction has to have General Manager approval.

1.4 CALM Act: Section 89

Provides authority for the Executive Director to confer rights on holders of permits (to take and contract the sale of forest produce on Crown land) to make roads, etc. and extend roads beyond the permit area. Crown land, by the definition which applies includes some CALM lands.

1.5 Wildlife Conservation Regulations 1970

Part 6 controls access and illegal making of roads in nature reserves.

1.6 National Parks Authority Regulations

Parts II and III and Regulation 26 control public access to reserves. Regulations 4 and 11, *inter alia*, provide authority for the closure of roads in reserves (as defined). Regulation 8 provides for the erection of signs to regulate use of roads in reserves. Roads in national parks are subject to the Road Traffic Act.

1.7 Road Traffic Act

States that a person who drives a motor vehicle on a road or place to which the public has access should exercise due care and attention and drive to the conditions in place. This can be interpreted that the onus is very much on the driver but the authority should provide consistent design conditions or cautionary signposting to advise of a change in standards so that users' safety is not compromised.

1.8 Control of Vehicles (Off Road Areas) Act 1978; Regulations 1979

Controls off road vehicles on south west coastal areas.

1.9 Other Acts

There are also powers in other Acts such as the Mining Act and the Metropolitan Water Supply Act that provide for the control of access.

2. STANDARDS

2.1 Cautionary and Regulatory Signposting

Australian Standards 1742â2-1986, Traffic Control Devices for General Use, Part 2 provides guidelines and standards for use of road signposting. To meet legal requirements "cautionary" signposting must meet Australian Standards Association criteria. "Regulatory" signs must be approved by Main Roads Australia and are enforceable under the Road Traffic Act.

2.2 Engineering Standards

Rural Road Design - Austroads 1989 Guide to Geometric Design of Roads provides engineering standards and specifications used by Main Road agencies Australia-wide.

2.3 Roadside Manual

This manual has been compiled by the Roadside Conservation Committee. It relates to the management of verges adjacent to public roads.

3. ROAD SELECTION GUIDELINES

A draft set of guidelines for road selection has been developed by the Southern Forest Region of CALM (October 1995) which provides definitions and selection principles for the strategic

roading network required to meet the needs of all of CALM's programs. A copy is attached - Appendix 2.

4. RELEVANT POLICY STATEMENTS

No. 3: Phytophthora Dieback
No. 9: Conservation of Threatened Flora in the Wild
No. 10: Rehabilitation of Disturbed Land
No. 18: Recreation, Tourism and Visitor Services
No. 19: Fire Management
No. 22: Basic Raw Materials
No. 28: Reporting, Monitoring and Re-evaluation of Ecosystems and Ecosystem Management
No. 33: Conservation of Threatened and Specially Protected Fauna in the Wild
No. 34: Visual Resource Management of Lands and Waters Managed by CALM

DEPARTMENT OF
CONSERVATION AND LAND MANAGEMENT
SOUTHERN FOREST REGION

ROAD SELECTION GUIDELINES

STRATEGIC NETWORK

These guidelines accompany maps that define the location of roads that comprise our Strategic Network. All new roads built in the vicinity of the Network must follow the defined alignment as closely as possible to progressively establish it.

K R Vear
Regional Manager

17 October 1995

ROAD SELECTION GUIDELINES

TABLE OF CONTENTS

ROAD SELECTION GUIDELINES

1. INTRODUCTION

These notes provide background and criteria for the selection of roads within the Southern Forest Region.

Roads service a number of requirements and our over-riding goals are:

* To provide a strategic and common network of roads to service -
  management access
  fire control
  harvesting
  recreation
  .....with some mutual exclusions being for safety reasons.

* To provide local roads to service specific needs where common usage significantly disadvantages one of the users

Criteria have been written for various uses. There is a need to adopt standard terminology, and to have guidelines for the selection of roads for different purposes, especially where quality requirements differ for each one..

2. DEFINITION

2.1 Road Terminology

Various terminology for roads have evolved and within CALM, the common three are found in the legend for Land Management Service maps, CALM*fire* literature, and Forest Resources contracts.

Attachment 1 summarises our various jargon and identifies the Acceptable Terminology to be used. Even our main reference 'Unsealed Roads Manual - Guidelines to Good Practice (URM)" avoids labelling roads, and chooses to describe them instead.

