FOREST PRACTICES CODE

PART FOUR

FOREST ROADS AND FIRE TRAILS

February 1999

Final(4 January 1999 Version 8.0)

Published by:

State Forests of New South Wales

2/423 Pennant Hills Road, Pennant Hills

Postal Address: Locked Bag 23, Pennant Hills, NSW 2125, Australia
Internet Contact: www.forest.nsw.gov.au

ISBN 0 7310 9104 3
STATE FORESTS OF NSW

STATE FORESTS OF NSW ENVIRONMENT POLICY STATEMENT (July 1996)

State Forests NSW is committed to sustainable forest management while supplying products and services to meet customer expectations and achieve a commercial return. We will manage all our activities in an environmental, socially and economically responsible manner so as to meet public expectations for maintenance of timber, biodiversity, water, soil, cultural, and other values. We are continually seeking improvements in our environmental performance. To meet our policy, State Forests will:

- communicate and consult effectively and constructively with the community, regulators and customers and develop partnerships for cooperative forest management at the strategic level
- protect and maintain healthy and productive forests to provide enhanced community benefits in perpetuity
- conserve biodiversity, heritage and cultural values in our native forests
- adopt environmentally sensitive land management practices for commercial plantations
- ensure all relevant legislative and regulatory requirements are met
- ensure that management strategies and operational procedures, including Codes of Practice, facilitate the recognition, mitigation and monitoring of the impact of our activities on the environment
- motivate and educate our employees and all those associated with State Forests to fulfil our environmental responsibilities
- encourage and assist our suppliers, contractors and other forest users to comply with our environmental standards
- identify and, where appropriate, adopt best practice in sustainable forest management
- be a progressive, adaptive organisation through active research and responding to changing scientific knowledge, public expectations and economic conditions
- develop and implement efficient energy use and waste management measures in all our activities
- develop an environmental management system incorporating an audit program, to internationally accepted standards.

STATE FORESTS OF NSW GOOD NEIGHBOUR POLICY STATEMENT (January 1997)

State Forests NSW and its people will:

- be recognised in our communities as environmentally responsible, professional managers
- develop and maintain excellent relationships with our neighbours
- be recognised as a good corporate citizen
- work with and gain the confidence and support of neighbours in managing the community's forests
- understand our neighbours and their needs and nurture their trust and respect
- actively engage and involve our neighbours in management of the community's forests

To achieve this we will:

- communicate and consult with our neighbours
- seek every opportunity to explain and interpret State Forests' management practices
- provide detailed information about proposed activities or works in progress
- actively participate in community forums on issues relating to forests, forest management and community values
- be responsive to neighbours' concerns and professionally conciliate any issues
- co-operate with neighbours to resolve concerns
- encourage and motivate our employees, forest user groups, interest groups, agents and licensees of State forests to develop a good neighbourly ethic.

CONTENTS

PREFACE

Over the last eighty years State Forests NSW and its predecessor the Forestry Commission of NSW, has established a comprehensive road and fire trail network within State forests.

During that time, State Forests took advantage of the latest road-building technology and equipment, as it became available, to build natural surface access roads for forestry purposes. In the 1960's forest road building practices were first written into operations manuals. However, this is the first time that forest roads and fire trails in State forests have come under the rules of a comprehensive Code.

State forest roads are being increasingly used for public access for recreation, tourism and rural commuting, although this was not necessarily the prime reason for their construction in the first place. The community now has an expectation that State Forests will maintain the forest road network as an important element of New South Wales's rural transportation infrastructure. State Forests recognises this need and does, as far as possible, maintain the overall road network. However priority is given to those roads and trails that give access for currently active forest management for fire protection and maintenance of timber harvest operations.

In this Code, State Forests recognises the need to upgrade the alignment standard of forest roads to meet modern vehicle requirements as well as the need to meet current environmental standards for soil, water and ecological protection. The Code especially recognises those conditions set out in the Pollution Control Licence held by State Forests for timber harvest operations in State that apply to timber haul roads. This Code therefore sets the standards to achieve these dual goals.

In approving this Code, I urge all forest road and fire trail users to follow the basic rules of behaviour set out on the back cover of this Code. I also remind everyone that natural surface roads are not suited to high-speed travel. All vehicles travelling through State forests must be registered. Although no overall maximum speed limit for forest roads has been set, everyone should take every care to drive safely and well within the limits that the nature of these roads and the forest terrain impose.

Finally, to all forest road users, there are times when these roads should not be used, that is:

- when it is raining or the road surface is wet;
- when fire danger conditions are high or extreme;
- where it is indicated that local logging traffic and harvesting operations are active.

Your cooperation in the sensible use of the access to your State forests is appreciated.

BOB SMITH
CHIEF EXECUTIVE

SCOPE

National Principles

- Each State will provide an appropriate system for the specification, control and accountability for forest practices relating to wood production activities.
- The system will provide for code(s) of forest practice suitable for the State.
- The purpose of the code(s) of forest practice related to wood production is to ensure that timber growing and timber production activities for commercial purposes, are conducted in a manner that safeguards the identified environmental values and is consistent with defined minimum standards associated with those forests.
- Review of the code(s) of forest practice related to wood production will be conducted at intervals permitting responses to developments in knowledge and technology. Community views should be actively sought as part of the review process.
- Planning of road systems in public forests will be based on the economic principle of minimising the combined cost of snigging and roading and on the Principles of Environmental Care.
- Forest operations should be supervised and monitored by qualified and authorised officers and be subject to possible audit.

Forest Practices related to Wood Production in Native Forests: National Principles

Part 4 of the Forest Practices Code sets out the standards to be followed by State Forests' managers, employees, contractors and all other forest road users in all aspects of forest road and trail use and management. The Code fulfils State Forests' obligations to other regulatory authorities, the community of New South Wales and the forest industries, to provide rules for the control of road systems within publicly owned forests in New South Wales.

The Code adopts the *Forest Practices Related to Wood Production in Native Forests and Plantations: National Principles (1992 and 1996).* The Code takes account of all relevant State and Commonwealth legislation and regulation affecting the following aspects of forest access:

- worker occupational health and safety;
- environmental protection;
- planning and development;
- regulatory and planning approvals;
- construction and maintenance standards.

The Code also reflects State Forests' *Environmental Policy Statement*, and other policy statements on Occupational Health and Safety, Environmental Protection and

Sustainable Forest Management, Commercial Performance and Client Satisfaction that may be issued by State Forests.

This Code is supported by appropriate Technical Guidance Notes, which should be regarded as benchmark standards for best practices in natural surface and unsealed road construction.

This Code acknowledges that the Pollution Control Licence schedule conditions will be mandatory where that Licence covers the use of timber haul roads for timber harvest operations. For all other roads and fire trails, this Code assumes that those conditions will be voluntary adopted as benchmark standards to support best practice in road use, construction and maintenance.

The planning and operational standards for road and trail construction and maintenance described in this Code are designed to ensure:

- Fulfilment of State Forests' duties and obligations under the Forestry Act;
- Good standards of ecologically sustainable forest management and workmanship which comply with environmental systems and approvals and their verification through audit;
- Safe working practices;
- Efficient and proper use of forest roads and trails;
- Protection of the forest and its environment;
- Protection of assets and other forest uses;
- Adoption of accepted standards for rural roads in Australia;
- Holding operating costs constant or reduce them in real terms;
- Protection of catchments and waterways.

Where supporting instructions do not exist, it is incumbent upon Regional Managers and others to draft relevant instructions, consistent with this Code, which may then be approved and used to sustain the intent of this Code.

The provisions of this Code are binding on all State Forests' staff, employees, contractors and consultants.

Any changes to this Code which are needed because of subsequent changes to legal and statutory requirements, through technical improvements or enhanced environmental standards will be advised through the publication of supplements to the Code.

Administration and performance associated with this Code will be subject to audit.

1. LEGAL AND OTHER REQUIREMENTS

National Principles

Soil, water catchment, cultural and landscape values must be protected by the careful location, construction and maintenance of roads and tracks and regulation of their use.

Forest Practices related to Wood Production in Native Forests and Plantations: National Principles

1.1 Environment Policy

This Code is subject to State Forests' *Environment Policy Statement* and reflects that policy's goals and objectives. The full text of the *Environment Policy Statement* is reproduced on the inside front cover of this Code.

1.2 Principles of Environmental Care

State Forests will manage the provision of forest access in accordance with the Principles of Environmental Care found in the wood production principles for native forests and plantations derived from the *National Forest Policy Statement*.

1.3 Legislation

(a) Forestry Act

The Forestry Act 1916 is the principal legislation governing the operations of State Forests. The Forestry Act gives State Forests power to control and manage forestry areas, to acquire land, to establish and maintain plantations, seed orchards and tree nurseries, to engage employees, to control the use of fire, and to regulate and control the use of roads. [Note that the title "State Forests NSW" is the trading name of the Forestry Commission of NSW.]

(b) Other legislation

Many of the other laws enacted by the Parliament of New South Wales affect forest road and fire trail management. A list of the most relevant legislation is set out in Appendix 1.

1.4 Australian Standards and other external Codes of Practice

State Forests also manages forest road and fire trail construction and maintenance operations, and controls forest access in accordance with relevant Australian Standards and industry Codes of Practice. Appendix 2 contains a list of relevant Standards and Codes and other external codes of practice.

1.5 State Forests' policies and instructions

Appendix 3 contains a list of State Forests' current policies, manuals and instructions applicable to road and trail construction, maintenance and use.

1.6 State Forests' Forest Practices Code

This is Part 4 of the overall Forest Practices Code being prepared by State Forests to cover all aspects of forest management and operational activities. Other parts of the Code published to date are:

Part 1 Timber Harvesting in State Forest Plantations (1995);
Part 2 Timber Harvesting in Native Forests - State Forests and Crown-timber Lands (1995);
Part 3 Plantation Establishment and Maintenance (1997).

Parts 1 and 2 include specific references to log haul road use by timber licensees and others engaged in harvesting operations.

1.7 Pollution Control Licence, Conservation Protocols, SEMGL, SEMGIF, NSW SCMLEGF, ESCSEPE.

Detailed conditions and instruction for the construction and management of timber haul roads within different parts of NSW are included in the following regulatory standards:

- *Pollution Control Licence issued to State Forests;*
- *Conservation Protocols jointly approved by State Forests and NPWS;*
- *Standard Erosion Mitigation Guidelines for Logging in NSW (SEMGL);*
- *Soil Erosion Mitigation Guidelines for Inland Forests in NSW (SEMGIF);*
- *Guidelines for Soil Conservation Measures during the Logging of River Red Gum Forests in NSW (SCMLRRGF).*

Application of these conditions for timber haul roads is mandatory. Application of these conditions to other forest roads and fire trails should be undertaken wherever relevant and practicable.

The guideline *Erosion and Sediment Control Strategy for Eucalypt Plantation Establishment (ESCEPE)* which applies to hardwood plantation establishment, includes instructions for to road and fire trail construction during site preparation.

[Note that the Pollution Control Licence issued to State Forests will become an Environment Protection Licence under the new legislation described in Appendix 1, Item 9.]

1.8 Delegations/Responsibilities

(a) Approvals by Regional Managers

Regional Managers in both Native Forests and Softwood Plantations Divisions, (or the equivalent delegated officer in Hardwood Plantations Division), will be responsible for ensuring that all planning, survey, environmental assessment and budgeting tasks are completed before approving any capital works road construction or major reconstruction/maintenance project.

Regional Managers have the same responsibility when submitting projects for higher delegated financial approval.

(b) Responsibilities of other managers

Managers and foresters so delegated by the Regional Manager will have responsibility for preparation of road construction and road maintenance proposals, management and oversight of construction in progress to ensure that projects meet budget and environmental protection standards.

(c) Control of road use

The Regional Manager assisted by a manager or forester who has been so delegated, responsible for all day-to-day control of forest road usage in the Region, including the use of timber haul roads. Such controls will include:

- temporary road closure;
- placement of signs;
- public media advice;
- preparation of rights of carriageway agreements;
- liaison with police, local government and other authorities.

2. USE OF FOREST ROADS AND TRAILS

Principles

Relevant government agencies will monitor the use of forests for tourism and recreation to assess their impact on forest ecosystems. Where necessary, forest access will be managed to protect and conserve forest ecosystems.

National Forest Policy Statement.

One of the primary objectives of State Forests under the Forestry Act is that,

> "Consistent with the use of State forests for the purposes of forestry and of flora reserves for the preservation of native flora thereon:
> (i) to promote and encourage their use as a recreation; ……."

Forestry Act 1916 S.8 A(1)(e)(ii).

> "Roads will be closed in wet conditions when unacceptable damage would occur, or when such other conditions may warrant."

Forest Practices related to wood production in Native Forests: National Principles

Background

State Forests constructs roads and fire trails in forests and plantations for three reasons:

- Access for harvesting;
- Fire protection;
- Forest management access to undertake forest works and silviculture.

Once constructed, many of these roads also fulfil other functions for the benefit of the community by providing:

- alternate and often superior access to private property;
- through routes between rural settlements, thus complementing the rural road infrastructure provided by local and State government;
- public access to State forests for recreation and tourism.

Under the Traffic Act and the Motor Accidents Act, all areas where a vehicle may proceed within State forests are **public streets** as defined under the Traffic Act. Therefore normal registration, insurance and licence requirements apply to the operation of any motor vehicle. Unlicensed drivers and/or unregistered vehicles may not use any roads in State forest areas. In addition to compliance with the Traffic Act, State Forests recognises the need to manage public use of forest access in order to protect the environmental and productive values of State forests, to provide equitable use for all users of State forests and to provide for public safety.

In this context, it should be understood that forest roads are not **public roads** and members of the public do not have an unfettered right to use them. The control of forest roads and discretion to allow their use is vested in State Forests through the Forestry regulation

The Forestry Regulation:

- regulates use and enjoyment of State forests;
- prohibits or regulates the entry of persons and provide for the safety of persons within State forests and timber reserves;
- secures decency and order;
- provides for the removal of trespassers and other persons causing annoyance or inconvenience;
- prohibits or regulates the entry and use of vehicles;
- regulates and controls the parking of vehicles;
- prescribes the speed and load limits of vehicles;
- regulates, controls or prohibits the use of forest roads, tracks, trails and other ways and circumstances under which these shall be open or may be closed to public traffic or use;
- prohibits the obstruction of roads, tracks, trails and other ways and controls and regulates the use of gates;
- considers an offence the damage or destruction of signs, notices, roads, fire trails, fences and other improvements.

2.1 Local Management of Forest Roads and Trails

Consistent with this chapter of the Code, Regional Managers will develop local strategies for the management or public use of roads and trails on State forests under their control. The strategy should be prepared in conjunction with strategic road network plans (see Chapter 6).

(a) Control of traffic within State forests

Regional Managers should liaise with RTA regional officers, local Traffic Advisory Committees and local government on the use of traffic control facilities for forest roads. The strategies should address:

- Accessibility levels (2WD, 4WD etc);
- Allowable speeds;
- Permanently closed roads (use of barriers, signs etc);
- Temporary closures or private use roads (gates, signs);
- Wet weather restrictions;
- Vehicle restrictions (trail bikes in picnic areas, horses etc);
- Use by organisations (eg. motor vehicle rallies).

These local strategies should form the basis for general public information on the allowable uses of State forests, specific use-restricted areas and roads and fire

TABLE 2.1
A guide to the preparation of local strategies for control of public use of forest roads and fire trails

Process	Issues to be considered	Action required
Review road network capacity and function	• Road classification; • Four wheel drive access; • Closed roads, dead end roads; • Through routes; • Impacts of weather restrictions.	Identify: • Roads and fire trails not to be used by the public; • Roads that are vulnerable to damage, frequent closure, etc; • gravelled and all-weather access; • Roads within Crown leaseholds and areas enclosed for permanent grazing; • Gates and grids.
Survey road usage and community needs	• Traffic densities; • Forest management and harvesting • traffic and its priority; • Major traffic patterns (weekday, weekends, public holidays); • School buses; • Non-logging heavy haulage; • Recreational vehicle usage; • Property access; • Access to National Parks and other parks and reserves; • Rural fire control; • Alternative routes to highways during major flood events.	For each road, identify the overall need for public use and its interaction with forest management and harvesting traffic. It may be necessary to undertake traffic surveys including vehicle counts, especially at weekends and public holidays to obtain a full picture. Check exclusive use events such as military exercises and car rallies and their potential impact on other forest users.
Consult with relevant user groups and traffic regulators	Interested groups should include: • Police; • Local government; • District Bush fire committee; • Local traffic committee; • Land-holders; • Representatives of recreational vehicle organisations; and, • State forest neighbours.	Set out and describe the forest road and fire trail network to the interest groups. Nominate the proposed controls relating to signage, weight limits, four-wheel drive access and periodic exclusive use, etc.
Determine control measures	• Roads signs; • Barriers and gates; • Speed limits; • Weight limits; • Wet weather notified closure procedures.	Set out control measures for individual roads or road networks on the plan. Prepare action plan for guidance of staff and others. Cross reference to the strategic road maintenance plan. The information plan should
Prepare information plan	Information needs to be available to: • Staff and employees; • Licensees and harvesting crews; • Leaseholders and permittees; • Neighbouring land-holders; • Local media outlets (radio, newspapers); • Special interest groups (RV, car rallies, military).	The information plan should include contact phone/fax lists with interested parties, prepared handouts on road closure procedures, and details to enable over-counter or phone inquiries to be answered.
Establish review process		There should be a full periodic review every three- five years.

trails, and the requirements/restrictions applicable to those uses. Local strategies should be amended as circumstances warrant and reviewed periodically.

