

EPA



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Protection
Authority
New South Wales

With Compliments

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Regards

Steve Beaman

POLLUTION CONTROL LICENCE

Issued under section 17A(b) Pollution Control Act 1970

Licence number: 4017

File number: 600000B1

Date licence begins: 11 April 1998

Date licence expires: 10 April 1999

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SECTION 1 – LICENCE DETAILS

Licence holder:

Forestry Commission of New South Wales trading as State Forests of New South Wales (referred to in this licence as "State Forests")

Activity covered by licence:

Logging operations, being:

- a) the cutting and removal of timber; or
- b) post-harvest burning associated with and following within 18 months of the cutting and removal of the timber; or
- c) the construction of roads to enable or assist the cutting and removal of the timber; or
- d) the maintenance or upgrading of roads, logged areas, log dumps, extraction tracks and snig tracks associated with the cutting and removal of the timber except where the licence specifies otherwise.

Land covered by licence:

This licence applies to:

- (a) land listed in Schedule 1; and
- (b) land for which State Forests has forwarded to the EPA a written notice in accordance with condition 32.

This licence ceases to apply to land when State Forests has forwarded to the EPA a written notice in accordance with condition 42.

Date licence commences

1. This licence commences on 11 April 1998.

Objects of this licence

2. The objects of this licence are to require practical measures to be taken to protect the aquatic environment from water pollution caused by logging operations and to ensure monitoring of the effectiveness of the licence conditions in achieving the relevant environmental goals.

In formulating this licence, the environmental goals that have been adopted by the EPA for all forests in NSW are *protection of aquatic ecosystems* and *primary contact recreation*.

These goals are defined in the "*Australian Water Quality Guidelines for Fresh and Marine Waters*" (Australian and New Zealand Environment and Conservation Council, 1992). The goals were identified as applying to all forested catchments in Australia by the Joint Australian and New Zealand Environment and Conservation Council - Ministerial Council for Forestry Fisheries and Aquaculture National Forest Policy Statement Implementation Sub-Committee.

For areas where the quality of water extracted for agricultural water supply or for drinking water supply may be affected by logging operations upstream, the EPA has adopted the criteria and indicators used in these environmental values as additional goals for protection.

Pollution of waters

3. State Forests must not pollute waters except as expressly permitted by this licence. (That is, the defence in Section 16(6) of the Clean Waters Act 1970 is available only if State Forests pollutes waters as expressly permitted by this licence.)

In this condition, the terms "pollute" and "waters" have the same meaning as in the Clean Waters Act 1970.

SECTION 2 – LIMIT CONDITIONS

Not applicable.

SECTION 3 – OPERATING CONDITIONS

Application of Section

4. This section is divided into three parts which contain conditions relating to the following:
- (a) Part 1 - transitional arrangements applying to logging operations commenced, approved or for which planning had commenced prior to 11 April 1998;
 - (b) Part 2 - process for commencing and undertaking new logging operations; and
 - (c) Part 3 - completion of all logging operations and process for ceasing licence coverage.

PART 1 - TRANSITIONAL LOGGING OPERATIONS

Application of Part

5. This Part is divided into five divisions, which contain conditions relating to the following:
- (a) Division 1 - conditions applying to logging operations commenced prior to 11 April 1995 and on land which is listed in Division 1 of Schedule 1;
 - (b) Division 2 - conditions applying to logging operations commenced on or after 11 April 1995 and prior to 11 April 1998, on land which is listed in Division 2 of Schedule 1;
 - (c) Division 3 - conditions applying to logging operations:
 - (i) which will commence on or after 11 April 1998; and
 - (ii) for which the EPA had issued before 11 April 1998 a Section 17D(3) notice against the 1997/98 licences, in accordance with condition 16(b) of the 1997/98 licences; and
 - (iii) which are on land which is listed in Division 3 of Schedule 1;
 - (d) Division 4 - conditions applying to logging operations:
 - (i) which will commence on or after 11 April 1998; and
 - (ii) for which planning had commenced in accordance with the 1997/98 licences but for which the EPA had not issued a Section 17D(3) notice against the 1997/98 licences prior to 11 April 1998; and
 - (iii) which are on land which is listed in Division 4 of Schedule 1; and
 - (e) Division 5 - conditions requiring the updating of logging operations specified in divisions 1 to 4 on land which is listed in Schedule 1, so that they comply with the same conditions as new logging operations commenced in accordance with Part 2 of this licence.

Definition of logging operations

6. For the purposes of this Part, "logging operations" has the following meanings:
- (a) if logging operations were commenced prior to 11 April 1995 on land listed in Division 1 of Schedule 1, the same meaning as defined in the 1994/95 licences;
 - (b) if logging operations were commenced on or after 11 April 1995 and before 8 August 1995 pursuant to a variation under condition 11(3)(e) of the 1994/95 licences and on land listed in Division 2 of Schedule 1, the same meaning as defined in the 1994/95 licences;
 - (c) if logging operations were commenced in the 1995/96 licence period pursuant to a

variation under condition 16(b) of the 1995/96 licences and on land listed in Division 2 of Schedule 1, the same meaning as defined in the 1995/96 licences;

- (d) if logging operations were commenced in the 1996/97 licence period pursuant to a variation under condition 16(b) of the 1996/97 licences and on land listed in Division 2 of Schedule 1, the same meaning as defined in the 1996/97 licences;
- (e) if logging operations were commenced in the 1997/98 licence period pursuant to a variation under condition 16(b) of the 1997/98 licences and on land listed in Division 2 of Schedule 1, the same meaning as defined in the 1997/98 licences;
- (f) if logging operations were commenced on or after 11 April 1998 on land listed in Division 3 of Schedule 1, but for which the EPA had issued before 11 April 1998 a Section 17(D) notice against the 1997/98 licences in accordance with condition 16(b) of the 1997/98 licences, the same meaning as defined in the 1997/98 licences; and
- (g) if logging operations were commenced in accordance with Division 4 of this Part, the same meaning as defined in the 1997/98 licences.

Division 1 - Conditions applying to logging operations commenced prior to 11 April 1995

Conditions applying to logging operations

- 7.1 In carrying out logging operations commenced prior to 11 April 1995 on land listed in Division 1 of Schedule 1, State Forests must comply with all of the conditions of Part 2 of the 1997/98 pollution control licences.
- 7.2 These conditions apply until 10 April 1999, except where the conditions are updated in accordance with Division 5.

Division 2 - Conditions applying to logging operations commenced on or after 11 April 1995 and prior to 11 April 1998

Conditions applying to logging operations

- 8.1 In carrying out logging operations,:
 - (a) if logging operations were commenced on or after 11 April 1995 and before 8 August 1995 pursuant to a variation under condition 11(3)e of the 1994/95 licences and on land listed in Division 2 of Schedule 1, then State Forests must comply with the conditions of Schedule 4 of the 1994/95 licences and the conditions of Schedule 4 of the 1996/97 licences;
 - (b) if logging operations were commenced in the 1995/96 licence period pursuant to a variation under condition 16(b) of the 1995/96 licences and on land listed in Division 2 of Schedule 1, then State Forests must comply with the conditions of Schedule 1 of the 1995/96 licences and the conditions of Schedule 4 of the 1996/97 licences;
 - (c) if logging operations were commenced in the 1996/97 licence period pursuant to a variation under condition 16(b) of the 1996/97 licences and on land listed in Division 2 of Schedule 1, then State Forests must comply with the conditions of schedules 1 and 4 of the 1996/97 licences; and

- (d) if logging operations were commenced in the 1997/98 licence period pursuant to a variation under condition 16(b) of the 1997/98 licences and on land listed in Division 2 of Schedule 1, then State Forests must comply with the conditions of schedules 1 and 4 of the 1997/98 licences.

8.2 These conditions apply until 10 April 1999, except where the logging operations are updated in accordance with Division 5 of this Part.

Variation of site-specific conditions

9.1 If during a logging operation State Forests considers that any of the site-specific conditions set out in the relevant schedules listed in condition 8.1 should be varied, then a State Forests officer at or above the rank of Regional Manager must approve the variation in writing prior to it being implemented.

9.2 In considering whether to approve the variation, the approving officer must ensure that:

- (a) the variation will maintain or decrease the potential for water pollution; and
- (b) the variation is consistent with the relevant schedules specified in condition 8.1; and
- (c) the documentation required by condition 9.3 has been prepared and is kept on file at the Regional Office.

9.3 State Forests must document the following information:

- (a) the condition which is proposed to be varied;
- (b) the physical area within the compartment, age class or roading area in relation to which the condition variation is proposed;
- (c) the reasons why the variation is being proposed; and
- (d) an explanation as to how the variation is expected to maintain or decrease the potential for water pollution.

Minor variations of site-specific conditions

10.1 Notwithstanding condition 9, in carrying out logging operations State Forests may vary any site-specific condition contained within a harvesting plan or roading plan referred to in the relevant schedules specified in condition 8.1 if the condition variation:

- (a) is minor; and
- (b) is consistent with the relevant schedules specified in condition 8.1; and
- (c) will result in the same or a decreased risk of water pollution than if the variation did not occur; and
- (d) does not relate to:
 - (i) the items listed in Form 1 of Schedule 7; or
 - (ii) the construction, upgrading or maintenance of road crossings of watercourses, drainage lines, swamps or wetlands, or the road approaches within 30 metres of the crossings.

10.2 State Forests may only vary the condition if, before varying the condition, the following matters are recorded on the harvesting plan or roading plan:

- (a) the condition which State Forests will vary; and
- (b) the physical area within the compartment, age class or roading area in relation to which the variation will occur.