2.2 Strategic Network

Our major and secondary roads comprise the Strategic Network which is designed, among other things to:

1. Provide rapid access to fires from response centres.
2. Provide direct access to major log customers from resource areas.

Travel distance is a critical factor in both cases and should be kept to a minimum, commensurate with selection criteria.

2.3 Supplementary Roads

These are usually minor roads and forest tracks which extend off the strategic network to provide local access for some specific purpose. A shunt for log extraction, forest track to access a waterhole or track to reach a picnic spot are examples of supplementary roads.

3. PRINCIPLES FOR SELECTING ROAD LOCATION

Six principles for the location of roads have been determined, in decreasing order of importance:

1. Roads must have a sound sub-base. That is, built on appropriate soil types and with adequate drainage to support the traffic that they are designed for (ref. URM sect 3.2)

2. Locate roads away from ecotones and other diverse ecotypes. (CONSERVATION)

3. Locate roads above the dieback occurrence line to allow work in dieback free forest and to reduce the risk of introduction of dieback into dieback free forest. (HYGIENE)

4. Construct roads low in the profile wherever possible, providing 1, 2 and 3 are met, and provided they suit their purpose.. (HYGIENE and CONSERVATION)

5. Minimise the overall extent of roading through the use of existing roads wherever possible, and by avoiding road duplication. (FINANCIAL and CONSERVATION)

6. Locate roads in the wide context, rather than just for the local needs. (INTEGRATED LAND USE)

These principles apply to all roads which make up our network for most purposes. In addition to the 'Strategic Network', some supplementary roading for specific purposes is required. These "special purpose" roads may have short term and/or seasonal use but will still be bound by the above principles.

Whilst the principles cover a range of requirements, such as engineering, hygiene, conservation etc, our essential need for rapid and direct access is the context within which detailed road planning takes place.

The above principles guide us in planning road location. In practice, we still follow basic forest engineering procedures of determining obligatory points and establishing base lines from which to select the final alignment. These are covered in our reference "Forest engineering - roads and Bridges - Forest Manual (1973)".

4. SELECTION CRITERIA

Road selection criteria differ for our three main forest activities of fire control, harvesting, and recreation but with a strategic network catering for all purposes, none will be fully satisfied. Attachment 2 summarises these criteria.

A framework plan sets out the intended strategic network to meet all uses as much as possible. Minor variations from it will occur as and when field selection takes place however, significant changes must be referred to the Regional Manager.

5. DETERMINING ROAD QUALITY

Where as selection criteria identify where roads are to be located, traffic type and speed determine the quality of road to be built. Design criteria such as vehicle speed, loads to be carried and whether or not to accommodate two-way (passing) traffic are the kind of factors determining construction specifications which are provided in Attachment 3.

The process for determining road quality involves three steps:

1. Identify current and foreseeable purposes for building each road.

2. Establish the design criteria for each purpose.

3. Specify the quality of road needed to satisfy the most demanding purpose.

For example, a road is to be built to a new coupe and will become the boundary of a strategic fire protection buffer. It will also receive local recreational traffic.

Coupe - low volume, summer access	= minor road
Strategic fire protection buffer	= secondary road
Local recreational traffic	= minor road

This road should be built to a secondary road standard. Harvesting operations will cover the cost of construction equivalent to a minor road quality. CALM*fire* will make up the difference to a secondary road quality.

6. SUPPLEMENTARY ROADS

Supplementary roads are additional to the strategic network. They are usually minor roads or forest tracks and often serve a specific need. For harvesting purposes, the shunt (no through road) is often to a secondary road quality and provides for logging, and regeneration. It may be extended to the boundary to set up a small fire protection cell but the extension would only be of a forest track quality. The shunt in the first instance, and extension later are both supplementary roads for specific purposes and do not form a part of the strategic network. The cost of providing each is met by their respective programs, and construction may not take place to the quality needed until it is to be used.

7. ROAD SELECTION SEQUENCE

The process of planning road locations should follow this sequence which is timed to facilitate flora surveys:

1. Identify logging, burning or recreation road requirements.

2. Refer to the Regional Road Framework Plan to identify where a road is to be located.

3. Identify likely users and determine the quality required.

4. Assess hygiene status.

5. Plan a road location according to the selection principles (3 above)

6. Carry out rare flora surveys.

7. Adjust planned alignments if necessary, select and construct the road.

8. BUILDING STRATEGY

To effectively establish the network, and to avoid building additional roads for short term purposes, requires planning and construction to set up 500 ha cells at a time. This consolidates activities associated with logging, such as dieback mapping, and advance and regeneration burning, as well as facilitating ongoing fire protection. It also reduces the total amount of roading required in any one year.