(b) Supervision of access

Local forest officers and employees should be fully informed of the requirements applying to road and trail use in their area. Appropriate staff should be authorised to police the requirements in the course of their daily work. All staff should be ready to provide advice to forest users where needed.

(c) Traffic control facilities

All traffic control facilities and structures (eg signs, barriers, etc.) should comply with appropriate AS 1742 and AS 1743 - *Standards for road signs and their specifications*. Any control signs erected by State Forests must have been previously prescribed under the Forestry Regulation to be enforceable.

The Roads and Traffic Authority (RTA) have responsibility for establishing general standards and principles for "traffic control facilities" (including signs) and for the movement, regulation and control of traffic throughout the State. The Authority also coordinates the activities of "public authorities" in relation to the erection of "traffic control facilities". Where inconsistencies emerge, the RTA has precedence. The local Traffic Advisory Committee can exercise such precedence where the RTA has delegated that power.

(d) Traffic Safety

Routine, pre-maintenance inspections and reports by forest officers and employees should pay particular attention to matters of road safety conditions including:

- Reporting of dangerous road conditions (eg. landslips, fallen trees);
- Regular inspection to determine faults in bridges and culverts (running decks, girders and key logs, pipe head walls and abutments);
- Directional, speed and safety signs (cleaning, repair and replacement);
- Sighting distances (the need to brush or remove obscuring vegetation);
- Roadside guard rails and protective fencing; (repair and vegetation removal);
- Cattle grids, gates and associated stock fencing (adequacy, drainage);
- Road pavement (gravel, potholes, damage).

Reports from licensees and the public should also be noted. Where a dangerous situation exists (eg. fallen tree), immediate action should be taken to remove the obstacle or place warning signs until the obstruction or dangerous conditions is removed. If necessary, further action should be taken as quickly as possible to close roads, divert traffic and make adequate repairs to render roads and structures safe. See also Section 6.6.

(e) Wilful damage to roads

Reporting should also provide for collection of information on access and traffic control breaches, such as:

- Unauthorised traffic using closed roads, timber extraction tracks etc;
- Creation of new tracks (pushing through with 4WD vehicles);
- Dangerous driving and excessive speed;
- Damage to roads, signs or other works.

Offenders will be dealt with under the Forestry Regulation.

2.2 Vehicle Compliance

(a) Registration

All motor vehicles must be registered under the Traffic Act or comply with RTA Permit requirements, and are to be in a roadworthy condition. Vehicles, plantation establishment or harvesting machinery, which are incapable of registration by virtue of their type or configuration, are prohibited unless an RTA permit is held.

The following vehicles are prohibited without exception unless the forest area has been designated as a Recreation Vehicle area (see 2.4 (h) below):

- Minibikes;
- Miniature agricultural/garden tractors;
- Unregistered trail bikes (except where used by a lessee within a recognised lease holding within the forest);
- Unregisterable/unpermitable all-terrain vehicles (except for small personal all-terrain vehicles used by lessees within dedicated lease areas for farm management purposes);
- Tracked vehicles not used for harvesting or forest works (except military tracked vehicles);
- Go-karts;
- Dune buggies (2 wheeled drive cross-country vehicles).

Offenders will be dealt with under the Forestry Regulation. See OC 95/08.

(b) Fire prevention

Vehicles shall comply with the Forestry Regulation, Clause 24, namely:

"*No person shall in an area drive, use or control any machine unless:*

a) a spark arrester in good and serviceable condition is securely fixed to the exhaust of the machine;

b) the fuel, electrical and braking systems and all combustion chambers, manifolds and exhaust pipes and expansion chambers of the machine and the joints thereof are in all respects in good order and condition; and

c) *the machine is free of surplus oils, dust impregnated with oil and vegetative matter.****"***

2.3 Driver Compliance

(a) Drivers

All drivers must be properly licensed for the vehicle they drive.

(b) Compliance with the Traffic Act

Drivers of vehicles must comply at all times with the provisions of the Traffic Act as it applies to public streets, especially speed and load limitations. Instructions and warnings on any signs erected by State Forests must be observed and the directions of any authorised officer shall be followed.

(c) Protection of road surfaces

Vehicles must not be driven in a manner, which is likely to cause damage to the road surface, or to any structure.

(d) Drivers under 17 years of age

Generally drivers under 17 years of age are prohibited from driving any heavy motor vehicle or machine. Drivers under 17 years of age may drive motor vehicles on formed roads provided they hold an appropriate RTA licence or permit, but must not operate any machine unless permitted by State Forests NSW to do so, and with appropriate supervision.

2.4 Vehicle Access

(a) General vehicle access

General vehicle access must be confined to permanent roads and fire trails, which have been kept, open for use and are adequately drained.

(b) Snig tracks and timber extraction tracks not to be used for access

Vehicles, except for State Forests' service vehicles, must not use snig tracks or other timber extraction tracks constructed for timber harvesting machinery purposes, except as provided for in the Forest Practices Code, Parts 1 and 2.

(c) Four wheel drive vehicles

Four wheel drive vehicles are permitted to use trails indicated as such by signposting or by indication on appropriate maps.

(d) Closed roads and fire trails

Vehicles may not use roads and trails that have been closed, except in an emergency. Such closed roads and trails will normally have been cross-drained and are revegetating.

(e) Walking tracks

Only pedestrians may use walking tracks.

(f) Horse riding

Horse riders must keep to permanent roads and trails or to trails that are signposted as especially available to them. Horse riders should not use walking tracks.

(g) Road closures

State Forests may close roads and trails to traffic:

- during periods of construction, maintenance or reconstruction;
- when they are considered unsuitable for use by the public in the interests of safety or protection of the environment;
- during periods of wet weather or high fire danger;
- when considered necessary for forest management reasons.

(h) Designated areas – Recreational Vehicles Act

In some areas, State Forests may make available an area for designation as a Recreation Vehicle Area under the Recreation Vehicles Act. Vehicles operating on any such area shall comply with the requirements of that Act.

(i) Recovery of vehicles

State Forests is not responsible for the recovery of vehicles of any kind when accidents, mechanical failure happen, or where vehicles become stuck or bogged. Where the recovery of vehicles is arranged, all costs must be borne by the vehicle owner, including the costs of repairing any environmental damage caused by the vehicle or by its recovery.

(j) Abandoned vehicles

Where necessary, State Forests is empowered to take action to recover the costs associated with the removal of unregistered, abandoned vehicles from State forest areas.

2.5 Periodic Restrictions on Road and Trail Use

Background

State Forests' managers and officers often need to restrict public access to individual roads or fire trails where:

- There are concerns for the safety of people, or of the forest (eg. fire or wet weather); or,
- A particular forest use warrants the temporary closure of a forest road, trail or forest area, (eg. active timber harvest operations, military exercises, or car rallies).

The Regional manager or other authorised officers may apply any of the following restrictions to all forest road and trail users when necessary.

(a) Delays and detours to traffic

Delays and detours may be incurred where major maintenance, repairs or reconstruction work is being undertaken.

(b) Safety closures

Roads may be closed to the public for safety reasons as a result of:

- Rock falls, tree falls or land slips, snow, frost, flood;
- Road reconstruction or maintenance activities;
- Gravelling operations, (frequent use of narrow forest roads by heavy gravel trucks can be hazardous to other road users);
- Tree-felling and harvest operations, including timber haulage (see also Forest Practices Code, Parts 1 and 2);
- Fire control operations or fuel hazard reduction burning (access to parts of a forest where a wildfire is burning or hazard reduction burning is in progress may need to be restricted in the interests of public safety);
- Access to a forest area when it is being treated through the aerial application of fertiliser, herbicide or pesticide;
- Where a Special Purposes Permit has been issued for exclusive forest use.

(c) Periods of very high to extreme fire danger

During periods of extreme fire danger, which are rarely longer than a day or two, the public may be excluded from a large part or the whole of a forest, particularly in high value plantations. This closure of the forests is to reduce the risk of ignition and likelihood of forest damage, and for the safety of the public should fire occur.

(d) Other restrictions

These may be applied:

- Where Permits have been issued to organisations for substantial events involving use of roads and trails (eg. car rallies, military exercises or horse events), public use of affected roads will normally be restricted for safety reasons;
- To certain vehicles in particular areas. For example, exclusion of motor bikes in the vicinity of picnic areas;
- On a time closure basis for some forest roads to cater for curfews on traffic noise or to allow safe passage for school buses;
- Where excessively dry conditions have led to dust formation causing traffic hazards and road pavement damage.

(e) Wet weather restrictions

Wet weather restrictions apply to all forest traffic. They are designed to prevent unsafe working practices, and are vital in avoiding excessive soil disturbance, minimising water turbidity and avoiding undue damage to roads and trails during and subsequent to periods of wet weather. Wet weather restrictions can apply at any time during the year. While these restrictions apply to all natural surface roads and trails, they may also apply to any other road regardless of alignment standard and running surfaces.

(i) Wet weather restrictions during timber harvest

Wet weather restrictions for timber harvest operations are dealt with in Forest Practices Code Parts 1 and 2. Wet weather restrictions for plantation establishment operations are dealt with in Forest Practices Code Part 3.

(ii) Wet weather restrictions for other forest users

Regional Managers and Supervising Forest Officers are responsible for advising all forest users of local instructions concerning wet weather restrictions, and when the various controls will apply. These controls may take the following forms:

- automatic wet weather closures without notification;
- notified wet weather closures (partial or total).

(iii) Automatic wet weather closures

Automatic closure restrictions apply to all vehicle use of natural surface (not self-gravelling, gravelled or sealed) roads or tracks. All natural surface roads are to be considered closed to traffic, without prior notification generally, when it is physically raining and/or water is running in table drains of natural surface roads as a direct result of rain or snowfall. All traffic movements on natural surface roads must cease under these conditions.

(vi) Notified closure of roads and use of flooded roads - all forest users

The Regional Manager may close any forest road or roads in specific forest areas to traffic during wet weather or flood periods by directing the placement of "Road Closed" signs or physical barriers. Alternatively, *Light Traffic Only* signs on

gravelled or sealed roads will indicate exclusion of harvesting machinery and heavy vehicles over two (2) tonnes gross weight.

(v) Advice of wet weather restrictions

Information regarding restrictions on forest road usage under adverse conditions should be made widely available to all forest road users. Media outlets should be used to advise the public where prolonged rainfall is likely to prevent their use of forest roads.

(f) Use of tracked machinery or chains

Tracked machinery, or machinery or vehicles with wheel chains must not be used on any road during wet weather or where pavements are wet and could sustain damage is strictly prohibited, except either in emergency circumstances such as injury or accident, or where specifically approved by a Supervising Forest Officer.

2.6 Recreational Vehicle Use

Background

The extensive network of roads and trails within State forests provides the basis for the very popular activity of recreation vehicle (RV) driving on public lands. RVs include four wheel drive vehicles and motorcycles. In more recent years the use of RVs has increased dramatically and State Forests recognises the use of RVs as a legitimate recreational activity on State forests.

(a) Responsible recreational vehicle usage

Recreational vehicle users are expected to follow the guidelines set out on the back cover of this Code.

(b) Organised Events

Organised events, such as car rallies, which are likely to attract significant numbers of participants and/or spectators and may cause excessive wear and tear on forest tracks and temporarily limit other forest users' access to State forest areas must only be held under the authority of a Special Purposes Permit. The Permit will specify the conditions under which the event can be conducted. Rally organisers/permittees may be required to make good any repairs required as a result of their road use or pay compensation for the damage caused.

2.7 Crown Leasehold Lands within State forests

Background

Crown leasehold lands within State forests are deemed to be private property for access purposes. The lessee has the entitlement to quiet enjoyment of the land, including the use of any constructed roads or trails within the leasehold area.

(a) State Forests use of roads within leasehold areas of State forest

State Forests' service vehicles may use all roads within leasehold areas within State forests for forest management purposes, without the need for permission from the lessee. State Forests does not require the consent of the lessee for the construction and use of roads for the purpose of harvesting operations on a lease within dedicated State Forest. However State Forests' *Good Neighbour Policy* requires that a manager consult with the lessee prior to any road construction. The consent of the lessee is required where a road on the lease is to be used for harvesting of other Crown-timber lands.

(b) Timber licensees access through leasehold to harvest other areas

Access by a licensee through a lease to load and transport timber or products from another part of a State forest outside that lease requires approval from the lessee in the form of a permit to enter where no easement exists.

(c) Use by public

The general public is not entitled to use dedicated leases for purposes such as recreation. State Forests' staff should be careful to avoid giving incorrect impressions on this point. Note that it is now standard practice to show dedicated leases on State Forests' S*tate Forests* map series, with suitable warnings in legend and text on restrictions on use by the public.

All other persons wishing to use these roads must seek the lessee's permission before entering the area.

(d) Crown roads

The lessee's permission is not required for the use of Crown roads, (reserve roads, or boundary roads), or public streets through leasehold lands within State forests (See also Section 3.4).

2.8 Flora Reserves

Where indicated by signage or other means, vehicles are not permitted to use roads or trails within Flora Reserves dedicated under the Forestry Act. Such roads should usually be closed off by barriers or locked gates.

2.9 Access through State forests

Background

Many State forests contain large road networks that link to Shire and Main roads. People travelling between rural centres often travel through State forests to shorten their journey. Also people who live in the vicinity of State forests often use forest roads for their own preferred daily access and for access by visitors or service people to their property.

A small number of roads within State forests have been built for primary or shared use by other authorities, such as access to high elevation points for radio services and television transmitters. Construction and maintenance of these shared-purpose roads is by agreement with State Forests.

(a) General use of forest roads and fire trails for non- State Forests purposes

All State forest users are subject to any requirement, compliance and restriction to forest road use that a State Forests' officer may determine from time to time. State Forests will generally allow the use of existing roads and trails within a State forest as access by any person provided that:

- The roads are responsibly used in accordance with other conditions in this Code and are not damaged by such use; and
- The cost to State Forests for road and fire trail maintenance will not be significantly increased as a result of that use.

(b) Damage to roads and maintenance costs

The Regional Manager may take action to seek compensation on behalf of State Forests where damage or increased maintenance cost for a forest road or fire trail is significant. This is where the damage can be attributed to any party or parties using that road for goods haulage, or transporting people for commercial purposes. In each case, the Regional Manager will take into account those additional maintenance costs, in order to decide whether the road can be economically maintained, or should be closed.

The parties identified as benefiting from using the road may be directed to obtain a Special Purposes Permit, or to enter a formal agreement with State Forests for their continued approval to use the road.

(c) Maintenance of roads and trails proposed for closure

Where a user desires to have a road or trail left open, they may enter an agreement with State Forests for planned maintenance and upkeep of the road at their expense, including the gravelling of the road to avoid undue damage during wet weather. See also 2.9(e).

(d) Requests for additional or improved access

In some instances, a property may not have direct access through a State forest to a permanent forest road, or the existing access is of a low standard (eg a fire trail). The property owner may request authorisation from State Forests' Regional Manager to open or improve that access for their use, at their cost.

State Forests may enter a contract agreement with that person, or they may be issued with a Letter of Authority or a Special Purposes Permit for the use of the road or trail to link the property with the nearest forest road. The contract, agreement or permit must include conditions that ensure environmental protection, exclude any maintenance or upgrading by heavy plant, and a statement that no expenditure for maintenance will be incurred by State Forests.

(e) Private construction reconstruction (upgrading) or maintenance of roads or trails

Where a property owner proposes private construction, reconstruction (upgrading) or maintenance of the access linking their property to the forest road network, the property owner must seek approval from State Forests. The owner must provide a plan which, if approved, must be complied with.

The Regional Manager must assess the management objectives for the forest, the environmental effects and design standards set out elsewhere in this Code in relation to the proposal before approving the work.

(f) Improvements to roads or trails remain the property of State Forests

Any improvements made to such access under (c) - (e) above, with a State Forest immediately become and remain the property of State Forests.

(g) Legal access

The use of a forest road or fire trail as principal or sole access to a property neighbouring a State forest does not constitute its recognition as legal access for property transfer, subdivision or local government requirements under the Local Government Act or the Environmental Planning and Assessment Act.

Land holders and prospective purchasers of properties adjacent to dedicated State forests must satisfy themselves that they have legal access to their property other than via a forest road within dedicated State forest.

2.10 Military Use of Roads and Trails

Background

State forests in New South Wales have long been used for military training exercises, by agreement with the defence forces, where such training does not result in significant environmental damage, and does not unduly restrict forest management and other forest users.

(a) Issue of training permits

Regional Managers must deal with all applications for permits for military training in accordance with Operational Circular 96/12. Permit approvals should consider the concurrent need to use forest roads and trails by other forest users and the public and any special conditions to be included to protect the forest road and trail network.

(b) Standard permit conditions

All permits must include the standard conditions relating to roads and trails. These include requirements that:

- all roads and trails are maintained in good order;
- repairs to roads and trails are effected promptly;
- vehicles are only to travel on constructed roads and trails unless otherwise permitted;
- roads and trails must be closed during periods of wet weather;
- no vehicle is permitted off-road to cross any creek or drainage line;
- adequate warning signs are to be used.

(c) Co-operative work

The Regional Manager may negotiate with military units for co-operative work to be undertaken on State forests where the military unit has the requisite expertise (eg. road and trail repair and maintenance), instead of payment of permit fees. Such work should comply with the standards set out in this Code.