Division 3 - Conditions applying to logging operations approved but not commenced before 11 April 1998

Conditions applying to logging operations

- 11.1 In carrying out logging operations commenced on or after 11 April 1998 on land listed in Division 3 of Schedule 1, but for which the EPA had issued before 11 April 1998 a Section 17D(3) notice against the 1997/98 licences in accordance with condition 16(b) of the 1997/98 licences, State Forests must comply with the conditions of schedules 1 and 4 of the 1997/98 licences.
- 11.2 These conditions apply until 10 April 1999, except where the logging operations are updated in accordance with Division 5 of this Part.

Variation of site-specific conditions

- 12.1 If during a logging operation State Forests considers that any of the site-specific conditions set out in Schedule 1 of the 1997/98 licences should be varied, then a State Forests officer at or above the rank of Regional Manager must approve the variation in writing prior to it being implemented.
- 12.2 In considering whether to approve the variation, the approving officer must ensure that:
- (a) the variation will maintain or decrease the potential for water pollution; and
 - (b) the variation is consistent with Schedule 4 of the 1997/98 licences; and
 - (c) the documentation required by condition 12.3 has been prepared and is kept on file at the Regional Office.
- 12.3 State Forests must document the following information:
- (a) the condition which is proposed to be varied;
 - (b) the physical area within the compartment, age class or roading area in relation to which the condition variation is proposed;
 - (c) the reasons why the variation is being proposed; and
 - (d) an explanation as to how the variation is expected to maintain or decrease the potential for water pollution.

Minor variations of site-specific conditions

- 13.1 Notwithstanding condition 12, in carrying out logging operations State Forests may vary any site-specific condition contained within a harvesting plan or roading plan referred to in Schedule 1 of the 1997/98 licences if the condition variation:
- (a) is minor; and
 - (b) is consistent with Schedule 4 of the 1997/98 licences; and
 - (c) will result in the same or a decreased risk of water pollution than if the variation did not occur; and
 - (d) does not relate to:
 - (i) the items listed in Form 1 of Schedule 7; or
 - (ii) the construction, upgrading or maintenance of road crossings of watercourses, drainage lines, swamps or wetlands or the road approaches within 30 metres of the crossings.
- 13.2 State Forests may only vary the condition if, before varying the condition, the following matters are recorded on the harvesting plan or roading plan:
- (a) the condition which State Forests will vary; and

- (b) the physical area within the compartment, age class or roading area in relation to which the variation will occur.

Division 4 – Conditions applying to logging operations for which planning had commenced prior to 11 April 1998 but for which a notice had not been issued

Operational planning

- 14.1 Each logging operation which is listed in Division 4 of Schedule 1 must be planned in a site-specific manner and site-specific conditions must be developed in accordance with the requirements of the 1997/98 licences.
- 14.2 In planning logging operations, State Forests must:
 - (a) take into account the matters identified in Schedule 2 of the 1997/98 licences;
 - (b) apply the water pollution hazard assessment model and identify the water pollution hazard categories of the compartment, age class or roading area in accordance with Schedule 3 of the 1997/98 licences;
 - (c) identify whether there are any dispersible soils in the compartment, age class or roading area in accordance with Schedule 3 of the 1997/98 licences;
 - (d) identify and adopt the suites of conditions contained within Schedule 4 of the 1997/98 licences which relate to each water pollution hazard category, as well as those conditions relating to dispersible soils; and
 - (e) identify site-specific conditions applying to the logging operation in accordance with Schedules 2, 3 and 4 of the 1997/98 licences.

Documentation of operational planning

- 15.1 State Forests must prepare planning documentation that:
 - (a) demonstrates that the operational planning has occurred; and
 - (b) contains the site-specific conditions that will apply to the logging operation.
- 15.2 The planning documentation must be kept on file at the Regional Office and must be provided to an EPA officer upon request.

Definition of summary of operations

- 16 For the purposes of this Division, “summary of operations” means the following documents:
 - (a) a notification of logging operations prepared in accordance with Form 1 of Schedule 7;
 - (b) an operational map prepared in accordance with Schedule 7; and
 - (c) a location map prepared in accordance with Schedule 7.

Preparation of a summary of operations

- 17.1 State Forests must submit a summary of operations to the EPA for every compartment, age class or roading area in which it proposes to commence logging operations in accordance with this Division.
- 17.2 State Forests must ensure that:
 - (a) the summary of operations does not contain any statement or information which is incorrect, false, misleading or incomplete;
 - (b) every statement and piece of information in the summary of operations is supported by the planning documentation;
 - (c) the procedure for obtaining information for the summary of operations is carried out in

- a competent manner and in accordance with the methodologies contained in schedules 2, 3 and 4 of the 1997/98 licences; and
- (d) the summary of operations is signed by an employee not below the rank of Regional Manager and with delegated authority by State Forests.

Submission of summary of operations

18.1 Each summary of operations must be faxed to the Manager of the Forestry Unit of the EPA at least one day prior to the date of commencement of the logging operation.

18.2 On the same or next working day State Forests must post to the Manager of the Forestry Unit of the EPA two copies of the summary of operations.

18.3 The postal address and fax number for the Forestry Unit of the EPA is contained in Schedule 8.

Note: The summary of operations may be faxed and posted to the EPA at any time prior to the commencement of logging operation (eg potentially several months before if that is when planning finished), so long as the fax version is received at least one day prior and the postal version is sent by the next day. However, the date of commencement of operations should not be filled in on Form 1 until the operation actually commences.

No logging until summary of operations submitted

19 Logging operations must not commence until the summary of operations has been submitted in accordance with this Division.

Conditions applying to logging operations

20.1 In carrying out logging operations for which State Forests has forwarded a summary of operations in accordance with this Division, State Forests must comply with:

- (a) the conditions set out in Schedule 4 of the 1997/98 licences; and
- (b) the site-specific conditions set out in the planning documentation referred to in condition 15.

20.2 These conditions apply until 10 April 1999, except where the logging operations are updated in accordance with Division 5 of this Part.

Variation of site-specific conditions

21.1 If during a logging operation State Forests considers that any of the site-specific conditions set out in the planning documentation referred to in condition 15 should be varied, then a State Forests officer at or above the rank of Regional Manager must approve the variation in writing prior to it being implemented.

21.2 In considering whether to approve the variation, the approving officer must ensure that:

- (a) the variation will maintain or decrease the potential for water pollution; and
- (b) the variation is consistent with Schedule 4 of the 1997/98 licences; and
- (c) the documentation required by condition 21.3 has been prepared and is kept on file at the Regional Office.

21.3 State Forests must document the following information:

- (a) the condition which is proposed to be varied;
- (b) the physical area within the compartment, age class or roading area in relation to which

- the variation is proposed;
- (c) the reasons why the variation is being proposed; and
- (d) an explanation as to how the variation is expected to maintain or decrease the potential for water pollution.

- 21.4 State Forests must fax to the Manager of the Forestry Unit of the EPA on the day the variation is approved a revised version of the summary of operations, signed by the approving officer, which accurately reflects the variation that has been approved.
- 21.5 On the same or next working day State Forests must post to the Manager of the Forestry Unit of the EPA two copies of the revised summary of operations.

Minor variations of site-specific conditions

- 22.1 Notwithstanding condition 21, in carrying out logging operations State Forests may vary any site-specific condition set out in the planning documentation referred to in condition 15 if the condition variation:
- (a) is minor; and
 - (b) is consistent with Schedule 4 of the 1997/98 licences; and
 - (c) will result in the same or a decreased risk of water pollution than if the variation did not occur; and
 - (d) does not relate to:
 - (i) the items listed in Form 1 of Schedule 7; or
 - (ii) the construction, upgrading or maintenance of road crossings of watercourses, drainage lines, swamps or wetlands or the road approaches within 30 metres of the crossings.
- 22.2 State Forests may only vary the condition if, before varying the condition, the following matters are recorded as part of the planning documentation referred to in condition 15:
- (a) the condition which State Forests will vary; and
 - (b) the physical area within the compartment, age class or roading area in relation to which the variation will occur.

Duty to notify

- 23 If State Forests finds that the information provided in the summary of operations is incorrect, false, misleading or incomplete, then State Forests must notify the EPA in writing as soon as practicable and, in any event, no later than seven days after State Forests becomes aware that the information is incorrect, false, misleading or incomplete.

Division 5 - Updating of logging operations in divisions 1 to 4

Requirement to update logging operations

- 24 For logging operations that are the subject of divisions 1 to 4, State Forests must either:
- (a) notify the EPA in accordance with condition 42 by 10 April 1999 that licence coverage is to cease; or
 - (b) to the extent that State Forests wishes to retain licence coverage past 10 April 1999, update the logging operation by 10 April 1999 in accordance with this Division so that it complies with the same conditions as new logging operations commenced in accordance with Part 2; or

- (c) elect not to cease licence coverage or update the logging operation prior to 10 April 1999, in which case licence coverage for those operations will cease on 10 April 1999.

Process for updating logging operations

25 For the purposes of this Division, updating the logging operations means:

- (a) ensuring that all of the matters listed in Schedule 2 are taken into account in the operational planning;
- (b) applying all components of the soil erosion and water pollution hazard assessment in accordance with Schedule 3, including the hazard assessment model, mass movement assessment, dispersible soils assessment and seasonal restrictions;
- (c) identifying and adopting the suites of conditions contained within schedules 4 and 5;
- (d) identifying site-specific conditions applying to the logging operations in accordance with schedules 2, 3, 4 and 5;
- (e) updating the planning documentation so that it reflects any changes to the operations;
- (f) completing a summary of operations for each logging operation in accordance with condition 31 of this licence;
- (g) forwarding a copy of each summary of operations to the Manager of the Forestry Unit of the EPA in accordance with condition 32 of this licence; and
- (h) completing an additional operational map which clearly indicates those parts of the compartment, age class or roading area for which logging operations remain to be carried out under the updated conditions, and forwarding this operational map to the Manager of the Forestry Unit of the EPA with the summary of operations.

Conditions applying to updated logging operations

26 In carrying out logging operations which State Forests has updated in accordance with this Division, State Forests must comply with:

- (a) the conditions set out in schedules 4 and 5; and
- (b) the site-specific conditions set out in the planning documentation referred to in condition 25.