Selecting the location of a road is the most important part of road building. It results in permanent clearing of the forest, potential disease risk to forest nearby, and indefinite use and maintenance. To fix a poorly constructed road is relatively quick and easy. To fix a poorly sited road is usually long and difficult and hence, selecting a good location in the first instance is essential.

These selection guidelines need to be read in conjunction with the design and construction criteria contained in the Manual.

A R LUSH
MANAGER,
FOREST RESOURCES
SOUTHERN FORESTS

23 August 1995

REFERENCES

Forest Engineering - Roads and Bridges, Foresters Manual 1973.

Unsealed Roads Manual - Guidelines to Good Practice, Australian Road Research Board Ltd, May 1993

ATTACHMENT 1

ROAD TERMINOLOGY

Land Management Series Maps	Fire	Harvesting	Acceptable Terminology
• Two or more lanes • Sealed and unsealed	• Major access • 8m Running Surface (R/S)	• Major and secondary access • 8m R/S	• **Major roads** • Formed and surfaced • 8m R/S
• One lane • Sealed and unsealed	• Secondary • 6m R/S.	• Other and incoupe roads • 5m R/S	• **Secondary roads** (secondary access and incoupe roads) • Formed and surfaced • 5m R/S and 6m R/S East of Frankland River and on corners and tights curves.
• One lane • Sealed and unsealed	• Minor road • Formed • 4m R/S	• D class road • 4m R/S	• **Minor roads** • Formed • 4m R/S
• Vehicle track	• Incoupe clearway (snig track) • Unformed	• Incoupe tracks	• **Forest tracks** • Unformed • 4m R/S

ROAD SELECTION CRITERIA

FIRE	HARVESTING	RECREATION & TOURISM
Major Roads		Specific recreation roads need their own criteria that:
There are no specific fire requirements for this standard of road.	1. To main resource areas 2. Direct from main mills 3. All season access 4. Suit rapid articulated transport 5. Well signposted 6. Regularly maintained	1. are consistent with the Recreation Framework plan. 2. are designed and built and signposted to impeccable safety standards 3. optimise the scenic appeal for road users, sometimes at the expense of speed or distance, whilst minimising negative visual impact on the landscape. 4. are consistent with other facilities at the end point (no point having a four lane highway to a site with no toilets, nor a caravan park at the end of a four wheel drive track). 5. require minimum maintenance (sealed where appropriate and possible). 6. are able to incorporate pull-off areas for interpretation signage.
Secondary Roads		
1. Surround cells - karri-2000 ha - jarrah-4000 ha 2. On strategic burn buffer boundaries (North and west side of creeks) 3. Burn buffer boundaries located in a single fuel type, preferably jarrah 4. Direct route from fire response centres 5. Suit rapid articulated transport 6. Well signposted 7. Regularly maintained (karri every year, jarrah two yearly)	1. Karri-500m maximum spacing Jarrah-600m maximum spacing 2. Minimise total road distance, but provide for future harvesting 3. All season access 4. Suit rapid articulated transport 5. Well signposted 6. Currently used roads maintained regularly 7. Most direct access to major harvesting roads	

ROAD SELECTION CRITERIA (cont)

Minor Roads)		
Boundary 1. Surround cells of regeneration karri-500 ha jarrah-1000 ha 2. On burn boundaries (North and West side of creeks) 3. Suit rapid articulated transport 4. Well signposted 5. Periodically maintained (karri 3 yearly, jarrah 5 yearly) 6. Avoid "no through" roads wherever possible **Subdivision** 1. Suit non-articulated trucks and light vehicles 2. Surround Karri regen cells 250 ha 3. Spring access 4. Periodic maintenance (fire operations) 5. Through access 6. Signposting - naming not essential entry direction indicators required (no through roads to be marked or blocked)	1. Suit slow articulated vehicles 2. Summer access but drainage provided for 3. Periodic maintenance (harvesting operations) 4. Jarrah-600m spacing Karri-500m spacing 5. Minimised total distance 6. Through access not necessary *access to low volume resource, in relatively wet environment, and relatively undulating topography	as above
Forest Tracks		
1. Suit heavy plant for fire fighting 2. Cells 40-50ha 3. Entry direction indicators required 4. Access recorded on CIMCIS sheets 5. Through access 6. Maintenance every 5-6 years	Same criteria as for minor roads but drainage not provided for. * access to low volume resource, in relatively dry environment and flat topography	