(d) Damage and compensation

Concurrent and post-exercise inspections should be undertaken to ascertain any damage, especially to roads and trails. When damage occurs, the unit should be asked to make appropriate repairs. Where these are insufficient, compensation should be sought, including the cost of additional necessary inspections.

3. FOREST ACCESS TO THE PUBLIC ROAD SYSTEM

Background

The State forest road network links to the public road system, which also is used by the timber industry to transport timber.

In some cases, where significant timber haul logging traffic uses public roads, State Forests will consider contributing to reconstruction and/or maintenance. Forest road location and design also needs to take into account road authority requirements at junctions with, or in the vicinity of public roads under their jurisdiction.

3.1 Responsibility for public roads

(a) Public road authorities

Full responsibility for construction, reconstruction and maintenance of any public road lies with the organisation nominated as the road authority for that road under the Roads Act. The road corridors for these roads are usually surveyed and dedicated under the control of the nominated authority. Where roads are constructed under the control of more than one road authority, the respective contributions to construction and subsequent maintenance should be established in an Agreement. Provisions of the Roads Act may apply to some agreements where the road is classified according to the Act.

(b) State Forests contribution to public roads

Where State Forests is a party to such an agreement, its contribution should be appropriate for the standard of road required.

(c) State Forests is not a road authority

State Forests is not a road authority for the purposes of the Roads Act.

3.2 Roading assistance to Local Government Councils

State Forests is under no obligation to contribute towards the cost of constructing or re-constructing roads where a local government council is the road authority, nor is it required to contribute towards their upkeep. Nevertheless, State Forests may consider local government council requests for assistance in special cases.

3.3 Location and design issues

(a) Public road re-alignment involving appropriation of State forest areas

Where a new road, or relocation/re-alignment of an existing road on a State forest is proposed by a roads authority, the Regional Manager may provide advice on the forest resource and other values that will be impacted and therefore affect State Forest's management of the area. The Regional Manager may also indicate any available alternatives for location that are preferred over the proposal. However, State Forests is under no obligation to supply assistance or information

to the proponent and may require the roads authority proposing the relocation to undertake an environmental impact assessment to evaluate the impacts.

The Regional Manager should also address any likely compensation for lost forest productivity. Only the Minister for Forestry can approve the revocation of a Sate forest area to allow for the realignment of a road.

(b) Forest road construction involving access to public roads

Where road construction or reconstruction is proposed by State Forests in the close vicinity of public roads, the Regional Manager must consult with the relevant roads authority to ensure that existing roads are not adversely affected. Any road junction connecting a forest road with a public road must be designed and constructed to meet the required standards of the controlling roads authority.

3.4 Crown roads (reserved roads and boundary roads)

Background

Crown Roads (reserved roads and boundary roads) are surveyed and dedicated access corridors established during sub-divisions of Crown land to provide legal access to land portions. They are "Crown lands" under the Crown Lands Act 1989 and "Crown-timber lands" under the Forestry Act.

Most Crown roads in rural areas were established during the sub-division of Parishes during the nineteenth century. Many Crown roads have become part of State forests where extensions to State forests have encompassed other land tenures.

(a) Crown roads not dedicated as State forest

Where a Crown road traverses a State forest, State Forests has no responsibility for maintenance, except in those cases where a Letter of Agreement has been made between State Forests and DLWC. Inquiries should be direct to the appropriate road authority for that particular road.

(b) Preferred use of Crown road reserves for access to State forest areas

Where access is required from State forest boundaries for connection to Shire and Main Roads or for fire trail construction for protection purposes, the availability of suitable Crown roads along the proposed route should be investigated ahead of seeking other means of access. No road works should be undertaken within a Crown road without the approval of DLWC which is the road authority for Crown Roads.

3.5 Neighbouring land, Permits to Enter

(a) Private Property

Where access is required onto private land for forest road survey and construction the owner's and any mortgagee's permission is required.

(b) Permits to Enter

Where such access is needed, a Permit to Enter form must be completed by the owner and any mortgagee. This permit will grant permission to State Forests and its employees, other persons, equipment, etc, to enter the private land for a stated purpose and a nominated period of time.

(c) Renewal of permits when there is a change of ownership

While a Permit to Enter is an enforceable contract, a new Permit to Enter will be required if there is change of ownership, a change of land use purpose or the current Permit expires and State Forests still wishes to retain access.

(d) Crown Roads

Permission is not required to travel along any Crown roads through the property provided such travel is within the road reservation. Also, in the event that a construction (eg. stockyard, barn, dam) on the property presents a barrier to access along the reserved road, a person is entitled to use the shortest practical alternate route through the property to skirt the barrier. (See 3.4 above.)

(e) Acquisition of access through private property

Potential encroachments on private property or other tenures not under State Forests' control for roading should be investigated to remove or minimise the need and cost of legalising the road through easement or other means. Where State Forests intends to construct a forest road through private lands or other tenures and keep it open for future use, action should be taken to secure its use by State Forests.

Such action should be effected by the creation of an easement (Right of Carriageway) under the provisions of the Conveyancing Act. A Right of Carriageway would give State Forests the right to use the road but would exclude the general public from using the road.

If the road provides access to a number of properties in addition to providing State Forest access, the relevant Local Government Authority should be asked if it is prepared to accept dedication of the road as a public road and accept responsibility.

4. SOIL PROTECTION AND POLLUTION CONTROL

National Principles

- Water quality (physical, chemical or biological) should be protected by measures controlling change resulting from forest activities.
- Soil, water catchment, cultural and landscape values should be protected by the careful location, construction and maintenance of roads and tracks, and regulation of their use.
- Soil stability should be protected by measures, which regulate site disturbance.

Forest Practices related to Wood Production in Native Forests: National Principles

Background

The Environment Policy Statement commits State Forests to:

- ensure all relevant legislative and regulatory requirements are met;
- ensure that management strategies and operational procedures, including Codes of Practice, facilitate the recognition, mitigation and monitoring of the impact of forest activities on the environment;
- develop and implement efficient energy use and waste management measures in all our activities;
- encourage and assist our suppliers, contractors and other forest users to comply with our environmental standards.

The Forestry Act (1916) requires State Forests to "preserve and improve, in accordance with good forestry practice, the soil resources and water catchment capabilities of Crown-timber lands".

Soil erosion from poorly constructed or maintained forest roads reduces the value of theses constructed assets, and can degrade catchment water quality. The potential for water pollution is determined by site factors, such as rainfall erosivity, topography and inherent soil erodibility, as well as by management practices, particularly as they affect the amount of soil protection provided by ground cover.

4.1 Pollution

(a) Air pollution

All site preparation burning, and hazard reduction burning associated with road construction and maintenance, must comply with orders prohibiting burning made by the Environment Protection Authority under Section 133 of the Protection of the Environment Operations Act.

(b) Dust

Measures should be taken to minimise any pollution or public inconvenience caused by excessive amounts of dust from forest roads.

(c) Water pollution

The pollution of waterways with sediment produced from forest roads must be avoided as far as possible by the measures prescribed in this Code and the provisions of any Pollution Control Licence issued to State Forests in relation to timber harvest operations.

(d) Noise pollution

The machinery used during road and trail construction and maintenance operations must comply with Section 139 of the Protection of the Environment Operations Act.

(e) Pollution Control Licence, SEMGL, SEMGIF, SCMLRRGF, and ESCSEPE

All design, construction, use and maintenance of roads associated with timber haulage must be in accordance with the relevant requirements of the:

- *Pollution Control Licence issued to State Forests;*
- *Standard Erosion Mitigation Guidelines for Logging in NSW (SEMGL);*
- *Soil Erosion Mitigation Guidelines for Inland Forests in NSW (SEMGIF);*
- *Guidelines for Soil Conservation Measures during the Logging of River Red Gum Forests in NSW (SCMLRRGF)*

All design, construction, use and maintenance of other roads and trails should be in accordance with the relevant requirements of the above and for hardwood plantations with the *Erosion and Sediment Control Strategy for Eucalypt Plantation Establishment.*

4.2 Use of Equipment

(a) Choice of machinery and equipment

In choosing between machinery, equipment and techniques for particular tasks, preference should be given to those having the least potential impact in terms of air, water and noise pollution.

(b) Use of machinery during extreme conditions

The use of machinery, vehicles and equipment should be modified when continued operations in very wet or very dry conditions so as to minimise the potential for soil erosion or reduce water quality, or the long-term serviceability

of roads and fire trails. Special care should be taken where roading activities take place on high erodibility or vulnerable soil types (eg dispersible soils).

(c) Training of operators

All machinery operators and supervisors involved in road construction and maintenance operations are to be properly trained and accredited in the techniques and precautions required to prevent soil erosion and pollution. The minimum standards are set out in the Forest Soil and Water Protection training competencies.

4.3 Storage and handling of fuels and other hazardous substances

(a) Fuel AS 1940

Fuel and lubricating oils are to be stored and handled in compliance with the requirements of AS 1940 - *The storage and handling of flammable and combustible liquids.*

(b) Mobile fuel tanks

Mobile fuel tanks are not to be located within, or within 10 metres of, a drainage feature protection area.

(c) Transport of fuel

Transport of fuel and refuelling of equipment must be done in a manner that prevents the potential for pollution of waters as a result of the escape of fuel.

(d) Pesticides - AS 2507

Pesticides and pesticide containers must be stored, handled and transported in compliance with AS 2507 - *The storage and handling of pesticides*.

(e) Training

All operators and supervisors involved in handling fuel, explosives and other hazardous substances are to be trained in the techniques and precautions required to prevent pollution of water or contamination of land. (See also Chapter 5.)

(f) Servicing and repairs

All servicing and repairs of equipment must be carried out in a manner that prevents the pollution of waters or contamination of land. Wherever possible servicing and repairs to equipment should be carried out away from the forest.

(g) Site protection

Plant and equipment and other substances and material on the site of road construction and maintenance operations must be handled, operated, moved and stored in a proper and efficient manner to prevent the pollution of waters.

4.4 Waste Disposal

(a) Definition of waste

Waste includes tyres, drums, wire rope, oils and fluids, empty chemical containers, spilled or surplus agricultural chemical, and any other litter. Waste does not include forest debris or forest litter (leaves, twigs, etc).

(b) Burial on State forest prohibited

Waste must not be buried in the forest except in approved facilities.

(c) Waste storage

Waste must be safely, properly and effectively stored until it can be removed from the forest. The general work area must be kept free of waste generated during road construction or maintenance operations. Waste must be stored in such a way that it poses no risk to other forest users, or any risk of polluting watercourses or contaminating land.

(d) Waste removal and disposal

Waste stored for removal must be removed from site no more than seven days after the completion of road construction or maintenance operations. Waste must be removed from the forest and disposed of in a proper and effective manner at an approved facility.

(e) Cleaning of roading machinery and equipment

All equipment washing-down operations must be carried out in a way to prevent concentration of contaminated runoff into drainage lines.

4.5 Notification of Water Pollution Events and Incidents

(a) Notification

Any employee or contractor who detects any pollution of water resulting from a road construction or maintenance activity must report the incident without delay to the Supervising Forest Officer or a forest manager.

(b) Maintenance of Registers

Registers must be kept at the Regional office in which pollution complaints and reported non-compliance in relation to timber haul roads is recorded. Each register must be kept up to date and available for inspection by authorised State Forests EPA officers. The register may be also used to record other pollution complaints and incidents where a notification is considered necessary.

5. OCCUPATIONAL HEALTH AND SAFETY, USE AND STORAGE OF DANGEROUS AND HAZARDOUS MATERIALS

National Principles

All wood production activities (including road construction and maintenance) will be conducted to comply with relevant occupational health and safety legislation and policy. In particular, all operators should be trained to designated standards in the safe and efficient use of equipment and machinery, and be responsible for safe working practices.

Forest Practices related to Wood Production in Native Forests: National Principles

Background

The NSW Occupational Health and Safety Act sets out the responsibilities of various parties at an industrial work site. In particular, it is the employer who has the obligation to ensure the health, safety and welfare of employees and other persons at the place of work. State Forests *Safety Standards Manual* (1995) and *Manual for the Use of Chemicals* (1996) include the detailed information relating to the management of safety generally and the use of hazardous materials.

5.1 Employer Responsibilities

(a) General

State Forests and other employers carrying out work on behalf of State Forests must ensure the health, safety and welfare at work of all their employees. This includes providing safe equipment and systems of work, arrangements for safe use, handling, storage or transport of plant and substances, and safe places of work.

(b) Safety standards manual and other compliance

All roading operations carried out by or on behalf of State Forests must comply with the relevant provisions of the *Safety Standards Manual*, and other State Forests' policies and instructions, legislation, Australian Standards, and Codes of Practice relating to occupational health and safety.

(c) Safety training

All persons must receive adequate and appropriate information, instruction, training and supervision in relation to safe working practices appropriate to the work performed.

(d) Safety competency

No person shall operate any power driven tool, machine or equipment without competent supervision, unless that person has been adequately trained and instructed in its operation and is capable of operating it safely without supervision.

5.2 Employee Responsibilities

All employees of State Forests, or employees of contractors doing work on behalf of State Forests, must report any dangerous work situation, take reasonable care for their own health and safety and of other persons and the general public at the workplace, and co-operate on any matters of occupational health and safety.

5.3 Safety Accreditation

(a) Manual handling code of practice

All employees and contractors should observe and use lifting techniques described in the *Code of Practice for Manual Handling* (NOHSC: 2005(1990). All State Forests' employees must be trained and accredited in manual lifting and have access to information on approved self-attended back care program courses.

(b) Accreditation and licensing of operators

All operators (both State Forests' employees and contractors' employees) must be trained, accredited and licensed to the minimum relevant legislative standard (eg. WorkCover). Any person operating industrial equipment must be 17 years of age or older.

(c) Chainsaw and brushcutter operators

Chainsaw and brushcutter operators must be accredited to a standard approved by State Forests and which complies with the *National Industry Competency Standards.* Unaccredited persons who are in training must only use chainsaws and brushcutters under the supervision of accredited persons.

5.4 Machinery Safety Standards

(a) General

All machinery used for forest works must comply with WorkCover requirements and relevant Australian Standards.

(b) Seatbelts

All machinery used in forest works must be fitted with seatbelts and seatbelt anchorages to AS 2664 - *Seatbelts and seatbelt anchorages.*

(c) Protective structures on machinery

Rollover Protective Structures (ROPS) fitted to machinery used in earthmoving for forest works must comply with AS 2294 - *Earthmoving machinery – Protective structures.* Falling Object Protective Structures (FOPS) must be fitted fitted to machinery used in forest works where considered appropriate and must comply with State Forests' Guidance Note - *FOPS & ROPS Canopies fitted to Plant used in the Timber Industry (Harvesting Timber)* (1994). Both ROPS and

FOPS must be adequately constructed according to AS 1636.1-3 - *Tractors-Rollover protective structures – Criteria and tests.*

(c) Machinery guards and exhaust systems

All other machinery must be fitted with have appropriate guards and shields (See AS 2153 - *Rules for the guarding of agricultural tractors and machinery*) and exhaust systems. Guards, shields and exhaust systems must be properly fitted and in safe working order.

5.5 Dangerous Goods

Background

Many materials that are classified as dangerous or hazardous are used in construction and maintenance work.

Dangerous goods are defined in the Dangerous Goods Act and Dangerous Goods Regulation, and include fuels, gases, explosives and some agricultural chemicals.

A **hazardous substance** is defined in the Occupational Health and Safety (Hazardous Substances) Regulation 1996 as any substance which has the potential to harm the health of persons in the workplace, and includes most dangerous goods, poisons (under the Poisons Act 1966) as well as many other substances.

(a) Classification of dangerous goods

All managers, contractors and employees must familiarise themselves with the type of dangerous goods they are handling as described in the WorkCover Guidance Note *Classification of Dangerous Goods* and the Manual for the use of Chemicals.

(b) Storage and transport of dangerous goods

State Forests NSW, and persons carrying out work on behalf of State Forests NSW, must ensure that dangerous goods are stored in facilities that comply with the licensing, construction design, location and other requirements of the Dangerous Goods Regulation.

(c) Licensed dangerous goods stores

Licensed dangerous goods stores must not be used to store other materials or goods. This should also apply to most non-licensed dangerous goods storage.

(d) Transportation of dangerous goods

Vehicles and operators transporting dangerous goods must be licensed in accordance with the Dangerous Goods Regulation and *Australian Dangerous Goods (ADG) Code*. Appropriate packaging, labelling, documentation and warning signs must be used and displayed on packages and vehicles as prescribed by the *ADG Code*.

(e) Records

Records of receipts and issues of dangerous goods in excess of licensed quantities (excluding delivery of fuels into vehicle fuel tanks) must be kept in all licensed dangerous goods stores.

5.6 Management of Hazardous Substances

State Forests and contracting employees engaged in forest works are responsible for ensuring that hazardous substances in the workplace are properly managed in accordance with the *Safety Standards Manual* and the *Manual for Use of Chemicals*.

5.7 Explosives

Background

The manufacture, purchase and use of explosives is controlled by Part 4 of the Dangerous Goods Act and Part 4 of the Dangerous Goods Regulation. The Regulation provides for the authorisation of certain persons to receive and use explosives through the issue of permits and prescribes the conditions for storage of explosives and detonators within licensed premises.

(a) Powderman's Certificate

No explosives may be used by any person on State forest unless they have received appropriate training and hold a current Powderman's Certificate of Competency issued by WorkCover NSW.