Variation of updated logging operations

27 If during a logging operation updated in accordance with this Division State Forests considers that any of the site-specific conditions set out in the planning documentation referred to in condition 25 should be varied then State Forests must comply with the requirements of conditions 39 and 40.

List of logging operations which have been updated

28 On 10 April 1999, State Forests must forward to the EPA a list of all logging operations listed in Schedule 1, indicating for each operation the date upon which:

- (a) the EPA was notified that the licence was to cease to apply to the operation; or
- (b) a summary of operations and additional operational map was submitted to the EPA.

Note: The remaining logging operations listed in Schedule 1 will cease to have licence coverage from 10 April 1999.

PART 2 - NEW LOGGING OPERATIONS

Definition of summary of operations

29 For the purposes of this Part, "summary of operations" means the following documents:

- (a) a notification of logging operations prepared in accordance with Form 2 of Schedule 7;
- (b) an operational map prepared in accordance with Schedule 7; and
- (c) location map prepared in accordance with Schedule 7.

Division 1 – Planning new logging operations

Application of division

30.1 State Forests may notify the EPA that it proposes to commence logging operations in accordance with this Part by forwarding to the EPA a summary of operations.

30.2 This Division applies to logging operations referred to in the summary of operations.

Note: Nothing in this Division is to be construed as requiring State Forests to submit a summary of operations to the EPA for logging operations for which State Forests has elected not to obtain licence coverage. Notwithstanding this Division, State Forests may elect to carry out logging operations without obtaining licence coverage.

30.3. State Forests must not forward a summary of operations for land west of the Great Dividing Range unless State Forests has:

- (a) developed an inherent soil erosion and water pollution hazard assessment methodology appropriate for these areas; and
- (b) developed best management practice conditions appropriate for logging operations within these areas; and
- (c) had the inherent soil erosion and water pollution hazard assessment methodology and best management practice conditions approved in writing by the EPA.

30.4. In this condition, “land west of the Great Dividing Range” means land set out in Figure 1, and is to follow the boundaries of the following State Forests Management areas:

Attunga, Cobar, Condobolin, Dubbo, Forbes, Gilgandra, Griffith, Gunnedah, Inverell, Mildura, Mudgee, Murray, Murrumbidgee, Narrandera, Pilliga, Steam Plains, Walgett and Warrung.

Preparation of a summary of operations

31.1 If State Forests elects to submit a summary of operations then State Forests must ensure that:

- (a) the logging operation that is the subject of the summary of operations has been planned in accordance with condition 33;
- (b) this planning has been documented in accordance with condition 34; and
- (c) the summary of operations has been prepared in accordance with conditions 31.2 and 31.3.

31.2 Each summary of operations must only apply to one compartment, age class or roading area in which State Forests proposes to commence logging operations.

31.3 State Forests must ensure that:

- (a) the summary of operations does not contain any statement or information which is incorrect, false, misleading or incomplete;
- (b) every statement and piece of information in the summary of operations is supported by the planning documentation;
- (c) the procedure for obtaining information for the summary of operations is carried out in a competent manner and in accordance with the methodologies contained in schedules 2,

- 3, 4 and 5; and
- (d) the summary of operations is signed by an employee not below the rank of Regional Manager and with delegated authority by State Forests.

Submission of summary of operations

- 32.1 Each summary of operations must be faxed to the Manager of the Forestry Unit of the EPA at least one day prior to the date of commencement of the logging operation.
- 32.2 On the same or next working day State Forests must post to the Manager of the Forestry Unit of the EPA two copies of the summary of operations.
- 32.3 The postal address and fax number for the Forestry Unit of the EPA is contained in Schedule 8.

Note: The summary of operations may be faxed and posted to the EPA at any time prior to the commencement of logging operation (eg potentially several months before if that is when planning finished), so long as the fax version is received at least one day prior and the postal version is sent by the next day. However, the date of commencement of operations should not be filled in on Form 2 until the operation actually commences.

Operational planning

- 33.1 Each logging operation the subject of this Division must be planned in a site-specific manner, and site-specific conditions must be developed in accordance with the requirements of schedules 2, 3, 4 and 5.
- 33.2 In planning logging operations, State Forests must:
- (a) take into account the matters identified in Schedule 2;
 - (b) apply the soil erosion and water pollution hazard assessment model and identify the inherent hazard level of the compartment or age class in accordance with Schedule 3;
 - (c) identify whether there is a mass movement hazard in the compartment, age class or roading area in accordance with Schedule 3;
 - (d) identify whether there are any dispersible soils in the compartment, age class or roading area in accordance with Schedule 3;
 - (e) identify the seasonal restrictions on the logging operation in accordance with Schedule 3;
 - (f) identify and adopt the suites of conditions contained within Schedule 4 which relate to each inherent hazard level, as well as those conditions in schedules 4 or 5 relating to or required to be developed for mass movement hazard, dispersible soils and seasonal restrictions; and
 - (g) identify site-specific conditions applying to the logging operation in accordance with schedules 2, 3, 4 and 5.
- 33.3 State Forests must ensure that only appropriately trained and competent people undertake the requirements of schedules 2, 3, 4 and 5.

Documentation of operational planning

- 34.1 State Forests must prepare planning documentation which demonstrates that this planning has occurred and which contains the site-specific conditions that will apply to the logging operation.
- 34.2 The planning documentation must be kept on file at the Regional Office and must be provided to an EPA officer upon request.

Division 2 - Commencement of new logging operations

Application of division

- 35 This Division applies to logging operations which have been planned in accordance with Division 1 of Part 2 of this section and for which a summary of operations has been submitted to the EPA under that Division.

Commencement of licence coverage

- 36.1 Licence coverage for logging operations for which a summary of operations was submitted in accordance with Division 1 will commence from the date of commencement of the logging operation.
- 36.2 State Forests must ensure that a copy of each completed summary of operations is placed in the operations register required by condition 56 from the date upon which the logging operation commences. This summary must include the actual date of commencement.

Notification of commencement

- 37 Within two weeks of commencing a logging operation in accordance with this Part State Forests must notify the Manager of the Forestry Unit of the EPA of the date of commencement of that operation.

Conditions applying to logging operations

- 38 In carrying out new logging operations, State Forests must comply with:
- (a) the conditions set out in schedules 4 and 5; and
 - (b) the site-specific conditions set out in the planning documentation referred to in condition 34.

Variation of site-specific conditions

- 39.1 If during a logging operation State Forests considers that any of the site-specific conditions set out in the planning documentation referred to in condition 34 should be varied, then a State Forests officer at or above the rank of Regional Manager must approve the variation in writing prior to it being implemented.
- 39.2 In considering whether to approve the variation, the approving officer must ensure that:
- (a) the variation will maintain or decrease the potential for water pollution; and
 - (b) the variation is consistent with schedules 4 and 5; and
 - (c) the documentation required by condition 39.3 has been prepared and is kept on file at the Regional Office.
- 39.3 State Forests must document the following information:
- (a) the condition which is proposed to be varied;
 - (b) the physical area within the compartment, age class or roading area in relation to which the variation is proposed;
 - (c) the reasons why the variation is being proposed; and
 - (d) an explanation as to how the variation is expected to maintain or decrease the potential for water pollution.
- 39.4 State Forests must fax to the Manager of the Forestry Unit of the EPA on the day the variation is approved a revised version of the summary of operations, signed by the approving officer, which

accurately reflects the variation that has been approved.

- 39.5 On the same or next working day State Forests must post to the Manager of the Forestry Unit of the EPA two copies of the revised summary of operations.

Minor variations of site-specific conditions

- 40.1 Notwithstanding condition 39, in carrying out logging operations State Forests may vary any site-specific condition set out in the planning documentation referred to in condition 34 if the condition variation:

- (a) is minor; and
- (b) is consistent with schedules 4 and 5; and
- (c) will result in the same or a decreased risk of water pollution than if the variation did not occur; and
- (d) does not relate to:
 - (i) the items listed in Form 2 of Schedule 7; or
 - (ii) the construction, upgrading or maintenance of road crossings of watercourses, drainage lines, swamps or wetlands or the road approaches within 30 metres of the crossings.

- 40.2 State Forests may only vary the condition if, before varying the condition, the following matters are recorded as part of the planning documentation referred to in condition 34:

- (a) the condition which State Forests will vary; and
- (b) the physical area within the compartment, age class or roading area in relation to which the variation will occur.

Duty to notify

- 41 If State Forests finds that the information provided in the summary of operations is incorrect, false, misleading or incomplete, State Forests must notify the EPA in writing as soon as practicable and, in any event, no later than seven days after State Forests becomes aware that the information is incorrect, false, misleading or incomplete.

PART 3 - CESSATION OF LICENCE COVERAGE

Licence ceases to apply

- 42.1 This licence ceases to apply to land where State Forests has forwarded to the EPA a written notice using Form 3 of Schedule 7.
- 42.2 This licence ceases to apply to land notified in this way from the date that the form was signed.
- 42.3 A copy of each form must be placed on the operations register required by condition 56, within five days of the form being signed.
- 42.4 Copies of each form must be forwarded to the Manager of the Forestry Unit of the EPA on the first day of each month for each compartment, age class or roading area where licence coverage ceased during the preceding month..

SECTION 4 – MONITORING CONDITIONS

Specification of water quality monitoring

- 43.1 State Forests must monitor water quality in representative areas selected in consultation with the EPA to assess the impacts of proposed logging operations on water quality.
- 43.2 In the selected representative native forest areas, water quality monitoring must occur before, during and following proposed logging operations.
- 43.3 State Forests must obtain the written approval of the EPA in relation to the water quality monitoring strategies for monitoring in the selected, representative plantations.
- 43.4 Logging operations must not commence in representative native forest areas until the EPA has approved this logging operation in writing.