ATTACHMENT 3

ROAD SPECIFICATIONS

	Major Road	Secondary Road	Minor Road	Forest Track	Remarks
Design Speed	100 km/hr	60 km/hr	30 km/hr	15 km/hr	Major road operates both ways
Max Grade	5°	7°	8°	8°	
Centre Crown	5%	5%	5%	Flat	
Min Radius Curve	500 m	200 m*	200 m *	200 m	*Where curves of 500m radius or less are to be built superelevation of the curve will be required. The Roading Officer will confirm in writing the amount of superelevation required for each curve
Stopping Sight	175 m	115 m	75 m	75 m	
Lane Width	2 x 4 m	1 x 5 m	1 x 4 m	1 x 4 m	
Shoulder Width	2 x 1 m	2 x 0.5 m	N/A	N/A	
Table Drain Width	2 x 2 m	2 x 2 m	2 x 2 m	N/A	
Min Table Drain Depth	200 mm	200 mm	200 mm	N/A	
Min Clearing Width	14 m **	10 m **	8 m	6 m	** Additional clearing width may be necessary on steep slopes to maintain the necessary side batter. The minimum side slope batter is 6:1 but this may be increased to 4:1 with specific permission form the Regional Roading Officer. Additional clearing may be necessary on T junctions, sharp corners or cross road junctions, to allow truck turning and safety.
Surfacing Thickness	150 mm compacted	150 mm compacted	150 mm compacted ***	N/A	
Off Shoot Drains	<1.5° fall	<1.5° fall	<1.5° fall	N/A	

Recreation roads for heavy touring public use are required to meet Austroads (1989) construction criteria, and Australian Standard 1742a.2 - 1986 for Regulatory and Pre-cautionary Signage

ROAD SPECIFICATIONS

OTHER REQUIREMENTS

	Major Road	Secondary Road	Minor Road	Forest Track	Remarks
Stag Falling	Yes	Yes	Yes	Yes	
Advance Mop Up	Yes	Yes	Yes	Yes	
Naming & Signposting	Yes	Yes	Yes	No through roads and nominated tracks	
Scrub Control or Slashing	Yes	Yes	No	No	
Landscape Management	Yes	Yes	Yes	No	
Significant Sensitive Areas (AVOID)	Yes	Yes	Yes	Yes	
Hygiene Mapping	Yes	Yes	Yes	Yes	

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DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

Form CLM 80B

To: All Directors, Regional Managers, Business Unit Managers, Branch Managers
Manager Management Audit, Manager Forest Management Branch

Your Ref:
Our Ref:
Enquiries: Rick Sneeuwjagt
Phone: (09) 442 0328

Subject: **2ND DRAFT OF ROAD MANAGEMENT POLICY NO. 40**

Comments have been received from many sections of the Department on the first draft of the revised Road Management Policy.

Many of the comments have been incorporated in the second draft which is circulated for your final perusal before it is submitted to Corporate Executive.

The proposed amendments to the first draft are shown in italics. Two main points of contention are in the Strategy section.

Point 1: Director role has been changed from that of "specifying the appropriate standards of roads constructed to achieve their program standard", to that of "approving" such a standard.

There is debate as to whether or not the Department should develop a Road Management Manual which specifies the appropriate standards for roads needed to achieve program objectives. Who would be responsible for the development and maintenance of such a manual and who would provide the training etc, are questions that need to be considered.

Point 2: Deals with the responsibility of Regional Managers to ensure that a strategic roading plan is prepared in consultation with other Regional/District and Business Unit staff. A set of Road Selection Guidelines for the Strategic Road Network has been developed in the Southern Forest Region. This is enclosed for comment also.

If you have any comment to make on the second draft, please provide them to the Director Regional Services by 13 June, 1997.

Rick Sneeuwjagt
A/DIRECTOR
REGIONAL SERVICES

22 May 1997

Att

cc: C Haynes - FYI
S Hancocks, Crawley
R Smith, Kelmscott

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