(b) Licensed magazines

Explosives must only be kept in licensed magazines. Licensed magazines owned by other organisations may be used where convenient and by agreement with the owner. Magazines must be licensed by WorkCover NSW, see OC 98/08.

(c) Detonators

Detonators must be stored and transported separately from other explosive materials.

(d) WorkCover instructions

WorkCover instructions regarding explosives must be observed at all times.

6. PLANNING FOREST ROAD SYSTEMS

National Principles

- Planning of road systems in public forests (and plantations) will be based on the economic principle of minimising the combined cost of snigging and roading (or the cost of roading and extraction) and on the principles of environmental care.

- Soil, water catchment, cultural and landscape values should be protected by the careful planning, location, construction, and maintenance of roads and tracks, and regulation of their use.

- Road design will be to standards consistent with the purpose for which the road is to be used, and capable of carrying the anticipated traffic with reasonable safety.

- Construction and maintenance of roads and associated works will be undertaken in a manner which will ensure compliance with the Principles of Environmental Care.

Forest Practices related to Wood Production in Native Forests (and Plantations):

Background

Road access is essential for the efficient development, protection and management of State forests and harvesting of timber resources. Since 1916, State Forests NSW has constructed around 23,000 kilometres of road and 18,000 kilometres of fire trail, for these purposes. These overall lengths have been reduced by the revocation of some State forest areas in the past decade.

Roads inevitably involve environmental disturbance, the degree of which may be greater or less according to their location and design, and to the care given to their construction and maintenance.

Overall strategic planning for the development and ongoing maintenance of road and trail networks is often a complementary activity to planning for harvesting in native forests, hardwood and softwood plantations, and plantation establishment. Road plans for specific road construction projects are usually developed in association with harvest plans or plantation establishment plans, but can be developed separately especially when high standard roads are needed for timber extraction in plantations at the time of the first commercial thinning. Similarly road maintenance plans may also be developed in conjunction with harvesting plans or to reconstruct plantation road networks at the end of one rotation and commencement of another. (See chapter 10 regarding Fire Trail Construction and Maintenance).

Forest Road Classification

The descriptive basis for all State Forests planning for road and fire trail access to forests uses single classification system for roads and fire trails in native forests and plantations. This classification is shown in table 6.1.

Forest roads are ranked in a functional hierarchal system. In many cases the function may not be exclusive, but the principal function is the basis of classification.

With each functional class, the standard of road constructed (formation width, alignment and availability for use during wet weather) depends on the planned function, the estimated vehicle intensity (principally the log truck intensity) and the topography traversed by the road.

Planning

State Forests' staff use five kinds of plans and planning cycles at two levels to manage:

- Strategic planning and development of forest road networks and their maintenance; and
- Operational planning for construction, re-construction maintenance of the actively used road network and rehabilitation of de-commissioned roads (see Diagram 6.2).

The strategic road network plan outlines access requirements for a forest management area over a period of several decades. The plan assigns road classification and alignment standard.

The strategic road maintenance plan determines road maintenance and repair requirements for a forest road network over a period of years. This plan reviews ongoing access requirements and determines long term programs for road upgrade, normal maintenance and for the de-commissioning and removal of roads and fire trails that are no longer needed.

An operational road construction plan (or roading plan) sets out the actual specifications for the construction of a road or a road system based on a justification for construction (or re-construction) including consideration of traffic needs, construction costs and environmental criteria. The plan may provide for staged construction. Some operational roading plans are contingent upon or incorporated into harvesting plans or plantation establishment plans.

An operational maintenance plan schedules the immediate road maintenance requirements on an annual or periodic basis. It forms an annexure to the strategic road maintenance plan.

A rehabilitation plan sets out the requirements for closing temporary and decommissioned roads, and restoring forest cover in those areas.

State Forests' standing instructions (see Appendix 4) give guidelines on road design, construction and maintenance.

Figure 6.1

THE PLANNING SYSTEM FOR FOREST ROADS AND FIRE TRAILS

6.1 Forest Road Classification

The forest road classification should only be used to describe roads either exclusively located within the dedicated State forest estate or where State Forests has a legal and/or administrative and financial responsibilities for management of roads outside the forest estate.

TABLE 6.1
State Forests of NSW Forest Road and fire trail Classification

FUNCTIONAL NAME	FORMATION WIDTH (m) Actual width depends on log truck intensity and topography	LAND INFORMATION CENTRE (LIC) Standard road system classification used on maps		FUNCTIONAL DESCRIPTION	
				NATIVE FORESTS	PLANTATIONS
Primary Access Road	5.5 to 7.3 native forest 9.2 to 11.0 plantations	All weather road, unsealed, two lanes	LIC Class III	A forest road serving as main carrier for traffic between the forest and the relevant industrial centre. Generally 2 lane all weather surface. Usually serves a forest area > 15,000 ha.	A plantation road serving as a main carrier for traffic between the plantation and the relevant industrial centre. Generally 2 lane all weather access. Usually serves an area >15,000 ha .Primary access to areas under 15,000 ha are provided with at least an all-weather surface. Road density 0.5 km - 1.5 km/1,000 ha. Timber carrying capacity between 150,000-300,000 tonnes/year.
Secondary Access Road	4.2 to 5.5 native forest 7.3 plantations	All weather road, unsealed, one lane; and dry weather road, loose surface.	LIC Class IV and Class V	A branch forest road, joining a Primary Access Road, that serves major sections of the forest (usually > 5,000 ha) or provides specific purpose access, eg, to a lookout. These are generally all-weather access roads.	A branch plantation road joining a Primary Access route that serves major sections of the plantation comprising one to four age classes in conifer plantations with areas between 300 and 1200 hectares. Road density 2.0 km/1,000 hectares. Timber carrying capacity between 40,000-80,000 tonnes/year.
Feeder Road	3.7 to 4.2 native forest 4.2 to 5.5 plantations	All weather road, unsealed, one lane; and dry weather track, loose surface.	LIC Class V	A forest road along which the harvested timber is collected (directly at roadside log dumps and/or by harvesting roads) and feeds into the system of Secondary and Primary Access Roads. Generally serve a forest area > 1,000 ha.	A plantation road along which the harvested timber is collected (directly from off road log landings and or log harvesting roads) and feeds into the Secondary and Primary access roads. Generally serves and area between 150 and 400 ha.. Road density 2.0-5.0 km/1,000 hectares. Timber carrying capacity between 20,000-30,000 tonnes/year.
Harvesting Road Compartment, Plantation Establishment Road	3.7 to 4.2 native forest 4.2 to 5.5 plantations	Dry weather track, loose surface.	LIC Class V	Generally, a dry weather temporary access track serving a small area of productive forest for timber harvest. Harvesting Roads feed into the higher order forest road system.	A plantation road separating individual compartments in a plantation age class along which harvested timber is collected and which links with higher order roads. Generally serves an area between 10 and 60 hectares. Road density 15.0-25.0 km/1,000 hectares. Timber carrying capacity up to 8,000 tonnes/year. Roads constructed at plantation establishment may be upgraded to higher order roads prior to harvesting where required.
Link Road Boundary Road (or Track)	3.7 to 4.2 native forest 4.2 plantations	Dry weather track, loose surface.	LIC Class V	A forest road (or track) linking points in the pattern of higher order roads to facilitate access for general management and protection of the forest. Link Roads may include boundary roads around the perimeter of forests.	A plantation road or track around the perimeter of a section of plantation used for fire protection and timber extraction. Similar road densities to Harvest Roads.
Fire Trail Service Trail	3.7 to 4.2 native forest 4.2 plantations	Four wheel drive track.	LIC Class VI	Permanent tracks provided for forest protection. Generally allow dry weather access only and suitable for 4 wheel drive vehicles only, including external fire trails forming part of the forest protection system.	Permanent tracks provided for plantation protection. Generally allow dry weather access only for suitable 4 wheel drive vehicles. Trails within plantation compartments may be unformed.

6.2 Strategic Road Network Plans

Regional Managers should ensure that all forest road and fire trail construction and reconstruction proposals are only considered and presented in the context of an overall Strategic Roading Network Plan. This plan must be prepared with sufficient lead-time to allow for its review and approval, before more detailed operational roading plans are prepared. Plans should be prepared for all Regions. They should reflect the overall state of development of the forest road network in the Region. Strategic plans prepared by delegated officers must conform to the following guidelines:

(a) Form of Strategic Road Network Plan

The plan should be prepared to show the location, function and standard of relevant existing and proposed roads. It should be supported by a covering report.

(b) Systematic development

Plans should be developed systematically, commencing with the primary and secondary access and progressing down through feeder roads to minor roads including snig shortener harvesting roads.

(c) Staged development

A plan should also consider staged construction options for primary and secondary access. Staged construction, to allow upgrading at a later time to meet increased traffic loads, should be explored by officers preparing strategic plans as a means of reducing early investment and reducing maintenance costs.

(d) Strategic plan revision

Plans should be revised periodically to allow review of roading needs and give priority to road maintenance or to road closures. A review period of five years is recommended.

(e) Fire trail planning

Strategic fire trail planning should be based on consultation with District Bush Fire Management Committees and documented in the Forestry Regional Fire Plan.

TABLE 6.2

Guide to the preparation of a strategic forest road network plan

Process	Tasks	Product document	Comments
Evaluate or re-evaluate forest access needs	Survey native forest resource or plantation establishment program. Report on road network needs.	Brief covering report.	This initial report should identify the need for a plan and its scope. Approval to proceed should be given by the Regional Manager.
Review financial and environmental issues for construction, maintenance or upgrade or bedding down and rehabilitation of roads.	Prepare global budget summary for the network plan area. Collect environmental information.	Brief report.	Environmental information may be available from other forest management reports.
Survey and data collection	Identify critical routes for timber haulage and forest management including necessity for retention of existing routes. Locate present and prosed forest access to existing forest and public road network. Check geophysical conditions for proposed main access. Identify critical exclusions and areas of special conservation value. Identify physical barriers to road construction.	Details included on one or more annotated maps and covered by a briefing note or report.	The network plan may be able to build on the previous strategic plan. The plan should consider necessary reconstruction to meet present day environmental and forest management requirements. Reference should be made to Forest management Zoning and other maps (GIS data). Always check trial routes with field inspection.
Locate trial road network.	Plot primary access. Plot secondary access. Plot feeder access. Indicatively plot minor roads, subdivision roads, etc.	Prepare draft strategic forest road network map.	Essentially a desk-top exercise using local knowledge and previous road survey information.
Field evaluation and modification to final road network proposal	Assess field conditions against trial locations. Modify primary, secondary and feeder access.	Amend strategic forest road network map.	This is the most important step in the planning process.
Report and seek approval	Prepare final map. Prepare covering report including critique of factors. Detail any major or staged construction program and include a long-term construction schedule.	Final map and report.	The formats set out in DLWC 1995 and the PCL are a useful guides and may be incorporated into the report.

Source: (Urunga District) Mid North Coast Region 1997

(g) Preliminary planning of individual roads in a road network

The preliminary planning of individual new roads within a network must be investigated in the context of the strategic roading plan's objectives. Managers should consider the following factors when evaluating individual roads within the network:

- The reason for access (native forest harvesting, plantation establishment);
- Cost of construction (including consideration of alternatives and options);
- Distribution of timber resources and economics of extraction and haulage;
- The presence of existing roads and the public road network generally;
- Hydrology and climate;
- Vegetation;
- Ease of timber extraction (downhill haulage);
- Geology and soils (existing and potential erosion);
- Landforms, (terrain, slope, drainage and seepage);
- Rock (mass movement and slope instability and potential slip areas);
- Visual resources (landscape and aesthetics);
- Indigenous and non-indigenous cultural heritage values;
- Flora and fauna values (including application of the Conservation Protocols);
- Forest zoning restraints;
- Capacity to meet functional, engineering and environmental standards;
- Fire protection.

6.3 Operational roading plans

(a) When a roading plan is needed

All road construction must be undertaken and controlled through the preparation and issue of a roading plan. Written plans must be prepared and approved for all significant roading operations. Significant roading operations include all new construction, reconstruction of roads for distances exceeding 500 metres, realignment (upgrading) for distances exceeding 2 kilometres and specific maintenance activities involving replacement of major structures. Where necessary roading plans may be incorporated into harvesting plans or plantation establishment plans or prepared concurrently with those other plans.

(b) Factors to be considered in a roading plan

The operational roading plan should consider the following factors:

- Legal access from public roads to the roading system proposal;
- Possible interests and requirements of local government and other authorities;
- Possible encroachments on private property or land administered by other land management authorities - whether permits to enter or right of carriageway be required;
- Consultation with relevant community groups.
- Present and future timber volumes to be transported over the road, their distribution and relative values;
- The direction and expected rate of timber flow;
- Its place in the overall roading system-function, alignment standard and relative importance;

- Aesthetic and environmental constraints, including forest management zones, sensitive zones, and wildlife, passage of migrating fish in waterways and drainage feature protection;
- Soil erosion and water pollution hazard for the road corridor (see *Erosion and Sediment Control Strategy for Forest Operations DLWC 1995* and current Pollution Control Licence schedule conditions);
- Topographic and other physiographic constraints on standard of construction;
- Start, terminal and other obligatory points (eg. stream crossings);
- Provision of timber loading facilities within the road corridor (loading bays, log landings, processing sites);
- Possible future extensions;
- The estimated date of need;
- Duration of need (temporary or permanent);
- Approximate cost of construction;
- Whether construction may be in stages - if so, the lengths, standards of each stage and times required.

(c) Approvals for survey

The Regional Manager should approve the purpose and cost of an individual road survey proposal prior to commencement of the survey. The approval should include consideration of the following:

- description of the proposed work (alignment standard, formation width);
- location of the work (including a map);

(d) Quantities and cost estimates

The plan must be supported by a schedule of work and quantity estimates, which identify the various activities to be undertaken, and their cost. Estimates may be derived from the road survey and design. These cost estimates, together with road survey and design costs and approved administrative overhead loadings, should provide a total cost estimate for the overall proposed work. The degree of detail required in the estimates will reflect the likely overall cost of the project and its significance.

Quantity and cost estimates should include these items:

- clearing;
- earthworks, (topsoil rock, other than rock (OTR), rippable rock, unsuitable construction material, grading (impaction, watering);
- bridges (specific individual estimates);
- culverts;
- drains (including mitre and table drains);
- pavement;
- ancillary items;
- revegetation and soil surface stabilisation;
- contingencies;
- survey costs.

(e) Construction schedule

Construction schedules should be planned so that construction is:

- Compatible with favourable seasonal conditions to minimise erosion and sedimentation and allow maximum opportunity for vegetation regeneration/establishment;
- Undertaken ahead of harvesting or plantation establishment operations;
- Staged to minimise unwarranted early expenditure.

(f) Approval for construction

The Regional Manager should give approval for construction on the basis of a submission and cost estimate attached to the plan. A road construction plan should include:

- Finalised location and description (with map);
- Schedule of work, quantification and final cost estimate, CAPEX submission (including economic justification);
- Conformity with budget and expenditure approvals;
- Environmental assessment and outcomes;
- Compliance with EPA Pollution Control Licence and other relevant requirements, codes and guidelines;
- How the work will be done (State Forests, contract, hired plant), and for which parts of the work;
- Titles of supervisors to be involved in the work;
- Provision for progress and final reporting and auditing;
- Signatures of the preparing and approving officers.

(g) Contract Work

Tender documents for contract work must be prepared in the approved format. They must include all the relevant information that a contractor should know to enable them to understand:

- The completed work standard required;
- Generic and specific conditions;
- Supervision requirements;
- Penalty clauses.

Road construction by all contractors must conform to the same standard which would apply to construction by State Forests. The contractor must be capable of doing the work to specifications that are clearly set out the contract. Where necessary the contract supervisor should issue design standards and other Technical Guidance Notes relevant to the contractor's work.

6.4 Strategic and annual road maintenance plans and reporting of road condition

Background

Forest roads and fire trails are important assets that require regular maintenance and repair to allow them to function. Some roads may be used many times per day while others may be used intensively for short periods only, or hardly at all. Storms, wind, snow, floods or fire can cause heavy damage to forest roads and fire trails from time to time.

(a) Aim of strategic road maintenance and annual maintenance plans

Roads, fire trails and related structures used by State Forests must be properly maintained to provide for continuing structural integrity, safe access and reduction of erosion and water pollution risk.

Maintenance works must be planned and given priority according to the level of traffic usage and the degree of active and potential soil erosion sites. Those areas with the highest immediate traffic usage and potential for soil loss into streams and watercourses should be given maintenance priority to reduce the risk of water pollution.

(b) Regional basis for Strategic Road Maintenance Plans

Regional Managers should ensure that Strategic Road Maintenance Plans supported by Annual Operational Road Maintenance Plans are developed for their Region. The Strategic Road Maintenance Plan should refer to the existing road and fire trail network. The Strategic Roading Network Plan should be used as a basis for the road maintenance plan. It should describe the review procedure that identifies which roads and trails will be strategically maintained to support timber harvest, forest management and protection needs, and to provide for demonstrated public access and other requirements.

TABLE 6.3

Contents guide for a strategic forest road and fire trail maintenance plan

Part 1 Background: Relation to management planning prescriptions and EIS/ EIA and other determinations in relation to reporting and review

A statement that relates the reporting and review function set out in forest management plans or environmental impact Statement/assessment and other determinations in relation to:

- Road and fire trail construction;
- Ongoing road and fire trail maintenance;
- Decommissioning or roads and fire trails and their rehabilitation;
- Reporting procedures between this plan and other annual operational plans.