Water quality monitoring locations

- 44 State Forests must maintain relevant maps of forest areas being monitored for water quality.

Water quality monitoring protocols

- 45.1 Any water quality monitoring required by this licence must be carried out in accordance with protocols approved by the EPA in writing before any water quality monitoring is conducted.
- 45.2 The parameters which must be monitored are as follows:
 - (a) turbidity;
 - (b) conductivity;
 - (c) pH;
 - (d) stream height;
 - (e) rainfall;
 - (f) temperature;
 - (g) total nitrogen;
 - (h) total phosphorus; and
 - (i) cations.
- 45.3 State Forests must obtain analyses of the water quality samples collected by using a laboratory which is NATA-registered for the tests being performed.
- 45.4 State Forests must analyse the water quality data using methodologies approved in writing by the EPA.
- 45.5 Monitoring results must be evaluated by comparison with all the environmental goals specified in condition 2.

Post-operational audits

- 46.1 State Forests must carry out compliance audits of logging operations undertaken in the representative areas in which water quality monitoring occurs.
- 46.2 Written documentation in respect of the post-operational audit must be kept in State Forests Regional Office and presented to an EPA officer upon request.
- 46.3 These audits must be performed within 10 days of the completion of harvesting or roading, and then within 10 days of any post-harvest burn (if applicable).

46.4 The audits must cover compliance with all relevant conditions of the licence, and the effectiveness of the operational controls required by the licence.

46.5 State Forests must also monitor regeneration of groundcover at six monthly intervals.

Monitoring and review of water pollution hazard assessment model

47.1 State Forests must monitor and review the soil erosion and water pollution hazard assessment model detailed in Schedule 3.

47.2 Monitoring and review of the model must be carried out from 11 April 1998 in accordance with a documented methodology which has been approved in writing by the EPA.

SECTION 5 – REPORTING CONDITIONS

PART 1 – PERFORMANCE MONITORING AND AUDITING

Report for the period from 8 August 1997 to 10 April 1998

- 48.1 State Forests must produce to the EPA a report covering the period from 8 August 1997 to 10 April 1998, in relation to land to which the 1997/98 licences applied.
- 48.2 The report must be forwarded to the Manager of the Forestry Unit of the EPA no later than 22 May 1998.
- 48.3 The report must relate to the 1997/98 licence periods and contain summaries of all:
- (a) entries made in the pollution registers and complaints registers required by conditions 49 and 50 of the 1997/98 licences;
 - (b) fortnightly reports required by condition 51 of the 1997/98 licences;
 - (c) water quality monitoring and results analysis required by conditions 35, 37 and 45 of the 1997/98 licences, including evaluation against the environmental goals specified in condition 1 of those licences;
 - (d) post-operational audits required by condition 38 of the 1997/98 licences; and
 - (e) improvements to or developments in best management practice employed in logging operations carried out under this licence.
- 48.4 The report must also examine and discuss the efficacy of the conditions of this licence in protecting water quality.

Report for the period from 11 April 1998 to 10 April 1999

- 49.1 State Forests must provide to the EPA a report covering the period from 11 April 1998 to 10 April 1999, in relation to land to which this licence applies.
- 49.2 The report must be forwarded to the Manager of the Forestry Unit of the EPA no later than six weeks after the expiry of the period covered by this licence.
- 49.3 The report must relate to the period from 11 April 1998 to 10 April 1999 and contain summaries of all:
- (a) entries made in the complaints registers, compliance registers and operations registers required by conditions 54, 55 and 56 of this licence;
 - (b) water quality monitoring and results analysis required by conditions 45 and 52.5 of this licence, including evaluation against the environmental goals specified in condition 2;
 - (c) post-operational audits required by condition 46 of this licence; and
 - (d) improvements to or developments in best management practice employed in logging operations carried out under this licence.
- 49.4 The annual report must also:
- (a) examine and discuss the efficacy of the conditions of this licence in protecting water quality; and
 - (b) respond to any information provided to State Forests by the EPA as a result of auditing activities, including details of the improvements to systems and practices that State Forests has made to ensure that any identified licence breaches are not repeated.

Certificate of compliance for the period from 8 August 1997 to 10 April 1998

- 50.1 The report for the period from 8 August 1997 to 10 April 1998 required by condition 48 of this licence must be accompanied by a certificate approved by the EPA and signed by an employee of State Forests, not below the rank of Divisional Manager, certifying:

Monitoring conditions

- (a) whether all monitoring required by the 1997/98 licences has been carried out;
- (b) if all the monitoring has not been carried out, what monitoring has not been carried out and the reasons why the monitoring has not been carried out;
- (c) whether all the monitoring data required to be reported to the EPA by the 1997/98 licences have been reported to the EPA;
- (d) whether all the monitoring data were reported within the time specified by the 1997/98 licences;
- (e) if all the monitoring data have not been reported to the EPA, or have not been reported within the time specified, the reasons why the monitoring data were not so reported;
- (f) whether all the monitoring data reported to the EPA were derived from monitoring carried out in accordance with the 1997/98 licences;
- (g) if any of the monitoring data reported to the EPA were not derived from monitoring carried out in accordance with the 1997/98 licences, what monitoring data were not so derived and the reasons why the monitoring data were not so derived;

Pollution event reporting conditions

- (h) whether all pollution incidents required to be reported under the 1997/98 licences have been reported;
- (i) whether all those pollution events were reported within the time specified by the 1997/98 licences;
- (j) if all the pollution events have not been reported to the EPA, or have not been reported within the time specified, the reasons why the pollution events have not been so reported;
- (k) whether the contents of any report concerning a pollution event are correct and are consistent with the requirements of the 1997/98 licences;
- (l) if the contents of the report to the EPA are not correct or are not consistent with the requirements of the 1997/98 licences, what parts of the contents are not correct or are not consistent and the reasons why the incorrectness or inconsistency occurred;

Compliance conditions

- (m) whether every condition of the 1997/98 licences has been complied with; and
- (n) if one or more conditions have not been complied with, in relation to each such condition:
 - (i) the nature of the non-compliance; and
 - (ii) the reasons for the non-compliance; and
 - (iii) any action taken to prevent, control or mitigate the non-compliance; and
 - (iv) any action that has been or will be taken to prevent a recurrence of the non-compliance.

- 50.2 In providing details of non-compliances of conditions, State Forests must provide the information on a regional or district basis, as well as summarised for each division. The information must be provided in a standardised format for each region or district.

Certificate of compliance for the period from 11 April 1998 to 10 April 1999

- 51.1 The report for the period from 11 April 1998 to 10 April 1999 required by condition 49 of this licence must be accompanied by a certificate approved by the EPA and signed by an employee of State Forests, not below the rank of Divisional Manager, certifying:

Monitoring conditions

- (a) whether all monitoring required by this licence has been carried out;
- (b) if all the monitoring has not been carried out, what monitoring has not been carried out and the reasons why the monitoring has not been carried out;
- (c) whether all the monitoring data required to be reported to the EPA by this licence have been reported to the EPA;
- (d) whether all the monitoring data were reported within the time specified by this licence;
- (e) if all the monitoring data have not been reported to the EPA, or have not been reported within the time specified, the reasons why the monitoring data were not so reported;
- (f) whether all the monitoring data reported to the EPA were derived from monitoring carried out in accordance with this licence;
- (g) if any of the monitoring data reported to the EPA were not derived from monitoring carried out in accordance with this licence, what monitoring data were not so derived and the reasons why the monitoring data were not so derived;

Compliance conditions

- (h) whether every condition of this licence has been complied with; and
- (i) if one or more conditions have not been complied with, in relation to each such condition:
 - (i) the nature of the non-compliance; and
 - (ii) the reasons for the non-compliance; and
 - (iii) any action taken to prevent, control or mitigate the non-compliance; and
 - (iv) any action that has been or will be taken to prevent a recurrence of the non-compliance.

- 51.2 In providing details of non-compliances of conditions, State Forests must provide the information on a regional basis, as well as summarised for each division. The information must be provided in a standardised format for each region.

Water quality reports

- 52.1 Data collected as a result of water quality monitoring required by this licence must be submitted to the EPA in a standardised format approved by the EPA, including summaries of the data as required by the EPA.

- 52.2 Three stand-alone reports must be submitted to the EPA as follows, in a standardised format approved by the EPA in writing:

- (a) at the end of the monitoring carried out prior to the logging operation commencing (that is, the "pre-operational monitoring period"), a report containing an interpretation of all the "pre-operational" data;
- (b) at the end of the monitoring carried out during the logging operation (that is, the "operational monitoring period"), a report containing an interpretation of all the "operational" data, and a comparison to the "pre-operational" data; and
- (c) at the end of the monitoring carried out after the logging operation (that is, the "post-operational monitoring period"), a report containing an interpretation of all the "post-

operational" data, and an analysis of the entire monitoring operation at that site. This analysis must contain an assessment of the effectiveness of the licence conditions in minimising water pollution, and in achieving the environmental goals specified in condition 2 of this licence.

- 52.3 An audit report must be prepared after each audit required under condition 46 of this licence, and submitted to the EPA within 30 days of the audit being carried out. The report must be presented in a standardised format, agreed to by the EPA in writing, that highlights any areas of non-compliance with the licence conditions.

Water pollution hazard assessment model monitoring reports

- 53.1 State Forests must report in writing to the Forestry Unit of the EPA on the program for monitoring and reviewing the soil erosion and water pollution hazard assessment model.
- 53.2 This reporting must be carried out in accordance with the documentation and methodology approved by the EPA in accordance with condition 47 of this licence.