Part 2 Forest road and Fire Trail Schedule and proposed maintenance activities

- A summary of the forest road and fire trail schedule for the management area concerned. The schedule and supporting maps should be incorporated into an appendix;

- An outline statement of major road and fire trail maintenance and rehabilitation activities for the period covered by the strategic plan;

- A table showing the broad cycle of maintenance activities for each category of forest road or trail to be maintained in trafficable condition. This should include consideration and operational definitions for the following activities:
    - Grading
    - Gravelling
    - Road clearing/road surface drainage;
    - Upgrading of drainage feature crossings to meet water pollution control requirements;
    - Roadside spraying for vegetation control;
    - Slashing for vegetation control;
    - Bridge and culvert repairs (deal with major structures separately);
    - Repairs to ancillary works (signs, fences, gates, grids).

Part 3 Reference to other regulatory requirements

A list of current regulatory requirements applying to the area covered by the plan.

Part 4 Proposed road reconstruction and upgrading activities for the plan period

Brief overview of major projects.

Part 5 Annual operational road maintenance plan

Includes reference to:

- The local format used in the Annual Operational Road Maintenance Plan;
- Local reporting procedures for damage to roads and fire trails, repair and maintenance needs;
- Procedures for scheduling work and the issue of Maintenance Instructions (Work Orders).

Strategic planning for road and trail maintenance should be based on a continuous cycle of work that takes account of:

- The road system to be maintained;
- Specific major works to be maintained (eg sealed roads, major bridges, etc);
- Optimum seasonal conditions for different maintenance tasks;
- Harvesting commitments;
- Fires and other protection commitments;
- Determination of priorities;
- Establishment of maintenance work schedules that provide for reasonable contingencies.

(c) Annual Maintenance Plan

The Annual Maintenance Plan is a summary schedule of road and fire trail maintenance works to be undertaken during the current financial year, together with an estimate of cost. It should form an Appendix to the Strategic Road Maintenance Plan for the Region.

(d) Reporting road and trail condition

The Strategic and Annual Maintenance Plans should include a reporting system which provides information from which the annual maintenance planning cycle can be reviewed and for the further scheduling of work. These reports will form the basis for work schedules to be attached to the Annual Maintenance Plan.

Specifically road reports should include:

- The name of the road/trail inspected;
- Road /trail condition;
- Work required;
- Work performed under necessary supervision to achieve the required quality standards;
- Previous work already completed to schedule;
- Effectiveness of the work.

(e) Reporting road damage

State Forests expects that all officers and employees will report damage to roads and fire trails and their drainage structures requiring urgent maintenance that are observed in the course of their daily work. Where practical, that they should take immediate remedial action (eg removal of a small tree, or fallen rocks across the road). Other remedial action should be taken to render a road safe and warning signs, flagging and barriers should be placed as soon as practicable where the road is in a dangerous condition. See also Section 2.1 (d).

(f) Inspection of timber haul roads during harvest operations

Where timber haul roads are in use, Pollution Control Licence conditions may apply. Where they do, road drainage structures must be inspected regularly for stability and function during active timber harvest operations. Where unstable structures are found they must be repaired in accordance with Pollution Control Licence conditions.

Road drainage structures must be inspected, in accordance with Pollution Control Licence conditions following any storm event that exceeds the design criteria for the structures and sediment control measures used. Repairs to damaged or non-functioning drainage structures must be undertaken as soon as possible as provided for in the licence conditions.

7. PROTECTION OF ENVIRONMENTAL VALUES AND THEIR ASSESSMENT

National Principles

- Where assessed as important, forest values such as intensive recreation, high scenic quality, significant geomorphic, biological, or cultural heritage sites should be protected from the adverse effects of forest operations on public land.

- Fauna, floristic, and landscape values be protected by the careful planning of operations and the reservation of appropriate patches and corridors of vegetation.

- Construction of roads and associated works will be undertaken in a manner which will ensure compliance with the principles of Environmental Care.

Forest Practices related to Wood Production in Native Forests: National Principles

Background

Management planning, forest zoning and conservation evaluation procedures are used by State Forests to identify areas for special forest values.

These procedures are used in conjunction with environmental impact assessment requirements to:

- Exclude areas of high environmental value from forest activities where they are incompatible with those environmental values;
- Identify the individual environmental values to be protected in areas made available and requiring access for harvesting, plantation development or fire protection;
- Assess how possible impacts should be avoided or mitigated.

State Forests NSW is also required by the Environmental Planning and Assessment Act 1979 (Part 5, Section 111) to "examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment" by reason of its forest development activities. Evaluation of these environmental effects is called an environmental impact assessment (EIA) and this process is documented according to the level of activity proposed and the reports are an integral part of any plan proposal for road or trail construction.

The factors to be taken into account when consideration is being given to the likely impact of an activity on the environment are specified in Clause 82(2) of the E.P.&A. Regulation (1994). Clause 5(A) of the E.P.&A. Act (1979) specifies the factors to be taken into account when deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities or their habitats.

If as a result of this consideration it is decided that an activity is likely to significantly affect the environment, State Forests is required to prepare an Environmental Impact Statement (EIS). If it is decided that the activity is on land that is critical habitat or is likely to significantly affect threatened species, populations or ecological communities or their habitats, a species impact statement (SIS) must be prepared in accordance with Division 2 part 6 of the Threatened Species Conservation Act 1995, and the concurrence of the Director-General of National Parks and Wildlife obtained for the activity.

7.1 General

Environmental values identified in forest assessment processes must be recognised and taken into account during the planning, location and construction of forest roads and trails. These include:

- Soil, water and catchment values;
- Flora;
- Fauna;
- Indigenous and non-indigenous cultural heritage;
- Landscape and aesthetics.

All licence conditions and planning requirements for forest access road and fire trail construction must be considered and any additional values identified assessed. Impacts should be avoided or mitigated wherever practicable. Records of these considerations must be maintained and any necessary and resultant instructions incorporated in operational planning. Environmental values likely to warrant further investigation, beyond that required for the purpose of any current roading proposal, should be brought to attention for subsequent consideration.

7.2 Preparation of Environmental Impact Assessments

Officers responsible for road construction and other significant reconstruction or upgrading projects must prepare an appropriate level of environmental impact assessment. The schedules set out in *Is an EIS required* (DUAP 1996) should be followed.

Environmental impact assessment is not required if the project has already been considered as part of an Environmental Impact Statement (EIS) submitted by State Forests. The depth, detail and documentation required in the consideration of the likely environmental impact of a proposed road construction plan will depend on the scale of the proposal.

Where an EIS or Review of Environmental Factors (REF) has already been determined, an individual roading proposal must still be evaluated against the EIS to ensure that it is covered by the determination or to identify how it differs in its environmental impact from the EIS.

A register of checklists and REFs must be maintained at the Regional Office.

8. ROAD LOCATION, DESIGN AND SURVEY STANDARDS

Background

State Forests uses good road and trail survey and design practices to ensure that its staff:

- Construct forest roads which are adequate and appropriate to the access requirement specified;
- minimise the impact on the local environment;
- minimise the cost of construction and future maintenance;
- provide safety for road-users;
- ensure adequate drainage to minimise and mitigate soil erosion and water pollution;
- avoid unnecessary intrusion by roading into areas of high conservation values and unintentional encroachment onto private property or other public lands.

Survey and design guidelines have been developed and used by State Forests throughout many decades of road construction.

They have been updated from time to time to meet the needs of modern traffic and to maintain uniformity with road design standards generally, especially those published by AustRoads and the NSW Roads and Traffic Authority (RTA) in situations where specific criteria are applicable to State Forests' roads.

In recent years, survey and design work has been substantially computerised and guidelines adjusted to conform to additional requirements to reduce environmental impact, particularly soil erosion and water pollution.

8.1 Road Location

(a) Use of erosion hazard strategies and Pollution Control Licence conditions

Road location should take into account any erosion hazard and sediment control strategy or the requirements of any Pollution Control Licence conditions applicable to the area. (See *Erosion and Sediment Control Strategy for Forest Operations* DLWC 1995.)

(b) Reference to other authorities

In all cases where the legitimate interests of other authorities may be involved (eg local councils), the location proposals should be fully discussed with them.

(c) Principles for road location

The following principles should be followed as far as practicable in locating particularly primary and secondary access, and feeder roads. New roads should be located:

- To minimise the length of road construction required;
- Where road grades can be minimised;
- On ridges, or as high as possible on slopes to:
  - allow road drainage water to escape;
  - reduce the catchment area above the road;
  - reduce the number of drainage line crossings and associated drainage line disturbance
  - avoid steep cross slopes.
- Away from filter strips, other drainage protection areas or riparian buffers except at watercourse and drainage line crossings;

New road location should avoid:

- Areas where construction would expose dispersible soils (where alternative road locations are available);
- Swamps, soaks or other areas of poor or restricted drainage;
- Areas prone to mass movement from subsoils and bedrock;

(d) Watercourse crossings

The number of watercourse and drainage line crossings should be minimised. Where crossings are required, locations should be selected where crossing approaches will cause minimal site disturbance and allow crossing alignment as close as possible at right angles to the drainage feature, unless an angled approach reduces ground disturbance.

(e) Rainforest

New road construction should avoid rainforest and sensitive forest types or areas of sensitive ecological value (and habitats) wherever possible. The requirements of the Conservation Protocols agreed to between NSW NPWS and State Forests should be considered in determining road or trail location. Where there is no other practical means of access, roads should traverse at the narrowest point and the removal of large trees should be avoided where possible. The following protection measures will also apply:

- disturbance to the over-storey canopy will be minimised;
- road clearing will be restricted to the minimum width required where practicable to allow for construction of a road suitable for safe vehicle passage.

(f) Steep side slopes and mass movement prone sites

New road location should avoid steep side slopes or areas identified with mass movement hazard where possible. New roads should not be located on cross slopes of more than 30^{o} or identified mass movement hazard areas except where engineering design and stabilisation technique can ensure the stability of the road, drainage structures and batters.

8.2 Road Survey

Background

Road survey (road line survey) is a procedure using instruments to measure topographic features and to delineate significant areas of vegetation and geology types through a corridor on which it is proposed to build a road. Topographic data collected is used in road design. State Forests uses several forms of survey which are described in full in the *Technical Guidance Notes for Roadworks.*

a) Reconnaissance Survey (RS)
An information and data gathering survey for planning purposes to investigate possible routes before undertaking a higher order road survey. A reconnaissance survey is used to locate the proposed road to avoid wet and unstable areas and ensure that grades will meet specified limits. The survey will also allow the collection of environmental data.

b) Grade Line Survey (GLS)
A preliminary survey run at predetermined grades between obligatory points (saddles, creek and gully crossings, etc. The road line is marked by flagging tied to trees along the survey line. Used to investigate vertical alignment where horizontal alignment is less important, (eg where a low alignment standard or lower order road is required.

c) Improved Grade Line Survey (IGLS)
A similar survey to a grade line survey but with more emphasis on horizontal alignment by approximating straights and curve locations on the proposed road line using flagging tape and stakes as necessary. Used for lower alignment standards roads such as in-compartment roads, link roads and fire trails.

d) Pee Dee Line Survey(PDLS)
A similar survey to IGLS but which includes the means to pick up vertical and horizontal alignment cross-sectional data through sections of topography along the route where road design, construction setout dimensions and calculated earthwork volumes are necessary. This method uses some techniques from both IGLS and TLS procedures. (Pee Dee comes from the location where this method was first used, Pee Dee State Forest No. 600, Hastings/Macleay Region near “PD” Creek.)

e) Traverse Line Survey (TLS)
The route selected from a reconnaissance survey (RL) is marked on the ground along the centre of the proposed road and detailed sections are measured to the left and right of each reference peg in addition to the horizontal and vertical alignment between pegs. The information obtained from this survey is used for road design. This method relies on computer aided road design and is relatively fast. It can be used where drainage or earthwork placement is not critical.

f) Final Location Survey (FLS)
These are carried out using precise equipment to locate and design high order roads (primary and some secondary access roads) in cases where high standard alignment is required and earthworks and drainage design is critical.

g) Stadia Survey (SS)
Very precise survey using theodolites. Required where high standard roads are being constructed.

(a) Compliance with State Forests' standards

Field survey of proposed new roads or re-alignment of existing roads must conform with State Forests' road planning standards as set out in the Technical Guidance Notes for Road Works. The survey will also gather relevant data on soils, rock, landforms and other information needed for final location and design.

(b) Survey type

The type of road survey or sequence of road surveys selected must be commensurate with the alignment standard, value, scale and potential environmental impact of the construction/or re-construction proposal. Approved survey types include:

- Reconnaissance Surveys (RS)
- Grade Line Surveys, or Improved Grade Line surveys (GLS, IGLS)
- PD Line Surveys (PDLS)
- Traverse Line Surveys (TLS)
- Final Location Surveys (FLS)
- Stadia Surveys (SS)

(c) Recording of soil types during survey

Changes to soil type should be noted during survey so that appropriate design and construction drawings will detail batters that will ensure slope stability.

(d) Approval for road survey

Road survey should be approved and carried out as early in the operational planning process as possible so that design specifications are available before road construction commences. See also 6.3 (b).

8.3 Road Design

Background

Road design is the determination of geometric elements of horizontal and vertical alignment for a road construction proposal. The designed alignment is based on, and relevant to, the existing topography which has been measured previously by a road line survey. The purpose of road design is to:

- Optimise the alignment to minimise the volume of excavation and surface area disturbance for road construction, while maintaining element limits specified for

grade (vertical alignment), horizontal alignment including curve widening, formation and table drain width and cut and fill batter slopes;

- Ensure that the volume of excavated material (cut) is balanced with the volume required in fill embankments;

- Ensure that alignment elements provide adequate safety for the anticipated traffic, particularly in regard to Stopping Sight Distance. For higher order roads or in cases where topography allows high standard alignment, design elements are provided in accordance with *Guide to the Geometric Design of Rural Roads* (AUSTROADS 1989);

- Calculate and detail drainage requirements;

Produce plans showing detailed profiles and dimensions necessary for construction. For lower order roads, plans may not be produced and in such cases, dimensions are printed on a setout report.

Detailed road design standards, procedures and methods are fully described in the *Technical Guidance Notes for Road Works.*

(a) Principles

Road design should aim at:

- Ensuring a safe working environment for road construction crews;
- Minimising cut volumes for earthworks and the use of borrow pit sites;
- Minimising haul distances from cut to fill locations;
- Balancing cut and fill earthworks along the alignment;
- Complying with the minimum geometric requirements for the required alignment standard;
- Providing adequate road surface drainage and soil erosion mitigation measures;
- Optimising cost efficiency in construction;
- Facilitating fire protection and personnel safety during fire fighting, by
  - ensuring adequate access to water supply points
  - eliminating dead end roads,
  - providing sufficient turn-around points and passing bays.
- Optimising visual resource opportunities and minimising visual resource impacts;
- Achieving traffic safety.

(b) Alignment

Selection of the alignment standard for a specific road proposal should be carefully considered for all proposed traffic use, topography and soil stability. Road design and structures must conform to State Forests' *Technical Guidance Notes* for roading. If economic or environmental circumstances warrant, a forest road may be divided into sections of reasonable length (say greater than 1 kilometre) of different alignment standard.

(c) Road grades

Roads must be located for construction with a maximum grade of 10° but also must take into account the timber haul requirements of future timber haul traffic systems. The maximum grade may be increased to 15° in the following circumstances to:

- Negotiate difficult terrain such as rock outcrops, unstable soils, or poorly drained soils;
- Take advantage of favourable terrain such as to reach a geologically stable bench or saddle;
- Take advantage of soil which is more suitable for the construction and drainage of the road;
- Reduce the catchment area above the road.

(d) Batters

Cut and fill batters for earthworks should be designed to be no steeper than the in-situ soil stability allows. The dip angle of the rock must be taken into account. Where this is unfavourable and cannot be avoided, cut batters should be laid back or benching carried out to reduce the exposed vertical height. In high batter failure risk situations engineering designed techniques should be used (eg gabions, retaining walls, etc).

(e) Cross slopes over 30°

Where cross slopes exceed 30^{o}, roads must only be constructed if engineering design and stabilisation techniques will ensure stability of the road, batters and drainage structures. Engineering design calculations and specifications should be prepared to document the design.

8.4 Sealed Roads

Where primary and secondary access routes warrant bitumen sealing, the design specifications and alignment standards for such roads must be reviewed by Civil Engineers Branch to ensure that the structural integrity will be adequate. Persons qualified in bitumen sealed road construction techniques must supervise the actual road construction.

9. ROAD CONSTRUCTION STANDARDS

(FOR FIRE TRAIL STANDARDS SEE CHAPTER 15)

National Principles

Construction of roads and associated works will be undertaken in a manner which will ensure compliance with the Principles of Environment Care.

Forest Practices related to Wood Production in Native Forests: National Principles.

9.1 General

The following conditions apply to all permanent and temporary roads within State forest and Crown-timber lands.

(a) Timing of construction

Construction of all roads should, as far as practicable, be undertaken during the drier months of the year.

(b) Field marking for road construction

The required horizontal and vertical alignment of all roads and tracks must be clearly marked in the field prior to construction.