Complaints register

- 54.1 Each State Forests Regional Office must keep a register of all complaints received by State Forests alleging water pollution which may have been caused by logging operations within that region, or alleging licence breaches which may have occurred during logging operations within that region.
- 54.2 The register must include details of the:
- (a) date and time of the complaint;
 - (b) method by which the complaint was lodged (telephone, letter, etc.);
 - (c) name, address, and telephone number of the complainant and/or a further contact person;
 - (d) name of the person receiving the complaint;
 - (e) precise location of the alleged pollution incident and/or licence breach;
 - (f) waters said to be polluted or potentially polluted;
 - (g) substance causing pollution or potential pollution and the amount in which it was present (if known); and
 - (h) action taken by State Forests in relation to the complaint, including any follow-up contact with the complainant.

Compliance register

- 55.1 Each State Forests Regional Office must keep a register of every incident of non-compliance with the conditions of this licence.
- 55.2 The register must include details of:
- (a) the date, time and duration of the non-compliance;
 - (b) the date upon which State Forests became aware of the non-compliance;
 - (c) the exact location of the non-compliance, either marked on the operational map or in the form of Australian Map Grid co-ordinates;
 - (d) the name of the person who caused the non-compliance;
 - (e) the nature of the non-compliance;
 - (f) the reasons for the non-compliance;
 - (g) whether the non-compliance resulted in any environmental harm;
 - (h) any remedial action taken by State Forests or any other person in relation to the non-compliance and the dates upon which it was taken;
 - (i) any disciplinary action taken by State Forests against any of its contractors,

- (j) employees, licensees or agents and the dates upon which it was taken; and any measure taken or proposed to be taken to prevent or mitigate the recurrence of such a non-compliance.

55.3 The register must be filled in within 14 days of State Forests becoming aware of the non-compliance.

55.4 In this condition, "environmental harm" includes any direct or indirect alteration to the environment and, without limiting the generality of the foregoing, includes any act or omission that results in the pollution of any water, within the meaning of the Clean Waters Act 1970.

Operations register

56.1 Each State Forests Regional Office must keep a register of all logging operations undertaken within the region.

56.2 The register must include copies of all:

- (a) summaries of operations submitted to the EPA in accordance with Division 4 of Part 1 of Section 3;
- (b) variations to summaries of operations submitted to the EPA in accordance with Division 4 of Part 1 of Section 3;
- (c) summaries of updated operations submitted to the EPA in accordance with Division 5 of Part 1 of Section 3;
- (d) variations to summaries of updated operations submitted to the EPA in accordance with Division 5 of Part 1 of Section 3;
- (e) summaries of operations submitted to the EPA in accordance with Division 1 of Part 2 of Section 3;
- (f) variations to summaries of operations submitted to the EPA in accordance with Division 2 of Part 2 of Section 3; and
- (g) notifications that licence coverage has ceased submitted to the EPA in accordance with Part 3 of Section 3.

PART 2 - PROVISION OF AND ACCESS TO INFORMATION

Reports

57.1 The EPA may direct State Forests to provide written reports on any matter relating to State Forests' compliance with any condition of this licence.

57.2 State Forests must supply the report to the Manager of the Forestry Unit of the EPA within 21 days of the request, or within such shorter time as may be specified in the request.

57.3 The EPA may make a written request for further details in relation to any report submitted by State Forests if the EPA is not satisfied with the report. State Forests must provide such further details to the EPA within the time specified in the request.

Records

58.1 All records, documentation and registers required by this licence must be kept for at least three years after the action or event took place, in respect of which the record has been created, or for three years after the last entry in the registers specified under Part 1 of this Section.

58.2 All records, documentation and registers must be kept in a legible form and must be produced in a legible form to any EPA officer upon request.

- 58.3 Copies of records, documentation and registers requested in writing by the EPA must be forwarded to the nominated EPA office within the time specified in the request.

Public inspection of documents

- 59.1 Copies of the following documents must be made available for inspection by any person at each State Forests Regional Office responsible for land to which this licence applies:

- (a) this licence;
- (b) the 1994/95 licences, the 1995/96 licences, the 1996/97 licences and the 1997/98 licences;
- (c) the Code of Logging Practice;
- (d) the "Conditions For Use With Harvesting Plans, Based on SEMGL (1993)", July 1993, compiled by State Forests;
- (e) all planning documentation relating to logging operations, and copies of the summaries of operation of each licensed operation which is the responsibility of the Regional Office;
- (f) the latest annual report submitted to the EPA; and
- (g) the operations register.

- 59.2 Copies of all planning documentation for logging operations which are the responsibility of the Regional Office must be made available to any person for photocopying at a reasonable cost.

SECTION 6 - GENERAL CONDITIONS

Activities must be carried out competently

- 60 All logging operations to which this licence applies must be carried out in a competent and reasonable manner.

Direction to undertake measures to achieve compliance with licence conditions

- 61 If any failure to comply with a requirement of this licence is causing or is likely to cause water pollution, State Forests must comply with any direction of an EPA officer requiring the taking of practical measures to prevent, control, abate or mitigate that pollution.

Licences under Forestry Act 1916

- 62.1 Any licence issued by State Forests under the Forestry Act 1916 or the Forestry Regulation 1994 which authorises the holder to carry out any logging operations covered by this licence must be issued subject to conditions which require the holder of the licence to comply:

- (a) for operations that are the subject of Division 1 of Part 1 of Section 3, condition 7; and
- (b) for operations that are the subject of Division 2 of Part 1 of Section 3, condition 8; and
- (c) for operations that are the subject of Division 3 of Part 1 of Section 3, condition 11; and
- (d) for operations that are the subject of Division 4 of Part 1 of Section 3, condition 20; and
- (e) for operations that are the subject of Division 5 of Part 1 of Section 3, condition 26; and
- (f) for operations that are the subject of Division 2 of Part 2 of Section 3, condition 38,

in the same way that State Forests must comply with those conditions.

- 62.2 State Forests must monitor compliance with those conditions and be able to demonstrate that the monitoring has occurred.

Understanding of State Forests' employees and contractors

- 63 State Forests must ensure that all employees, contractors, sub-contractors, agents or State Forests licensees engaged in any aspect of logging operations covered by this licence understand the general and site-specific conditions applying to the logging operation prior to their involvement in the logging operation.

Field supervision of logging operations

- 64.1 State Forests must ensure that a State Forests employee is present at each compartment, age class or roading area while logging operations are occurring under this licence for the purposes of ensuring compliance with this licence, for at least one full working day per week per logging operation.
- 64.2 State Forests must ensure through this and any other supervision that may be necessary that all employees, contractors, sub-contractors, agents or licensees comply with the conditions of this licence.
- 64.3 State Forests must record the name of the State Forests employee who was present at each logging operation, and the dates upon which they were present.
- 64.4 State Forests must also record the items listed in Division 3 of Schedule 6.

Relationship of this licence to other documents

- 65.1 Where there is a conflict between the conditions of this licence and the documents with which this licence requires compliance, the conditions of this licence prevail.

- 65.2 Where there is a conflict between the conditions of this licence and the conditions of a licence issued to State Forests under the National Parks and Wildlife Act 1974, State Forests must consult with the EPA and the National Parks and Wildlife Service to resolve the conflict.
- 65.3 Where there is a conflict between the conditions of this licence and the conditions of a determination of an environmental impact statement issued to State Forests under the Environmental Planning and Assessment Act 1979, State Forests must consult with the EPA and the Department of Urban Affairs and Planning to resolve the conflict.
- 65.4 Where there is a conflict between the conditions of this licence and the conditions of a decision made by the Regulatory and Public Information Committee (RaPIC) under the Timber Industry (Interim Protection) Amendment Act 1994, State Forests must consult with the EPA and RaPIC to resolve the conflict.

Responsible employees

- 66.1 State Forests must authorise at least two of its senior employees to:
- (a) speak on behalf of State Forests; and
 - (b) provide any information or document required under this licence.
- 66.2 State Forests must authorise those persons, and inform the Manager of the Forestry Unit of the EPA, of the names and telephone numbers of those authorised persons, by 24 April 1998.
- 66.3 State Forests must inform the Manager of the Forestry Unit of the EPA of any change in the information provided under this condition within 14 days of the change.
- 66.4 Any person authorised under this condition by State Forests must be readily contactable on the person's nominated telephone number during regular working hours.

Continuation of soil and water training

- 67.1 State Forests must continue to develop the soil and water training program for operators, supervisors and planners, development of which commenced during the 1994/95 licence period and in accordance with the 1994/95 licence, to the point where VEETAB accreditation has been obtained.
- 67.2 The operators' course, supervisors' course and planners' course must be provided on a regular basis and at least once a year by a training organisation approved in writing by the EPA.
- 67.3 State Forests must advise the EPA in writing of the date on which each course is finalised and is first formally offered by a training organisation.

Soil assessor training

- 68.1 State Forests must ensure that persons verifying soil regolith and detecting dispersible soils in accordance with Schedule 3 are trained and competent to do so.
- 68.2 Soil assessors must have gained accreditation in writing from the EPA before carrying out any soil regolith or dispersibility assessments.

SECTION 7 - DEFINITIONS

"age class" means a compartment or group of compartments in a plantation, in which the trees are approximately the same age;

"aggregate" means a unit of soil structure consisting of primary soil particles held together by cohesive forces or by secondary soil materials such as iron oxides, silica or organic matter;

"air-dry aggregate" means the state of dryness of a soil aggregate at equilibrium with the water content in the surrounding atmosphere. The actual water content will depend upon the relative humidity and temperature of the surrounding atmosphere;

"armour" means to provide a protective surface that is resistant to erosion or displacement by machinery or vehicles;

"Australian Map Grid " means the 13 digit map coordinates (6 digit Eastings and 7 digit Northings) provided on a 1:25 000 or 1:50 000 map sheet produced by Land Information Centre (formerly Central Mapping Authority);

"batter" means an earth slope formed by the placing of fill material or by cutting into the natural hillside;

"batter drain" means a constructed and stabilised drain to carry runoff down a batter without scouring or erosion;

"batter stabilisation" means the provision of adequate vegetative, structural or mechanical measures to control erosion from batters. Measures may include the provision of catch drains, topsoiling, seeding, mulching, geofabrics, benching, use of batter drains or use of retaining walls or other engineering structures;

"bench" means a strip of relatively flat earth or rock breaking the continuity of a slope;

"best management practice" means practices that have been developed to prevent or minimise pollution and to protect the environment. They are often applied to non-point sources of pollution where there is a need to define a range of practices that need to be applied to prevent degradation of the environment.

"blading off" means the removal of surface soil from a snig track or road in wet conditions in order to expose a drier or firmer surface for use by machinery;

"borrow pit" means an excavation which does not form part of the road, from which fill material is extracted for road construction, upgrading or maintenance;

"bridge" means a structure designed to carry a road over a drainage feature by spanning it;

"buffer strip" means a strip along each side of a drainage depression in which soil disturbance during logging operations must be prevented to the greatest extent practicable;

"catch drain" means a diversion drain excavated on the high side of the batter, embankment or road to intercept and divert surface runoff water before it reaches the batter, embankment or road;

"causeway" means a natural or manmade crossing which enables vehicles to ford a drainage feature. The pavement of a causeway may consist of gravel, rock, bitumen or concrete, or of a stable natural surface;

"Code of Logging Practice" means:

- a) in the case of plantations, "Forest Practices Code - Timber Harvesting in State Forests Plantations", prepared by State Forests, July 1995; and
- b) in the case of native forests, the "Forest Practices Code in Native Forests, State Forests and Crown-timber Lands" prepared by State Forests, November 1995;

"compartment" means an area of forest designated for forestry management purposes, principally for the cutting and removal of timber. A compartment is an area of forest identified by a compartment number and a State Forests name. Compartment boundaries are delineated on State Forests' Geographic Information System (GIS).

"concentrated water flow " means the discharge of water from a structure across a surface in a manner other than a sheet of water, up to the peak discharge from a storm event of less than or equal to the required design specification for that structure. Concentrated water flow is evidenced by rivulets, rills, gullies or streams of water, or the eroded areas where rivulets, rills, gullies or streams of water have flowed.

"constructed snig tracks" means snig tracks that have had some form of machinery preparation prior to use, ranging from removal of leaf litter to the benching in of tracks around steep ground slopes;

"construction " means the act of building, erecting or installing;

"coupe" means a sub-unit of a compartment and the basic harvesting unit in the Eden Management Area (EMA);

"crossbank" means a hump of earth constructed across an extraction track, snig track, outrow, log dump or road to baulk the flow of water so that it can be diverted;

"crossing structure" means a structure designed to allow the crossing of a drainage feature. Crossing structures are bridges, causeways, and culverts;

"crown timber land" means lands for which the Forestry Commission of New South Wales has responsibility under the Forestry Act 1916, including State Forests, Flora Reserves, Timber Reserves, unoccupied Crown Lands, lands held in specified Crown tenures and Purchase tenure which have timber rights reserved;

"culvert" means one or more adjacent enclosed conduits for conveying a drainage feature underneath a road formation;

"deposition" means the laying down of solid material which has been eroded and transported from a distant part of the land surface;

"directional felling " means the felling of a tree in such a way that it falls in a pre-determined direction. This is achieved by cutting the tree at a particular angle;

"dispersibility" means the behaviour of a soil material, whereby soil aggregates break down and separate into their constituent particles in water, due to deflocculation.

"dispersion" means the process whereby soil aggregates break down and separate into their constituent particles in water, due to deflocculation;

"dispersible soils" means soils which has been classified class 2, 3 or 4 as determined using the methodology specified in Module 3 of Schedule 3 of this licence;

"disturbed area" means an area which is susceptible to erosion because the vegetative soil cover has been removed or altered. The disturbance may be accompanied by the mixing or removal of some soil horizons;

"drainage depression" means a level to gently inclined shallow, open depression with a smoothly concave cross-section, rising to moderately inclined hillslopes.

"drainage feature" means a drainage depression, drainage line, major water storage, watercourse, swamp or wetland;

"drainage line" means a channel down which surface water naturally concentrates and flows. Drainage lines exhibit one or a combination of the following features which distinguish them from drainage depressions:

- a) evidence of active erosion or deposition - e.g., gravel, pebble, rock, sand bed, scour hole, knick points; or
- b) an incised channel of more than 30 centimetres depth with defined bed and banks;

"drop-down structure" means a non-erodable channel or hydrologic structure that discharges water over a fill batter. Drop-down structures may be constructed of gabion baskets, rock mattresses, precast concrete segments, geotextiles or half round sections of plastic, corrugated or concrete pipes. An energy dissipater must be used in conjunction with a drop-down structure.

"earthworks" means mechanical soil movement and disturbance. This may include the construction, upgrading and maintenance of log dumps, roads, drainage feature crossings, snig tracks and extraction tracks;

"effective bank height" means the minimum height of a crossbank above the outlet;

"energy dissipater" means a device in the base of a channel or running water that dissipates the energy of the flow. The dissipater reduces the velocity and depth by spreading the water flow over a larger area. Energy dissipaters may be constructed from rocks, logs, steel baffles and concrete blocks;

"environmental goals" means the environmental goals referred to in condition 1 (Objects of this licence);

"EPA" means the Environment Protection Authority;

"erosion" means wearing away of the land by running water, rainfall, wind, ice or geomorphological agent, including but not limited to processes such as detachment, entrainment, suspension, transportation and mass movement, at a rate accelerated due to logging operations;

"excavator" means a tracked machine which moves earth by means of a bucket or other implement mounted on an hydraulically operated boom;

"existing roads" means roads which were in existence prior to the commencement of logging operation;

"extraction" means a route for transport of logs from the point of felling to the log dump or log landing;

"extraction track" means a track along which forwarding machinery travels;

"felling" means the process of cutting down standing trees;

"fill" means a previously excavated material that is used to raise the surface of an area to a specified level;

"filter strip" means a strip of vegetation or groundcover along each side of a watercourse or drainage line retained for the purposes of:

- a) retarding the lateral flow of runoff and facilitating its infiltration into the soil, thereby causing deposition and filtration of transported material, and reducing sediment movement into the stream; and
- b) retarding sediment movement into the stream by minimising ground disturbance which may reduce infiltration and concentrate water; and
- c) reducing the risk of erosion of the channel and bank;

"five metre zone" means the area up to five metres from the top of the bank of the incised channel of a watercourse or drainage line in a filter strip;

"forestry licence" means any licence issued by State Forests under the Forestry Act 1916 or the Forestry Regulation 1994 which authorises the holder to carry out any logging operations covered by this licence;

"forwarding" means the carrying of logs by vehicles from the point of felling to the log dump in such a manner that the logs are fully supported off the ground;

"full supply level" means the maximum level to which water is normally stored, not including any temporary surcharge due to flooding effects;

"geotextile" means a product used as a soil reinforcement agent and as a filter medium. It is made of synthetic or natural fibres manufactured in a woven or loose non-woven manner to form a blanket-like product;

"grade" means a unit of slope measured from a horizontal plane (measured in degrees);

"gravel" means a natural occurring mixture of coarse mineral particles larger than 2.0 mm and smaller than 75 mm in diameter. Gravel is placed on the surface of a road to increase the load bearing capacity of a natural surface;

"gravel pit" means a pit formed by extraction of gravel for the purposes of road construction, upgrading or maintenance;

"gross area" means the total area of land within a compartment, age class or roading area, before exclusion areas are removed (in hectares);

"groundcover" means material which covers the ground surface and has the effect of reducing erosion. Groundcover may include existing vegetation, leaf litter, tree debris, gravel, rock, straw, mulch, geotextiles, erosion control mats, jute mesh and coconut mesh;

"ground-based harvesting" means felling of trees where those trees will be extracted from the compartment or age class using:

- (a) a dozer, skidder or forwarder; or
- (b) a winch attached to a dozer or skidder.

"groundslope" means the angle of inclination of the ground surface from the horizontal expressed in degrees;

"gully" means an open incised channel with a depth of >0.3 metres and characterised by moderately to very gently inclined floor and steep walls. For the purpose of this licence, a gully is a type of drainage line;

"gully stuffer" means a type of crossing for a road or snig track or extraction track across a drainage feature. It is formed by filling the drainage feature with trees, debris, spoil, soil, rock or other material to the level of the road or track;

"harvesting" means the cutting and removal of forest products;

"haulage operations" means the removal and transport of timber products from, the point of loading within the compartment, age class or roading area by machinery or truck along a road;

"infall drainage" means a drainage method for a section of road located in steep side slope terrain where the whole surface is in-sloped against the natural surface side-slope;

"inherent soil erosion and water pollution hazard" means the potential for soil erosion and water pollution to occur in an area as a result of logging operations, and takes into account rainfall erosivity, soil erodibility (and dispersibility), slope, mass movement, existing erosion, groundcover and intensity of logging operations. Inherent soil erosion and water pollution hazard is determined in accordance with Schedule 3;

"log dam" has the same meaning as "gully stuffer";

"log dump" means areas where forest products are assembled for processing and sorting of logs prior to loading onto a truck;

"log landing" has the same meaning as "log dump";

"logging debris " means tree debris resulting from a logging operation;

"machinery" means all mechanical equipment used in the forest except chainsaws;

"major water storage" means a dam constructed for public irrigation or the supply of town water;

"mass movement" means the downslope movement greater than 10 cubic metres of soil regolith, where gravity is the primary force and where no transporting medium such as wind, flowing water, or ice are involved. The key factors which affect mass movement are slope angle, material strength, vegetal cover and site drainage. This may include, but is not limited to earth slumps, translational slides and earth flows;

"mitre drain" means a drain used to conduct runoff water from the shoulders of a road to a disposal area away from the road alignment. Often it is the extension of a table drain away from the road surface;

"mulch" means a natural or artificial layer of plant residue or other material covering the land surface that conserves moisture, holds soil in place, aids in establishing plant cover and minimises temperature fluctuations;

"natural surface road" means a road that is unsealed or not gravelled;

"net harvestable area" means the portion of a compartment or age class available for logging operations.