(c) Road construction standards

Road construction standards as set out in the *Technical Guidance Notes for Roadworks* must be followed in all phases of construction. This includes clearing, formation construction, drainage, pavement construction and soil erosion and water pollution mitigation measures. Construction must be carried out and supervised by appropriately trained and accredited personnel (eg in forest soil and water protection).

(d) Progressive stabilisation of disturbed areas

Construction activities should be undertaken so as to ensure the progressive stabilisation of all disturbed areas.

9.2 Clearing

(a) Timing of clearing

Clearing should be undertaken immediately prior to earthworks and undertaken in stages on major construction work to optimise soil stabilisation.

(b) Extent of clearing

The extent of clearing should be minimised in accordance with any assessment of soil erosion and water pollution hazard to reduce the level of soil disturbance. As much vegetative ground cover as possible should be retained, using clearing debris.

(c) Maximum clearing width

A maximum clearing width of three metres clear of the edge of the road's earthworks and batters (the road prism) is allowed unless otherwise specified and/or marked. Clearing width may be increased in some situations eg. to allow road drying or to ensure a clear line of sight on curves or at intersections.

Chainsaw felling and other techniques which limit the disturbance to the ground surface should be used where clearing greater than three metres outside the limits of the road prism is required,. Wider clearing must be specified in the roading/ harvest plan, and any special stabilisation measures also specified.

(d) Removal and disposal of clearing debris

Stumps, logs and other forms of substantial debris not required for groundcover should be removed and stacked:

- outside watercourses, drainage lines and away from road culvert outlets;
- where burning will cause minimum damage to adjacent vegetation;
- outside the boundaries of filter strips and, where practicable, outside the boundaries of buffer strips;
- outside the toe of road fill batters.

Under no circumstances should debris from road clearing be incorporated into any formation or earthworks.

(e) Debris in drainage lines and watercourses

Debris accidentally felled into drainage protection areas along drainage lines and watercourses must be removed with minimal disturbance, unless removal would increase disturbance.

(f) Dangerous trees

Any dangerous tree (alive or dead) which is assessed as an unacceptable safety hazard to road users should be removed by felling where practicable.

(g) Rainforest roading sites

Any trees felled for road construction within rainforest, sensitive forest types or ecologically sensitive areas will be snigged out along the road line to reduce disturbance to vegetation on either side of the road and disposed of elsewhere, unless it increases disturbance.

(h) Salvage of trees cleared in road construction

Every opportunity should be taken to salvage commercially saleable timber from clearing operations.

9.3 Earthworks

(a) Minimisation of earthworks

Movement of earth for cutting and filling the road formation must be kept to a minimum consistent with long term road stability and efficient future maintenance. Where fully designed, earthworks must conform to the mass haul diagram and schedules set out in the road plan.

9.4 Topsoil management

Where specified in the roading plan, topsoil should be removed from within the limits of the formation and stockpiled for re-use before other earthwork activities commence.

9.5 Drainage during construction

(a) Drainage to protect loose earth from rainfall runoff

All loose earth resulting from road construction activities should be left in a position where protective measures can be taken to minimise its dispersal through rainfall and runoff.

(b) Drainage techniques to protect soils against erosion

Drainage for erosion, sediment and water pollution control during construction must be assisted by one or more of the following practices:

- Programming construction activities for those months of relatively lower rainfall erosivity;
- Temporary installation of sediment control structures, especially at drainage feature crossings;
- Installation of the intended structures across water courses and drainage lines in advance of earthworks to allow external runoff to pass safely through the construction site (eg. bridges and culverts);
- Provision of outfall drainage of the road formation surface during construction to prevent concentration of runoff. This will include frequent and regular removal of all earthen windrows caused by construction machinery and vehicles;
- Installation of relief pipes and mitre drains as soon as table drains have been formed;
- Timely and progressive revegetation of completed works.

9.6 Revegetation and Surface Protection

Exposed and bare areas should be progressively prepared for revegetation immediately following road construction, using natural regeneration, indigenous and/or preferably non-invasive plants as construction proceeds. Respreading of topsoil, cultivation techniques and revegetation methods, including selection of seed stock and plants should be specified in roading plans. Pollution Control Licence conditions must be observed in relation to drainage protection areas during timber haul road construction.

9.7 Road surface drainage

Background

Effective road surface drainage is installed to control rainfall runoff to prevent it from concentrating and reaching erosive volumes and/or velocities. Well constructed road surface drainage ensures that road runoff is directed onto stable areas such as undisturbed vegetation, rock, or sediment traps.

(a) General

All permanent and temporary timber haul or link roads must be constructed with adequate drainage. Timber haul roads must be drained during and upon the completion of harvesting operations. All primary, secondary and permanent feeder roads must be designed and constructed with appropriate drainage structures, where required.

(b) Spacing between road surface drainage structures

Road surface drainage structures must not be spaced at distances exceeding those set out in current Pollution Control Licence schedule conditions.

(c) Peak flow discharge from road drainage structures

Road drainage structures must be located, constructed and maintained in such a way that they will have sufficient capacity to convey the peak flow from a 1:5 year storm event by:

- Diverting flow onto undisturbed vegetation;
- Diverting flow onto harvest slash or debris;
- Use of natural or artificial sediment control barriers downstream of drainage structures;
- Diverting flow onto natural or artificial non-erosive surfaces.

(d) Mitre and table drains

Mitre and table drains should be constructed to the following principles:

- To keep the flow of rainfall runoff water to a non-erosive velocity;
- To have a minimum gradient sufficient to ensure the effective removal of runoff from the table drain (5^{o} or 1:20 is a maximum recommended grade);
- To be no longer than is necessary to effectively dispose of rainfall runoff water.

(e) Combined flow of drainage water on to disturbed areas

The combined length of the flow of water from pipe culverts onto extraction tracks, snig tracks, log dumps or other disturbed road side areas should not exceed fifteen metres.

(f) Cross Banks and Spoon Drains

Background

Cross banks and spoon drains are used to direct water across the road surface and reduce erosion by minimising the concentration of runoff along the road pavement and reducing runoff velocity. Two types of cross banks are used:

- ***Rollover cross banks*** are used where the road or track is intended to be trafficable.
- ***Peaked cross banks*** are steeper, narrower based banks that are not trafficable. They are constructed on roads to be closed to traffic and to drain snig tracks at the completion of timber harvesting operations.
- ***Spoon drains*** (dish drains) are used on sections of lower road grades as an alternative to rollover cross banks. Spoon drains are built by excavating a small depression across the road and spreading the soil thinly along the road surface down slope of the drain itself.

These principles should be followed in the construction of crossbanks and spoon drains:

- Construction should be at approximately right angles to the road alignment. Construction at a slight angle may help to obtain a channel gradient sufficient to ensure the effective removal of runoff;
- Channel grades should ensure that runoff drains freely at the outlet point at a non erosive velocity;
- The bottoms of channel cross sections should aim to be flat;
- Outlets should not discharge down fill batters over 1 metre high where erosion is likely to occur unless protective measures such as the installation of drop structures and dissipaters are used.

(g) Design specifications for crossbanks and spoon drains

Crossbanks (rollover banks for opened roads, peaked banks for closed roads) must be constructed to the following minimum design specifications so as to have sufficient capacity to convey the peak flow from a 1:5 year peak storm event. In lieu of calculating the capacity necessary to convey the peak flow, the following minimum heights and depths must be used.

Rollover Crossbanks (opened roads)
Minimum consolidated effective height of 200 mm.
Peaked Crossbanks (closed roads or tracks)
Minimum unconsolidated effective height 350 mm or minimum consolidated effective height 200 mm.
Spoon Drains (for opened or closed roads)
Minimum depth of 150 mm

9.8 Watercourse and Drainage Line Crossings

(a) Pollution Control Licence and other protective guidelines

The Pollution Control Licence schedule conditions give directions for watercourse crossings where the licence covers timber haul roads. The same conditions should be applied to other roads where practicable. Other approved soil mitigation guidelines for timber haul roads in inland native forests and soil conservation measures for timber haul roads in river red gum forests should also be observed.

(b) Protection of fish passage in permanent or semi-permanent flowing streams

Attention must be given to avoiding disturbance to the passage of native and other fish species during the construction and installation of crossings. NSW Fisheries' Guidelines must be followed in ensuring that crossing construction does not result in either temporary or permanent blockage of the crossing site against migrating fish stocks or other aquatic fauna.

(c) Principles for crossing construction

These principles should be followed in the design and construction/installation of watercourse and drainage line crossings:

- Watercourse/drainage line crossing structures should be installed in advance of road formation earthworks (construction of temporary access to the structure under construction os permitted);
- Crossings must be designed and constructed to minimise damage to the bed and banks to the greatest extent practicable;
- Heavy machinery should be excluded from the creek bed as far as possible and must not be permitted to work in the creek bed;
- The deposition of soil within the watercourse or drainage line must be avoided;
- The bed or bank should be rehabilitated immediately if damage occurs;
- Any soil should be removed immediately if accidentally deposited in the watercourse or drainage line, with minimal bed or bank disturbance, unless removal would cause greater soil erosion/stream instability than leaving it in place;
- Soil, whether or not required for later use should be stockpiled:
  - away from watercourses, drainage lines, filter strips and buffer strips;
  - above expected peak flood levels.
- Tree debris should be stacked outside the watercourse flood level for dispersal or disposal;
- The nearest road surface drains must be no closer than 5 metres nor more than 30 metres from the drainage feature.

(d) Road crossings

Road crossings should normally be designed and constructed at, or as close as possible to, right angles to the flow in water courses and drainage lines unless an angled approach reduces ground and soil disturbance. Skewed crossings are permitted where hydraulic design has been carried out so as to ensure that any proposed crossing will not impede or disturb the flow of water contained within the limits of the banks of the drainage feature.

(e) Selection of crossing structure

The selection and design of a watercourse crossing structure should be based on hydrological and engineering criteria to ensure:

- the structure is of an inherently stable type (causeway, bridge or culvert);
- minimal impedance to stream flow discharge during normal occasional peak rainfall events;
- the long term stability of bed and bank of the watercourse or drainage line;
- the integrity of the structure.

(f) Causeways

Causeways are best used where stable, natural surface crossings exist and minimum earthworks are required for approach construction. Where natural, stable, erosion resistant surface crossings are unavailable, causeways should be constructed using erosion resistant materials such as fines-free rock, timber, concrete, gravel or bitumen.

Special care should be taken during the construction of approaches and exits to minimise erosion and water pollution. If the use or construction of a causeway will result in erosion of the bed or banks of the drainage line/watercourse, or road surface, then either bridges or culverts should be used.

Background

Bridges and culverts are used to cross over high flow natural waterways where causeways are not practical because such factors as the normal water volume in the stream, topography and traffic intensity make causeway or culvert use impractical. Bridgework is a significant part of road construction on State forests. All bridges are constructed to State Forests' standards.

(g) Bridges and Pollution Control Licence schedule conditions

Pollution Control Licence schedule conditions give directions on soil erosion and water pollution aspects for bridges and culverts for timber haul roads covered by the licence. They should also be applied to other forest roads where practicable.

(i) Bridges - general

Bridges and culverts should be designed and constructed to approved engineering standards, and maintained, as to wholly contain the calculated peak flow for a 1:5 year recurrent flood event and to withstand the peak flow from a 1:10 year recurrent flood event with minimal structural damage or erosion. This may require, especially for culverts, provision to allow safe bypass disposal.

The following factors should be calculated and consider:

- Catchment size;

- Likely rainfall intensity;
- Run-off characteristics (soil, slope, vegetation etc);
- Road class and intended use.

(ii) Bridges – design

Bridge and culvert design should be carried out in accordance with accepted design procedures. Such procedures are detailed in the Technical Guidance Notes.

(iii) Bridge approaches

Particular attention should be given to the stability of approaches, abutments and the adjacent banks with special provision made where necessary for protective measures.

(iv) Bridges and pipe or box culverts

These should be protected against erosion by using suitable concrete, timber, logs, rock, vegetation or other appropriate materials. The design specification for each bridge or pipe or box culvert must be shown in the construction plan including location; size, length and level. Field marking will also be necessary.

(v) Upgrading and relocation of bridges and culverts

Bridges and culverts may need to be replaced, relocated or upgraded in situations where:

- The necessary upgrading of a section of road necessitates realignment or deviation from the existing crossing;
- The existing structure has deteriorated to an unsafe or irreparable condition;
- Suitable timber is not available for repairs to an existing bridge;
- The structure fails to meet pollution control licence or other required standards.

In cases where a bridge has been replaced, the old structure should be removed or otherwise left in a condition so that it does not impede the stream flow. Special care must be taken in removing old structures to minimise spillage of soil into the waterway and disturbance to the bed and bank of the drainage feature. Use of excavators is recommended.

(vi) Soil/gravel pavements on bridges

Where soil or gravel is used as the pavement for the bridge surface, the bridge design must incorporate structures installed to prevent, to the greatest extent practicable, soil or gravel from falling into or otherwise entering the drainage feature.

9.9 Ancillary Works

The following ancillary work should be carried out as required once road formation, pavement and drainage structures are completed:

- Restoration of property boundaries(installation of cattle grids and/or gates; fencing restoration);
- Safety measures (guard rails, guide posts);
- Traffic signs (traffic control signs, directional signs).

10. FIRE TRAIL CONSTRUCTION AND USE

Background

Fire trails are a lower engineered class of forest access, generally of low alignment standard and not necessarily providing all weather access.

They have the potential to incur the same types of environmental damage as roads. It is important therefore that standards be set for fire trails and that construction and maintenance incur minimal damage.

10.1 Fire trail construction standards

Fire trails should be constructed to the specifications set out in the Technical Guidance Notes. Trail location on State forests should be based on strategies outlined in the Regional Fire Plan and in the operational plans produced by local Bush Fire Management Committees.

(a) Fire trail location and alignment

Fire trails must be constructed to appropriate alignment standard for safe access by fire-fighting vehicles and fire tankers. Their location and design should ensure that soil erosion and other adverse environmental effects are minimised. Field location should follow ridge tops or other natural features to optimise drainage of the trail surface to either side.

(b) Fire trail width and grades

Pavement width should be kept to the minimum necessary for safe passage of vehicles, but should include provision for passing and turning bays. Dead end trails should be avoided where practicable and clearly signposted at entry junctions as dead end trails. Fire trail grades should usually not exceed 20°. Grades up to 25° may be allowed on suitable soil types to avoid side cutting where the natural surface can provide traction. At least grade line survey of these sections will be required.

(c) Use of minimum construction techniques

Fire trail construction should be confined to removal of trees and rocks etc. and to trimming the natural surface, so as to allow for pavement stability through recovery of natural ground cover. Trails should be located up the spines of ridges and spurs to minimise constructed drainage and clearing.

(d) Environmentally sensitive areas

Where unsuitable soils or environmentally sensitive areas are encountered (such as drainage lines, rainforest, etc.) the general requirements applicable to road design and construction will apply, to minimise erosion and other environmental effects (see Chapter 9).

(e) Fire trail drainage

Fire trails must be properly drained with crossfall and other surface drainage where appropriate. Rollover crossbanks and spoon drains should be installed to supplement crossfall drainage.

10.2 Upgrading and reconstruction of trails

Fire trails should be upgraded and/or reconstructed to rehabilitate and ameliorate erosion damaged sections, improve drainage and safety where necessary. This action should be based on achieving a reasonable safety standard and/or improving trail formation and drainage to reduce the risk of erosion. Reconstruction and improvement of fire trails must be in accordance with standard procedures for fire trails outlined earlier in this chapter.

10.3 Fire trail construction during fire-fighting

When temporary fire trails are constructed to assist control of wildfires they should, as far as practicable, comply with the specifications set out for permanent trails.

(a) Construction during fire-fighting

The use and movement of heavy plant during emergency fire trail construction should be supervised to minimise damage to other road and fire trail structures and environmental impacts.

(b) Follow up drainage and repairs to trails

Permanent drainage to temporary fire trails and repair work to permanent roads and fire trails should commence during, or as soon as practicable after fire control and mop-up have been completed. If a fire trail is not to be retained as a permanent road/trail, the trail should be properly closed and rehabilitated.

(c) Repairs to trails on private property following fire fighting operations

Where State Forests has used trails on private property or other areas outside dedicated State forests to control bush fires or conduct hazard reduction burns, these trails are to be inspected following use. After consultation with the land owner or appropriate land management authority, repairs should be made to damaged drainage structures with their approval. Crossfall drainage should be installed.

11. ROAD AND TRAIL CLOSURE AND REHABILITATION OPERATIONS

Background

Following forest operations, or as an outcome of the periodic review of forest road and trail use, some roads may be identified for closure (see Chapter 6). Mostly, these will be temporary harvesting roads which may not be needed again for many years, if at all, and would not justify the cost of being maintained in a useable condition. In some cases they may be old roads or fire trails which lacked contemporary drainage structures and may have had little maintenance other than occasional clearing.

11.1 Preparation of roads and fire trails for closure

Roads and fire trails no longer required for timber harvest, forest management or protective or demonstrated public use should be closed. Temporary timber haul roads must be drained upon the completion of harvesting operations as required by a Pollution Control Licence.

(a) Operational Road Rehabilitation Plan

A road rehabilitation plan should be prepared or included as part of a roading plan where temporary harvesting roads are being constructed. The plan should consider the following points:

- reason for closure;
- likely period before the road is to be re-opened for future use;
- proposed bedding down operation to prepare road pavement and formation as a seedbed for regeneration;
- drainage works;
- removal of structures (bridges, signs, etc);
- special requirements (eg access prevention measures);
- monitoring requirements for regeneration and checking for soil erosion and water pollution mitigation measures.