The net harvestable area does not include any exclusion areas within the compartment or age class;

"1994/95 licences" means the licences dated 8 August 1994 issued by the EPA to State Forests in respect of logging operations carried out on land in the Central Region, Southern Region, Northern Region, Western Region and Softwoods Region;

"1994/95 licence periods" means the periods of the licences from 8 August 1994 to 7 August 1995 inclusive;

"1995/96 licences" means the licences dated 8 August 1995 issued by the EPA to State Forests in respect of logging operations carried out on land in the Central Region, Southern Region, Northern Region, Western Region and Softwoods Region;

"1995/96 licence periods" means the periods of the licences from 8 August 1995 to 7 August 1996 inclusive;

"1996/97 licences" means the licences dated 8 August 1996 issued by the EPA to State Forests in respect of logging operations carried out on land in the Central Region, Southern Region, Northern Region, Western Region and Softwoods Region;

"1996/97 licence periods" means the periods of the licences from 8 August 1996 to 7 August 1997 inclusive;

"1997/98 licences" means the licences dated 8 August 1997 issued by the EPA to State Forests in respect of logging operations carried out on land in the Central Region, Southern Region, Northern Region, Western Region and Softwoods Region;

"1997/98 licence periods" means the periods of the licences from 8 August 1997 to 10 April 1998 inclusive;

"old roads" means roads which were in existence prior to the commencement of logging operation;

"outfall drainage" means drainage which occurs when the surface of a road, snig track or extraction track has cross slope cause water to flow across and off the surface. This flow of water is away from and not into the hillside;

"outlet" means the point at which water discharges from a:

- a) river, creek or other flowline; or
- b) lake; or
- c) tidal basin or drainage depression; or
- d) pipe, channel, dam, or other hydrologic structure;

"outrow" means a corridor of trees felled in a plantation in order to allow the passage of processing, snigging or forwarding machinery and vehicles in the performance of their functions;

"peak flow" means the maximum flow which occurs during a flood of a specified average recurrence interval. (Refer to Part C of Schedule 2 of this licence);

"permanent extraction track crossing" means a crossing or crossing structure that is retained at the completion of harvesting;

"permanent snig track crossing" means a crossing or crossing structure that is retained at the completion of harvesting;

"plantation" means a forest established by the planting of native species or exotic species and managed intensively for timber production;

"pollution" has the same meaning as in the Clean Waters Act 1970;

"post-harvest burning" means burning associated with the cutting and removal of timber which is carried out within 18 months of the timber being cut and removed;

"prescribed stream" means a river, creek, effluent or lake within the meaning of section 21B(1) of the Soil Conservation Act, 1938;

"pulplug" means logs suitable for the manufacture of reconstituted products including paper and panel board;

"rainfall erosivity" means a measure of the ability of rainfall to cause erosion;

"rehabilitate" means to return an area of land or a road or track surface to a stable condition. This may involve reshaping the land, spreading topsoil, constructing banks, revegetating or employing a combination of these;

"relief pipe" means a pipe used to direct water from a table drain and under the road;

"revegetate" means to establish an effective vegetative groundcover by either natural regeneration or sowing with a seed and fertiliser mixture;

"rill" means a form of erosion that is characterised by small channels up to 0.3 metres deep which have cut into the surface of a slope;

"road" means any route used for the vehicular access to, and the transport of logs from, the point of loading within the compartment, age class or roading area;

"road drainage" means a structure designed to direct water along, across or underneath a road, and includes catch drains, mitre drains, relief pipes, rollover banks, spoon drains, and table drains;

"road prism" means that part of the road from the inflexion point at the toe of the fill batter to the inflexion point at the top edge of the cut batter. Where there is no cut or fill batter as part of the road, then the road prism is to be taken from the outside edge of the table drain on either side of the road;

"roading area" means land which is disturbed by the construction of access roads necessary to enable or assist the cutting and removal of timber;

"rollover crossbank" means a crossbank constructed with a smooth cross-section and gentle batters, and which is well compacted to allow permanent vehicular trafficability;

"rollover drain" has the same meaning as "rollover crossbank";

"runoff" means that portion of the precipitation falling on a catchment area that flows from the catchment past a specified point;

"saprolite" means part of the weathered soil regolith profile. It is characterised by the preservation of structures that are present in the unweathered rock material;

"saturated soil" means the physical condition of a soil in which no more moisture can be absorbed or accepted. Saturated soils are subjected to compaction, rutting or displacement by machinery and vehicles;

"sawlog" means logs suitable for processing through a sawmill into solid timber products;

"sediment control measures" means a measure or practice that is used to mitigate, reduce or prevent the amount of sediment in runoff waters;

"sediment trap" means a structure designed to mitigate, reduce or prevent the amount of soil that is being transported by runoff;

"sedimentation" means the process of sediment deposition.

"SEMGL" means the "Standard Erosion Mitigation Guidelines for Logging in New South Wales" prepared by the Department of Conservation and Land Management, 5 March 1993 version;

"silt fence" means a fabric or mesh placed in the path of runoff which acts as a filter to reduce and detain sediment from runoff waters;

"slaking" means the partial breakdown of soil aggregates in water due to the swelling of clay and the expulsion of air from pore spaces.

"slash" means tree debris resulting from a logging operation;

"snig track" means a track along which snigging equipment travels;

"snigging" means the pulling of logs, either wholly on the ground or partly supported from the point of felling to the log dump. Wheeled or tracked vehicles are used for this purpose;

"soil erodibility" means the susceptibility of a soil to erosion due to rainfall and the surface runoff of water;

"soil regolith" means the mantle of the earth and soil, including rocks and sediments altered or formed by land surface processes;

"spoil" means excess soil, rock or other material excavated during logging operations;

"spoon drain" means a drain with a semi-circular cross-section and which has no associated ridge of soil. Its capacity is solely defined by the excavated channel dimensions;

"stable" means the physical condition of a parcel of land or flowline which experiences no appreciable soil erosion, or sedimentation, and is protected from erosive agents. "Stable" also means a soil conservation or hydraulic structure which is functioning effectively and is not adversely affected by erosive agents;

"stable outlet" means an outlet which is protected from erosion, up to peak discharge of water flow from a storm event of less than or equal to the design specification of the structure;

"soil stabilisation" means the provision of vegetative, structural or mechanical measures to prevent or

control erosion by providing an energy-absorbent or energy resistant barrier on the soil surface;

"State Forests licensee" means the holder of any licence issued by State Forests under the Forestry Act 1916 of the Forestry Regulation 1994 which authorises the holder to carry out any logging operation covered by this licence;

"substantial debris" means logging debris greater than 100 millimetres in diameter and three metres in length;

"swamp" has the same meaning as "wetland";

"table drain" means the side drain of a road adjacent to the shoulders of the road;

"temporary extraction track crossing" means a crossing or crossing structure that is removed at the completion of harvesting;

"temporary snig track crossing" means a crossing or crossing structure that is removed at the completion of harvesting;

"timber" means sawlog, pulplog, pole, pile or girders;

"track drainage structure" means any structure designed to direct water across an extraction track or snig track surface. These may including crossbanks, hay bales or sand bags;

"trackscavator" means a self-propelled, tracked tractor, commonly fitted with log forks, used for snigging and loading logs;

"tree" means a perennial plant with a self-supporting woody main stem or trunk which usually develops woody branches, and includes a sapling, shrub or scrub;

"toe" means the bottom intersection line of two slope planes, that is the toe of a fill is the line formed by the intersection of a fill batter with the natural ground surface;

"topsoiling" means the application of topsoil to exposed or eroded areas, including batters and earthworks, to encourage the rapid growth of vegetation over them, for the purpose of soil stabilisation against erosion.

"upgrading" means the act of improving or replacing;

"walk-over" means timber extraction or snigging without removing or unduly disturbing the existing natural groundcover; that is, where no snig track construction or blading is required or performed;

"watercourse" means a channel, having a distinct bed and banks, down which surface water flows on a permanent or semi-permanent basis;

"wetland" means 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" means an accumulation or mound of soil material on the edge of a road or snig track formed by the spillage from the edge of a blade or other similar machine during earthmoving operations;

"windthrow" means trees blown over by wind. Windthrow occurs naturally in both native forests and plantations, but often follows harvesting operations which open up the forest, allowing more wind to penetrate.

SECTION 8 - ATTACHMENTS

SCHEDULE 1	LAND (COMPARTMENTS, AGE CLASSES AND ROADING AREAS) WHICH IS THE SUBJECT OF TRANSITIONAL LOGGING OPERATIONS
SCHEDULE 2	FACTORS TO BE TAKEN INTO ACCOUNT WHEN PLANNING OPERATIONS
SCHEDULE 3	HAZARD ASSESSMENT MODEL METHODOLOGY
SCHEDULE 4	BEST MANAGEMENT PRACTICE CONDITIONS
SCHEDULE 5	ROADING CONDITIONS
SCHEDULE 6	SUMMARY OF ITEMS TO BE RECORDED BY STATE FORESTS DURING OPERATIONS
SCHEDULE 7	FORMS TO BE USED TO NOTIFY THE EPA
SCHEDULE 8	CONTACT NUMBERS AND ADDRESSES FOR EPA OFFICES
FIGURE 1	LAND WEST OF THE GREAT DIVIDING RANGE
FIGURE 2	SCHEMATIC DIAGRAM OF STREAM ORDER

SCHEDULE 1

(Conditions 5; 6; 7; 8; 14; Schedules 3 & 6)

Land (compartments, age classes and roading areas) which is the subject of transitional logging operations

- Division 1:** Land on which logging operations commenced prior to 11 April 1995.
- Division 2:** Land on which logging operations commenced on or after 11 April 1995 but prior to 11 April 1998.
- Division 3:** Land on which logging operations will commence on or after 11 April 1998 and for which a Section 17D(3) notice was issued by the EPA before 11 April 1998 against the 1997/98 licences.
- Division 4:** Land on which logging operations will commence after 11 April 1998 and for which planning of the operation had commenced in accordance with the 1997/98 licences, but for which a Section 17D(3) notice had not been issued by the EPA before 11 April 1998 against the 1997/98 licences.