(b) Revegetation

Where roads are to be closed, they must be appropriately prepared so that the road formation and verges will remain stable and revegetate, without the need for further maintenance. Where the rapid re-establishment of natural vegetation is considered unlikely, special revegetation techniques may be used to assist direct seeding or rapid establishment of ground cover.

Where soils are not highly erodible and rainfall erosivity is not too high, road surfaces may be expected to regenerate and stabilise provided adequate reliable drainage prevents build-up of surface water run-off. In such cases, banks and spoon drains should be installed. Where relief pipe drains were installed they should not be relied on for subsequent drainage without ongoing maintenance cleaning.

(b) *Assisted rehabilitation*

Where soils are highly erodible and/or rainfall erosivity is very high, road surfaces be prepared to improve drainage and speed-up revegetation. The following procedures should be used:

(i) Reshaping

The road surface should be re-shaped to provide pronounced outfall drainage, including the removal of all windrows and wheel tracks, etc. Additional requirements will be specified in the rehabilitation plan.

(ii) Drainage

Where crossfall drainage might be insufficient to prevent concentration of run-off down the road, particularly where grades are steep, cross banks should be installed at strategic locations, or if necessary, at the normally required spacings.

(iii) Topsoiling and revegetation

All recoverable topsoil should be respread over reinstated areas where specified in the rehabilitation plan. Where the rapid re-establishment of natural regeneration is considered unlikely, the rehabilitated area should be seeded and fertilised.

(c) Rainforest and sensitive forest environment type crossings

Where roads to be closed traverse rainforest, or sensitive forest environments each area must have earthworks or formations drained so that water is not ponded and vegetation establishment is facilitated.

(d) Removal of bridges and culverts

Where it has been decided to remove access altogether crossing structures, such as bridges and culverts and other structures can be dismantled and removed the following way:

- Runoff from the road should be prevented from entering the crossing site;
- Disturbance to the watercourse or drainage line bed and banks during crossing removal should be minimal and spoil removed;
- Watercourse or drainage line bed and banks should be left in a stable condition following crossing removal. The site should be:
  - reshaped as close as possible to the original ground surface;
  - respread with topsoil; and
  - revegetated.

(e) Signs and Barriers

Signs and/or barriers should be used to ensure that roads are not used after closure. Barriers can take various forms, such as large crossbanks, horizontal logs, or piers inserted at intervals across the road. A “road-closed” sign must be used to complement the barrier. Signs can be used without barriers, but are less likely to be effective. Signs should be placed well before the end of roads that are closed off to allow vehicles time to stop before the closure barrier.

APPENDIX 1 - Legislation

1. Forestry Act 1916

(Administered by **State Forests of New South Wales**).

The Forestry Act 1916 is the principal legislation governing the operations of State Forests. The Forestry Act gives State Forests (as the trading name of the Forestry Commission of NSW) the power to control and manage forestry areas, to acquire land, to establish and maintain plantations, to construct and maintain roads and trails, to engage employees, to control the use of fire, and to regulate and control the use of roads.

The Act also allows State Forests to enter agreements and form partnerships with other parties, including local government and other public authorities, to undertake forestry on areas other than Crown-timber lands.

The Act requires State Forests:

"to preserve and improve, in accordance with good forestry practice, the soil resources and water catchment capabilities of Crown-timber lands", and:

"to take all practicable steps it considers necessary or desirable"

to preserve and enhance the environment.

The Act authorises designated forest officers to control the activities of all persons, contractors, licensees and the public, including the use of vehicles and machinery, on State forests. Authorised forest officers may also issue penalty or infringement notices for specified offences against the Forestry Act.

Forestry Regulation 1994

The Forestry Regulation gives State Forests and its delegated officers (which may include member of the NSW police force) certain powers in relation to administration of the Forestry Act.

The Regulation also provides for State Forests' management and control of State forests, including forest roads, fire control, and the issue of licenses and permits. The Regulation also describes offences that may be committed under the Act and provides for any penalties to be applied.

2. Construction Safety Act 1912

(Administered by the **NSW WorkCover Authority**)

The Construction Safety Act provides for the accrediting and licensing of operators of cranes, forklifts, front-end loaders and backhoes.

3. Dangerous Goods Act 1975
(Administered by the **NSW WorkCover Authority**)

The Dangerous Goods Act provides for the classification of Dangerous Goods and through the Dangerous Goods Regulation 1978 regulates their transport and storage. Dangerous Goods include flammable and combustible liquids and some pesticides.

4. Environmental Planning and Assessment Act 1979
(Administered by the **Department of Urban Affairs and Planning**)

Some objectives of the Environmental Planning and Assessment Act are to encourage:-

> "the proper management, development and conservation of natural and man made resources, including agricultural land, natural areas, forests .... for the purpose of promoting the social and economic welfare of the community and a better environment" and;
>
> "protection of the environment."

The Act promotes the sharing of responsibility for environmental planning between the different levels of government in the State, and encourages public participation.

State Forests usually operates under Part 5 of the E.P.&A. Act, and where necessary prepares environmental impact assessments and Environmental Impact Statements (EIS's), which may include Species Impact Statements (SISs). State Forests may occasionally operate under Part 4 of the Act eg. where making an application under the Native Vegetation Management Act.

The Act provides for the proclamation of State Environmental Planning Policies, including:-

S.E.P.P. No. 14 which regulates the management of coastal wetlands,
S.E.P.P. No. 44 which regulates the destruction of potential koala habitat.

5. Fisheries Management Act 1994
(Administered by the **Minister for Agriculture and Fisheries**)

Sections 218 to 220 of this Act refer to obstructions to fish passage. Section 218 gives the Minister authority to require the construction of works (other than public authority works) that enable fish to pass through or over dams, weirs or reservoirs. These Sections of the Act need to be considered when constructing bridges, culverts or other watercourse crossings for forest roads and trails.

6. Heritage Act 1997
*(Administered by the **Minister for Planning and Urban Affairs)***

The Act aims to ensure that environmental heritage is properly identified and conserved. It also establishes the Heritage Council of NSW. The Council may make recommendations to the Minister on whether to make conservation orders.

Under the Act, any permanent, interim, or protective order relevant to protect a natural or cultural heritage conservation item on Crown-timber land must be notified to State Forests. State Forests maintains a Heritage and Conservation Register that record

details of any heritage item that could be subject to a heritage conservation order, as required under S.170 of the Act..

6. National Parks and Wildlife Act 1974
(Administered by the **National Parks and Wildlife Service**, **NPWS**)

Aboriginal relics

All aboriginal relics are the property of the Crown. It is an offence to disturb aboriginal relics or declared aboriginal places without the consent of the Director-General NPWS. Relics may not be disturbed, moved or removed from Crown land. Any relic discovered must be reported to the Director-General NPWS.

Native Animals

The Act classifies fauna as "unprotected" (Schedule 11), "endangered" (Schedule 12) or "protected amphibians" (Schedule 12A). Any species not listed under these schedules is automatically "protected." Protected fauna may not be harmed except according to the conditions of a license issued by the NPWS, or during declared open seasons**.** Open seasons do not apply in National Parks. They may apply on State forests, with the approval of State Forests NSW. Unprotected fauna may be taken or killed at any time, but on State forest only in accordance with relevant regulations. Note that the term "take or kill" includes the destruction of fauna habitat in the course of timber harvesting or other operations.

The Minister or Director-General of NPWS may issue stop work orders to prevent activity that they believe may significantly affect the environment of protected fauna. If satisfactory modifications cannot be made to the proposed activity to protect the environment of protected fauna, an interim protection order may be made.

Threatened species

Consent authorities (Part 4 of the E.P.&A. Act) and determining authorities (under Part 5 of the E.P.&A. Act) are required to consider the likely impact of proposed activities on threatened species, populations, ecological communities, or their critical habitats, and on any other protected fauna or flora. This process may require the preparation of a Species Impact Statement.

Protected native plants

The Act provides for the classification of some native plants as "protected". No one may pick or remove protected native plants on State forest or other Crown land unless they have a license issued by State Forests NSW or where appropriate NPWS. Protected plants on private property may be picked and removed with the permission of the owner, lessee or occupier of that property.

7. Native Vegetation Conservation Act 1997
(Administered by the **Department of Land and Water Conservation)**

The Act relates to the conservation and sustainable management of native vegetation and the clearing of land. It amends the Soil Conservation Act by removing the protected lands provisions from that Act and redefining the nature of protected land.

The Act replaces SEPP 46 (Protection and management of native vegetation). The objects of the Act are to:

(a) Provide for the conservation and management of native vegetation on a regional basis;
(b) Encourage and promote native vegetation management in the social, economic and environmental interests of the State;
(c) Protect native vegetation of high conservation value;
(d) Improve the condition of existing native vegetation;
(e) Encourage the revegetation of land with appropriate native vegetation;
(f) Prevent the inappropriate clearing of vegetation; and,
(g) Promote the significance of native vegetation.

in accordance with the principles of ecologically sustainable development.

While the Act does not apply to dedicated State forests, it does apply to other lands where forest roading and associated activities may take place (eg. on purchased lands acquired for plantation establishment). State Forests is preparing a Code of practice in accordance with the Act, in consultation with DLWC and other authorities.

8. Occupational Health and Safety Act 1983
(Administered by **WorkCover NSW**)

All employees and contractors who work in the forest shall comply with the provisions of the O.H.&S. Act. State Forests has a special duty, under Sections 15, 16(1) and 17(1) of this Act, to make certain that all forest workers have as safe a work environment as is practical, use safe equipment and adhere to safe working practices. State Forests must ensure that employees, contractors and the visiting public are not exposed to risks to their health or safety in the forest environs as a result of actions by State Forests' employees or its' contractors.

The Occupational Health and Safety (Hazardous Substances) Regulation 1996 lists hazardous substances (defined broadly to include any substance with the potential to harm the health of workers). The Regulation also provides for proper labelling, supply of MSDS, training, risk assessment and control measures, and monitoring and health checks, for any hazardous substances used in the workplace. Employers must keep a register of all hazardous substances used and produced in the workplace, and records of worker training, risk assessment reports and the results of monitoring.

9. Protection of the Environment Operations Act 1997
(Administered by the **NSW Environment Protection Authority**)

This Act consolidates all the New South Wales Acts concerned with environmental protection into a single Act. It replaces the:

- *Clean Air Act 1961;*
- *Clean Waters Act 1970;*
- *Environmental Offences and Penalties Act 1989;*
- *Noise Act 1975; and,*
- *Pollution Control Act 1970.*

There are transitional saving from these Acts (eg. in respect of Pollution Control Licences), pending the promulgation of the Act and of regulations under the new Act.

The objects of the Act include:

- Protection, restoration and enhancement of the quality of the environment in New South Wales, having regard for ecologically sustainable development;
- Provision of increased opportunities for public involvement and participation in environment protection;
- Ensuring that the community has access to relevant and meaningful information about pollution;

- Reduction of risks to human health and prevention of degradation of the environment by the promotion of:
  pollution prevention and cleaner production;
  reduction of substance discharge to environment harmless levels;
  reduction and recycling of materials;
  progressive environment improvement and pollution reduction at source;
  monitoring and reporting environment quality;
- Rationalisation and improvement in legislative regulation and administration
- Assistance in waste minimisation.

Chapter 3 of the Act deals with Environment Protection Licences

The Act provides for the licensing of activities causing pollution that would otherwise be an offence under the Act. Environment Protection Licences are issued with conditions. If the holder of a licence contravenes any condition of the licence that person is guilty of an offence under the Act.

Licences for logging (timber harvesting) are required to be held by State Forests as this is now a scheduled activity under Section 48 and Schedule 1 of the Act. Logging operations in the Schedule are described as:

"(1) The cutting and removal of timber (being sawlogs or pulplogs) from a compartment, where
  (a) at least 20% of the compartment has a slope greater than 18°, and
  (b) at least 30 timber stems (at least 40 cm in diameter at breast height) are to be cut and removed from each hectare of the compartment when averaged over the net harvestable area of the compartment, or
(2) The construction of new access roads within a compartment for cutting and removal of timber as referred to in paragraph (1), or
(3) the construction of new access roads for hauling timber from more than one compartment.

This item does not include any activity on a timber plantation and does not include any activity west of the Great Dividing Range."

Note that the Pollution Control Licence currently held by State Forests will become an Environment Protection Licence under this section of the Act.

Chapter 5 of the Act deals with Environment Protection Offences

The Act retains the three tiered approach to penalties set out in the former Environmental Offences and Penalties Act 1989 but distinguishes various forms of offence differently.

Tier 1 offences are the most serious and are specifically described whereas Tier 2 and Tier 3 offences are more general and apply to all the other categories.

Tier 2 offences (major or serious offences) carry higher penalties and involve court proceedings.

Tier 3 offences (least serious or minor offences) are usually dealt with by way of the issue of an infringement notice to the offender with a specified prescribed penalty.

The Act describes offences under the following categories:

Tier 1 offences
Tier 1 offences include unauthorised or negligent disposal of waste, causing substances to leak or spill, or emission of ozone-depleting substances. (See also above.)

For Tier 1 offences it is a defence to prove that the commission of the offence was due to causes over which the person responsible had no control, and that the person exercised due diligence to prevent the commission of the offence.

Other offences
Water pollution
Unauthorised pollution of waters. It is a defence to prove that the pollution was in pursuit of an activity which is regulated under the Act, or for which an Environment Protection Licence has been issued.

Air pollution
Pollution of air caused by plant operations, industrial or other processes for materials,, exceeding air impurity standards or emission of odours from scheduled premises are offences. Under sections 133 and 134, the EPA or its officers may give directions to prohibit burning in the open air.

Noise pollution
Sale of articles, operation of plant or dealing with materials in such a way as to cause excessive noise, are offences. Part 8.6 of the Act deals with special provision for noise control including the issue of noise control notices by other regulatory authorities (eg. councils)

Land pollution
Includes littering.

Motor vehicles
This deals with offences involving the use of unleaded petrol and failure to fit emission control equipment or anti-pollution control equipment to motor vehicles.

Schedule 2 of the Act describes the scope of Regulations that may be created under the Act. These include regulations to control or manage noise, vehicles, waste, open fires, licences and load based or other licence fees, and general regulation.

10. Rivers and Foreshores Improvement Act 1948
(Administered by the **Department of Land and Water Conservation**)

Part 3A of this Act provides for the protection of rivers and lakes. This is important in relation to excavation and alteration to the bed and banks or rivers and lakes either for property improvement, extraction of materials (sand, gravel, etc) or in association with the construction of river crossings such as bridges and causeways. State Forests, as a public authority, is exempt from the requirement to obtain a permit under S.22 of the Act. However, there may be some instances where a major stream or river crossing is proposed, where close consultation with DLWC in the design and construction of the crossing may be needed to ensure that the protective intent of this part of the Act is met. The extent of overlap between the requirements of this Act and the Soil Conservation Act in respect of prescribed streams is unclear.

11. Rural Fires Act 1997
(Administered by the **NSW Rural Fire Service**)

The Rural Fires Act provides for the prevention, control and suppression of bush fires, and for the mitigation of danger resulting from fires. The Act contains provisions for the control and suppression of fires that are imminent or burning, including a definition of the responsibilities of various authorities during bush fire emergencies. Importantly, it also ensures that measures to reduce the hazards that contribute to the occurrence, intensity and spread of fire are carried out by responsible agencies such as State Forests.

Section 44 provides for the preparation of District Fire Management Plans. These comprise:-

- an Operational Plan which sets out the procedures to be followed in determining levels of preparedness during the bush fire season, procedures to be followed for the control and suppression of bush fires, and;

- a Fuel Management Plan that sets out strategies and programs for the reduction of fire hazards.

The Act also prescribes penalties for various offences.

12. Surveyors Act 1929, Survey Co-ordination Act 1949
(Administered by the **Department of Land and Water Conservation**)

These Acts provide that no unauthorised person may deface or interfere with any survey mark, eg. survey peg, shield tree, or trigonometric marker.

13. Threatened Species Conservation Act 1995
(Administered by the **National Parks and Wildlife Service, NPWS**)

This Act makes it an offence to harm or pick a threatened species, population or ecological community of a plant or animal, or damage a critical habitat or other habitat of a threatened species.

The exceptions are:

- where the activity is under authority of a license issued by NPWS; or,
- where it occurs in the course of an activity that has satisfied the requirements of the E.P.&A. Act 1979.

14. Traffic Act 1909, Roads Act 1993, Motor Accidents Act 1988, (Local Government Act 1993).

(Administered by the **Roads and Traffic Authority**, and local government.)

Registration of vehicles and licensing of drivers
All motorised vehicles operating on State forest must be registered within the provisions of the Motor Traffic Act and comply with the provisions set out in the Regulation to the Roads Act 1993. All drivers must hold a current Driver's License appropriate to the class of vehicle being driven.

Load limits
All motor vehicles must comply with load limits for vehicles operating on public roads and streets, as determined for main roads and highways by the Roads and Traffic Authority (RTA), and other public roads by local government.

Permits for unregistered vehicles
Other motorised vehicular plant (where applicable) must be issued with a **"Permit to operate an unregistered motor vehicle"** issued by the Roads and Traffic Authority. This permit is needed for such machines as crawler-tractors, excavators, forwarders, skidders, loading cranes and agricultural tractors used in plantation establishment and maintenance operations.

Third party injury insurance
For the purposes of the Traffic Act and the Motor Accidents Act, all areas within State forest are deemed to be public streets. Hence operators of vehicles and machines on State forests that comply with registration or permit requirements are covered by third party insurance for personal injury.

16. Workers Compensation Act 1987
(Administered by **WorkCover NSW**)

The Workers Compensation Act provides for workers compensation insurance and the rehabilitation of injured workers.

17. No commonwealth legislation is specifically or significantly relevant to the management of forest roads and fire trails in New South Wales.

APPENDIX 2 - Australian Standards and other external standards, guidelines and codes of practice

Australian Standards

AS 1121 - 1983	*Guards for agricultural tractor PTO drives*
AS 1216 - 1981-84	*Classification, Hazard Identification and Information Systems for Dangerous Goods*
AS 1319 - 1993	*Safety Signs for the Occupational Environment*
AS 1636.1 - 1996	*Tractors - Roll-over Protective Structures - Criteria and Tests. Part 1: Conventional tractors*
AS 1636.2 - 1996	*Tractors - Roll-over Protective Structures - Criteria and Tests. Part 2: Rear-mounted for narrow-track tractors*
AS 1636.3 - 1996	*Tractors – Roll over protective Structures – Criteria and Tests Part 3: Mid mounted for narrow tractors*
AS 1678.10.001-1985	*Emergency Procedure Guide Transport - Pesticides*
AS 1716 - 1991	*Respiratory Protective Devices*
AS 1742 – 1990/94	*Standards for road signs (14 separate standards)*
AS 1743 – 1992	*Road signs - specifications*
AS 1800 - 1981	*The Selection, Care and Use of Industrial Safety Helmets*
AS 1841 - 1992	*Portable Fire Extinguishers (Parts 1 - 5, Water & powder types and servicing)*
AS 1940 - 1993	*The Storage and Handling of Flammable and Combustible Liquids*
AS 2153 - 1978	*Guarding of Agricultural Tractors and Machinery*
AS 2187.1- 1984	*SAA Explosives Code Part 1: Storage and Land Transport*
AS 2188 - 1988	*Explosives - Relocatable Magazines for Storage*
AS 2294 - 1990	*Earthmoving Machinery - Protective Structures*
AS 2507 - 1984	*The storage and handling of pesticides*
AS 2664 - 1983	*Earthmoving machinery – Seatbelts and seatbelt anchorages*
AS 2727 - 1984	*Chainsaws - Guide to Safe Working Practices*
AS 2906 - 1991	*Fuel Containers - Portable - Plastics and Metal*
AS 3574 - 1988	*SAA Forest Safety Code*

Australian Standards are available from Standards Australia
Phone 02 9746 4666 Fax 02 9746 3333

Other external standards, guidelines and codes of practice

Australian Dangerous Goods (ADG) Code (5th edition)
Australian Government Publishing Service 1992

Australian Rainfall and Runoff – A Guide to Flood Estimation
Pilgrim D.H. (editor.) Institute of Engineers, 1987

Classification of Dangerous Goods.
NSW WorkCover Authority 1995

Code of Practice for the Use and Storage of Chemicals in Agricultural Workplaces.
NSW WorkCover Authority 1996

Code of Practice for Manual Handling [NOHSC: 2005]
National Occupational Health and Safety Commission/ WorkSafe Australia 1990

Conservation Protocols for Timber Harvesting on State Forests
For the duration of the IFA decision NPWS, SFNSW November 1996

Erosion and Sediment Control Strategy for Eucalypt plantation Establishment
State Forests & Department of Land and Water Conservation July 1997.

Erosion and Sediment Control Strategy for Forest Operations.
Dept. of Land and Water Conservation 1995

"Is an EIS required" - Best Practice Guidelines for Part 5 of the Environmental Planning and Assessment Act 1979
NSW Dept. of Urban Affairs & Planning 1995

National Standard and Code of Practice for Manual Handling.
Worksafe Australia 1990

Pollution Control Licence
NSW Environment Protection Authority. Issued annually under Section 17 (a b) of Pollution Control Act 1970. Revised annually.

Road Design Guide
Roads and Traffic Authority, December 1989

Soil Erosion Mitigation Guidelines for Native Forests of Inland NSW
Dept of Land and Water Conservation and State Forests NSW, June 1996

Standard Erosion Mitigation Guidelines for Logging in NSW (SEMGL).
Department of. Land and Water Conservation 1993

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

APPENDIX 3 - Current State Forest policies and other instructions

Policies

State Forests NSW Corporate Plan 1998/99 to 2002/03	Issued July 1998

Circulars

Control of persons on State Forests: prosecution of trespassers	OC95/08 June 1995
Glossary of terms associated with forest roading	OC 96/04 June 1996
Defence training exercises on State forests	OC 96/12 Dec 1996

Manuals and other instructions

Safety Standards Manual	Issued March 1995

Other Instructions

The Geometric Design of Forest Roads	Issued March 1991
ROPS and FOPS – Canopies fitted to Plant used in the Timber Harvesting Industry	Issued March 1994

GLOSSARY

Accreditation
Formal documentary evidence of competence to perform a particular task, following training and testing.

Alignment
A term that broadly describes the horizontal and vertical lines along the length of a road. The horizontal line is the combination of straights and curves and the vertical line is the combination of up and down hill grades.

Australian Standard (AS)
A standard published by Standards Australia.

Batter
The uniform slope of the side of a constructed earth embankment. A *Fill Batter* is the side slope of an embankment formed by the placement of fill material. A *Cut Batter* is the side slope of an excavation such as occurs in a road cutting.

Batter drain
A reinforced drain that carries water down a batter without causing erosion. Also refer *Drop Down Drain.*

Batter stabilisation
The provision of adequate vegetative, structural or mechanical measures to control erosion from road batters. Measures include provision of catch drains, topsoiling, seeding or mulching, hydromulching and use of geofabrics.

Bridge
A structure designed to carry a road over a drainage feature by spanning it.

Buffer strip
A strip along each side of a drainage depression in which soil disturbance during forest operations should be kept to a minimum.

CAPEX
The name given by State Forests NSW to expenditure of a capital nature. This includes all road construction and reconstruction to upgrade roads, but not maintenance. All road construction proposals have to be accompanied by a CAPEX submission which includes cost-benefit and other analyses to justify the building of the road.

Catch drain
A diversion drain excavated outside the normal road width. The drain is located on the high side of the road to intercept and divert surface runoff water before it reaches the road. Catch drains minimise the flow of water down the sides of cut batters and into the road drainage system

Catchment area

The area determined by topographic features where falling rain will contribute to the runoff at a particular point.

Causeway
A natural or constructed crossing that enables vehicles to ford a watercourse, drainage line or drainage depression.

Concentrated Water Flow
A rate and volume of flow of road drainage water which results from a rainfall recurrence event of less than 1:5 year probability.

Contractor
Any person or organisation who contracts to carries out work for State Forests NSW.

Crossbank
A hump of earth placed across a lower order road or a fire trail to divert water to a vegetated natural surface.

Crossfall
The fall or slope of a road perpendicular to the centre line constructed to prevent ponding of water on the road surface.

Crossfall drainage
Shaping of a road formation so that all water drains to the lower terrain side of the road. Drainage created by a *Crossfall.* Can be either *Infall* or *Outfall Drainage.*

Crossing
Any structure, including bridges, causeways, and culverts, designed to allow the crossing of a drainage feature.

Crowning
Shaping of a road formation so that water drains to both sides of the road.

Culvert
One or more adjacent enclosed pipes or other structures that allow water to flow under the formation of the road. Pipe culverts are circular in cross section and are usually constructed from precast concrete or steel pipes. Box culverts are square or rectangular in cross section and can be constructed from pre-cast concrete units, *in situ* concrete, bricks or timber. See also *Relief Culvert.*

Cut
Portion of land where earth has been removed by excavation.

Drainage depression
A level to gently inclined shallow, open depression with a smoothly concave cross-section, rising to moderately inclined hill slopes, that conveys runoff only during or immediately after periods of heavy rainfall. Drainage depressions may be subject to seasonal waterlogging and spring activity, and vegetation type may indicate a wetter micro-environment than the surrounding country.

Drainage feature

A drainage depression, drainage line, watercourse, wetland or major water storage.

Drainage protection area
A strip of land along each side of a drainage feature in which special conditions are applied.

Drainage line
A channel down which surface water naturally concentrates and flows, conveying water only during or immediately after (hours or days) periods of heavy rainfall. Drainage lines exhibit one or both of the following features which distinguish them from drainage depressions:

a) evidence of active erosion or deposition - eg gravel, pebble, rock or sand bed, scour hole or knick points;

or,

b) an incised channel of more than 30 centimetres depth with clearly defined bed and banks.

Drop down structure (drop down drain)
Drop down drains discharge water over a fill embankment. Drop down drains consist of a non-erodable channel that prevents erosion and controls the direction of flow.

Earthworks
All operations involved in moving, loosening, depositing, shaping, compacting and stabilising soil and rock.

Erosion
The wearing away of the land by running water, rainfall, wind, ice or geological agents.

Erodibility
The susceptibility of a soil to erosion due to rainfall and the surface runoff or water.

Excavator
A tracked machine which moves earth by means of a bucket or other implement mounted on an hydraulically operated boom.

Fill
A previously excavated material that is used to raise (fill) the surface of an area to a specified level.

Filter strip
A vegetated strip of land adjacent to a *Drainage Feature* that retards the flow of *Surface Runoff* causing suspended sediments to be deposited. This prevents sedimentation of drainage features. See also *Buffer Strip*.

Formation
The profile of a road when viewed through and across its width.

Formation Width
The width of the road provided for occupation and use by traffic. This width includes the road shoulders and allows for vehicle overhang, particularly around curves. See also *Pavement Width*.

Gravel
A naturally occurring mixture of coarse mineral particles larger than sand and smaller than 75 mm diameter. Gravel is placed on the surface of a road to increase the load bearing capacity of poorer soils to allow for wet weather trafficability.

Gravelling
Providing natural surface roads or tracks with a running surface of harder rocky material.

Ground-cover
Material which covers the ground surface and has the effect of reducing erosion. Ground-cover may include living or dead vegetation, leaf litter, tree debris, gravel, rock, straw, mulch and jute mesh.

Infall Drainage
A drainage method for a section of road located in steep side slope terrain where the whole surface width is *in* sloped against the natural surface side slope. Infall drainage sheds rain water to the high terrain side of the road. See *also Crossfall Drainage* and *Outfall Drainage*.

Log Dump (Log Landing)
An off-road area to which logs are pulled and where logs are loaded onto trucks, ie: the working area for cross-cutting, sorting and loading of logs. A landing may include an area set aside for stockpiling of logs.

May
A requirement is optional.

Mitre drain
A drain used to conduct runoff water from the shoulders of a road to a disposal area away from the road alignment. The purpose of a mitre drain is to:

- Spread the concentrated water flow in a table drain to a low velocity flow across a vegetated natural soil surface, away from the road formation;
- Relieve the flow in table drains before water volume and velocity becomes high enough for erosion to occur.

Must
A requirement is mandatory.

Outfall Drainage
A drainage method for a section of road located in steep side slope terrain where the whole surface width is sloped *out* in the same direction as the natural surface side slope. Outfall drainage sheds runoff to the low terrain side of the road. See also *Crossfall Drainage* and *Infall Drainage*.

Pavement
The surface of the road formation, excluding *Shoulders*, that support and provide a running surface for vehicular traffic. Depending on load bearing capacity of soil in the formation and the requirement for wet weather trafficability, the pavement may consist

of the insitu formation material or may require the importation of a higher load bearing capacity gravel.

Pavement Width
The width of the road used to support and provide the load bearing surface for vehicular traffic. See also *Pavement*.

Plantation
A forest established by the planting of native species or exotic species of trees and managed intensively, usually for timber production.

Pollution
Has the same meaning as under the Protection of the Environment Operations Act 1997.

Prescribed Stream
A river, creek, effluent or lake within the meaning of section 21B(i) of the Soil Conservation Act 1938.

Protected Land
Land defined in Division 2 of the Soil Conservation Act 1938. Generally it is land depicted on a protected land map, with a slope greater than 18^{o}, situated within 20 metres of the banks of any river or lake, or otherwise environmentally sensitive.

Relief Culvert
Rain water from the road surface may be shed to *Table Drains* on one or both sides of the road formation. Relief culverts relieve the water flow in a *Table Drain* located on the high terrain side of a road by piping the water under the road formation across to the low side for controlled roadside discharge on the natural soil surface

Rehabilitate
To return an area of land or a road or track surface to a predisturbed condition. This may involve reshaping the land, spreading topsoil, constructing banks, revegetating or employing a combination of these techniques.

Revegetate
To establish an effective vegetative groundcover by either natural regeneration or sowing with a seed and fertiliser mixture, in order to prevent soil erosion.

Road Prism
The boundary of the area of land occupied by a road which encloses the road formation, pavement and drainage structures from the highest part of any cut batter or catch drain above it to the lowest toe of a fill batter or the lowest constructed part of a drainage structure outlet.

Rollover Drain (Cross Drain)
A shallow drain in combination with a low earth *Crossbank* or hump that is constructed across the full width of a road. Rollover drains are used on moderate to steep sections of lower order roads and sized so that the road remains trafficable. With correct interval spacing, the purpose of rollover drains is to mitigate erosion of the road by discharging

water to the natural soil surface at numerous points on the low terrain side of the road. See also *Cross Bank, Spoon Drain*.

Runoff Water
The portion of precipitation falling on a catchment area that flows from the catchment past a specified point.

Sediment
Particles of soil material that have been transported by weathering action. These particles can be deposited in *Drainage Features* causing sedimentation.

Sediment Trap
A structure or vegetative barrier constructed to trap sediment in runoff by reducing the water velocity, allowing sediment to deposit. Sediment traps mitigate siltation of natural waterways..

Shall
A requirement is mandatory.

Should
A recommendation.

Snig Track
A track along which snigging equipment pulls logs.

Spoon Drain
A shallow drain excavated at right angles to a road. A spoon drain is similar in purpose to a *Rollover Drain* and *Relief Culvert*.

Surface Runoff
The portion of *Runoff* that is not immediately absorbed into the soil and becomes surface flow.

Swamp
A vegetated low lying area subject to waterlogging. Usually carries a distinctive vegetation type.

Sediment
Particles of soil material that have been transported or deposited by weathering action.

Supervising Forest Officer (SFO)
An employee of State Forests who is authorised to supervise forest operations. An SFO often has to supervise temporary road construction or maintenance associated with timber harvesting operations.

Table Drain
A drain constructed along the side of a road between the shoulder and a cut batter. It collects and drains runoff water away from road surface and also intercepts runoff water from cut batters that might otherwise flow onto the road surface.

Toe

The bottom intersection line of two slope planes eg. the toe of a fill is the perceived line around the intersection of a fill *Batter* and the natural ground surface.

Topsoil
The uppermost part of a soil profile containing material which is usually more fertile than underlying layers. It usually has high organic content.

Watercourse
A channel, having a distinct bed or banks, down which surface water flows on a permanent or semi-permanent basis or, at least, for a substantial time under natural conditions after periods of heavy rainfall within its catchment.

Waterway
The cross-sectional area provided for the passage of water under a *Bridge*, through a *Culvert* or over a *Causeway*.

Wetland
A vegetated depression with a seasonal or permanent water table at or slightly above the floor of the depression. The vegetation type in a wetland typically indicates a wetter micro-environment than the surrounding country.

Windrow (earthworks)
A mound of soil that is run off the end of a bulldozer or grader blade.

Windrow (timber)
A linear stack of woody material produced by clearing vegetation.

Guidelines for Safe & Responsible Recreational Vehicle Usage

- Know where you are going – research and organise your trip properly.
- Know who is the owner or manager of the land you intend to visit – obtain permission if appropriate.
- Know the limitations of yourself and your vehicle in rough terrain.
- Vehicles should only be driven on formed tracks and trails. Do not *"bush bash"* or travel *"off road"* or damage vegetation.
- All vehicles must be registered and drivers appropriately licensed.
- Natural surface roads and fire trails should only be used when they are dry and care should be taken to avoid damage to road drainage structures.
- Undertake proper training in recreational vehicle operation and encourage others to do the same.
- Carry adequate emergency equipment – first aid supplies, water, food and clothing as well as recovery equipment for your vehicle.
- Respect the rights of others – keep noise to a minimum and do not drive your vehicle where conflict may result with other State forest visitors.
- Leave gates as you find them. Do not attempt to access areas behind locked gates as there are good reasons why these areas have been closed off.
- Abide by any State Forests NSW sign/notice or direction given by a State Forests NSW officer.
- Drive carefully and responsibly and educate yourself and others in responsible driving habits and techniques.
- Be actively involved with a responsible outdoor recreation club or association.
- Leave the area as you find it – take all your rubbish home with you.
- Minimise the use and impact of fire and report wildfires promptly to the nearest State Forest NSW office. In summer check the fire danger situation for the area you intend to visit.
- Keep away from environmentally sensitive areas, such as wetlands, river and creek banks, erodable soils or sensitive fauna habitat.
- Keep away from timber harvesting operations and other forest works – hazards may be present.
- State Forests NSW cannot accept any responsibility for any action or incident arising directly out of or in any way connected with the use of recreational vehicles in State forests. Penalties may result for irresponsible recreational vehicle usage and costs may be incurred for recovery of stranded vehicles in State forests.

Source: Hunter Region: 1997