Division 1: Land on which logging operations commenced prior to 11 April 1995.

Hume	Bago A	AMB69A1
Hume	Bago A	AMB71A1
Hume	Bago B	AMB0229/35BPON
Hume	Bago B	AMB0232/33/34BPON
Hume	Bago B	AMB0235B1PON
Hume	Bago B	AMB0331B1LAR
Hume	Bago B	AMB0334B2LAR
Hume	Bago B	AMB0335B2LAR
Hume	Bago B	AMB55B
Hume	Bago B	AMB62B
Hume	Bago B	AMB66B
Hume	Bago B	AMB68B1
Hume	Buccleuch	ATB60D
Hume	Buccleuch	ATB70MIN
Hume	Buccleuch	ATB71LIN
Hume	Buccleuch	ATB74Q 1N
Hume	Buccleuch	ATB83S0N
Hume	Buccleuch	ATB83Y0N
Hume	Greenhills N	AMH25N1N
Hume	Greenhills N	AMH55N3
Hume	Greenhills N	AMH72N
Hume	Greenhills N	AMH80/82N
Hume	Greenhills S	AMH80S-N0
Hume	Munderoo B	AMU81BN0
Hume	Munderoo J	AMU80J-NO
Hunter	Bulahdelah	152 plantation
Hunter	Bulahdelah	153 plantation
Hunter	Bulahdelah	154 plantation
Hunter	Bulahdelah	155 plantation
Hunter	Wang Wauk	114
Hunter	Wang Wauk	117
Hunter	Wang Wauk	137
Macquarie	Gurnang	1960
Macquarie	Jenolan	1954
Macquarie	Jenolan	1960
Macquarie	Vulcan	1931
Monaro	Penrose	1977
Monaro	Tallaganda	1969
Monaro	Tallaganda	1977
Monaro	Wingello	1975
Monaro	Wingello	SMW76A1
Northern Softwood	Barcoongere	232/1955
Northern Softwood	Barcoongere	303-308
Northern Softwood	Barcoongere	309-329
Northern Softwood	Beaury	101
Riverina	Bago	12
South Coast	Dampier	157
South Coast	Dampier	174
South Coast	Dampier	223

South Coast	Dampier	219
South Coast	Dampier	232
South Coast	Moruya	240
South East	East Boyd	184
South East	Glenbog	2331
South East	Glenbog	2339
South East	Glenbog	2376
South East	Tantawangalo	2404
South East	Yambulla	294
South East	Yambulla	303
South East	Yambulla	308
Western	Ben Bullen	417
Western	Ben Bullen	418
Western	Ben Bullen	419
Western	Warung	13

Division 2: Land on which logging operations commenced on or after 11 April 1995 but prior to 11 April 1998.

Hume	Bago A	AMB0171A
Hume	Bago A	AMBA01PLINE
Hume	Bago B	AMB0163/64B
Hume	Bago B	AMB0168-70B
Hume	Bago B	AMB0168B1
Hume	Bago B	AMB0169B
Hume	Bago B	AMB0269B1
Hume	Bago B	AMB1624B1
Hume	Bago L	AMB0161L
Hume	Bago L	AMB0163L1
Hume	Bago L	AMB0165L1
Hume	Bago L	AMB0183L1
Hume	Bago L	AMB0183P1
Hume	Bago L	AMB0184L1
Hume	Bago L	AM-R0002
Hume	Buccleuch	ATB58F3N/61F3N
Hume	Buccleuch	ATB59/60D, 62A N0
Hume	Buccleuch	ATB61G/64G MCF
Hume	Buccleuch	ATB62A (OCF/MCF)
Hume	Buccleuch	ATB63A (OCF/MCF)
Hume	Buccleuch	ATB63G_2 3N
Hume	Buccleuch	ATB64G3N
Hume	Buccleuch	ATB66T2N
Hume	Buccleuch	ATB67J2N
Hume	Buccleuch	ATB67T2N
Hume	Buccleuch	ATB68K2N
Hume	Buccleuch	ATB68M2N

Hume	Buccleuch	ATB68T2N
Hume	Buccleuch	ATB70L1N
Hume	Buccleuch	ATB71M1N
Hume	Buccleuch	ATB71N1N
Hume	Buccleuch	ATB72L1N
Hume	Buccleuch	ATB72S1N
Hume	Buccleuch	ATB73W1N
Hume	Buccleuch	ATB74N1N
Hume	Buccleuch	ATB82B0N
Hume	Buccleuch	ATB82O0N
Hume	Buccleuch	ATB83F0N
Hume	Buccleuch	ATB84O0N
Hume	Buccleuch	ATB84Y0N
Hume	Carabost K	AMA0167K1
Hume	Carabost P	AMA0182P
Hume	Carabost P	AMA0183P
Hume	Carabost R	AMA0170R4
Hume	Carabost Y	AMA0171Y
Hume	Greenhills N	1983N1
Hume	Greenhills N	1984N1
Hume	Greenhills N	AMH0160/64N
Hume	Greenhills N	AMH0162N1
Hume	Greenhills N	AMH0163N1
Hume	Greenhills N	AMH0166N2
Hume	Greenhills N	AMH0167N3
Hume	Greenhills N	AMH0182N1
Hume	Greenhills N	AMH64N3N
Hume	Greenhills N	AMH68N1/2
Hume	Greenhills N	AMH74N
Hume	Greenhills N	AMH0163N3
Hume	Greenhills S	AMH0175S1
Hume	Greenhills S	AMH0175S2
Hume	Greenhills S	AMH0176S2
Hume	Greenhills S	AMH0176S3
Hume	Mannus P	AMMPSAL
Hume	Munderoo B	AMU0183B1
Hume	Munderoo B	AMU82B
Hume	Munderoo J	AMU0165/66/67JM
Hume	Murraguldrrie	AMG0176/77W1
Hunter	Bulahdelah	144
Hunter	Bulahdelah	146
Hunter	Bulahdelah	158
Hunter	Bulahdelah	159
Hunter	Bulahdelah	160
Hunter	Chichester	44
Hunter	Chichester	45
Hunter	Chichester	46
Hunter	Chichester	47
Hunter	Chichester	53
Hunter	Chichester	54
Hunter	Chichester	57
Hunter	Chichester	58

Hunter	Chichester	10 part
Hunter	Chichester	22 part
Hunter	Chichester	23 part
Hunter	Heaton	239
Hunter	Masseys Creek	117
Hunter	Masseys Creek	173
Hunter	Masseys Creek	174
Hunter	Myall River	25
Hunter	Myall River	26
Hunter	Myall River	30
Hunter	Myall River	40
Hunter	Myall River	53
Hunter	Myall River	55
Hunter	Myall River	56
Hunter	Nerong	103
Hunter	Olney	20
Hunter	Olney	21
Hunter	Olney	33
Hunter	Olney	40
Hunter	Olney	41
Hunter	Ourimbah	140
Hunter	Ourimbah	142
Hunter	Wallingat	205
Macleay Hastings	Ballengarra	78
Macleay Hastings	Ballengarra	79
Macleay Hastings	Ballengarra	81
Macleay Hastings	Ballengarra	82
Macleay Hastings	Boonanghi	27
Macleay Hastings	Boonanghi	28
Macleay Hastings	Boonanghi	29
Macleay Hastings	Boonanghi	30
Macleay Hastings	Boonanghi	31
Macleay Hastings	Burrawan	8
Macleay Hastings	Burrawan	23
Macleay Hastings	Cairncross	7
Macleay Hastings	Cairncross	8
Macleay Hastings	Cairncross	12
Macleay Hastings	Cairncross	13
Macleay Hastings	Cairncross	14
Macleay Hastings	Cairncross	15
Macleay Hastings	Cairncross	16
Macleay Hastings	Cairncross	27
Macleay Hastings	Cairncross	28
Macleay Hastings	Cairncross	29
Macleay Hastings	Kerewong	115
Macleay Hastings	Kerewong	133
Macleay Hastings	Kerewong	138
Macleay Hastings	Middle Brother	231
Macleay Hastings	Middle Brother	233
Macleay Hastings	Tamban	70
Macleay Hastings	Yessabah	27
Macleay Hastings	Yessabah	28

Macleay Hastings	Yessabah	29
Macleay Hastings	Yessabah	30
Macleay Hastings	Yessabah	31
Macquarie	Canobolas	1959
Macquarie	Canobolas	1960
Macquarie	Canobolas	1960
Macquarie	Canobolas	1961
Macquarie	Canobolas	1984
Macquarie	Glenwood	1960
Macquarie	Glenwood	1961
Macquarie	Glenwood	1962
Macquarie	Glenwood	1963
Macquarie	Gurnang	1962
Macquarie	Gurnang	1963
Macquarie	Gurnang	1964
Macquarie	Gurnang	1975
Macquarie	Gurnang	1979A
Macquarie	Gurnang	1979B
Macquarie	Gurnang	1980A
Macquarie	Gurnang	1980B
Macquarie	Jenolan	1949
Macquarie	Jenolan	1952
Macquarie	Jenolan	1953
Macquarie	Jenolan	1957
Macquarie	Jenolan	1958
Macquarie	Jenolan	1967
Macquarie	Jenolan	1953/1954
Macquarie	Jenolan	1961A
Macquarie	Jenolan	1961B
Macquarie	Jenolan	1961C
Macquarie	Lidsdale	1935
Macquarie	Lidsdale	1958
Macquarie	Mount David	1986
Macquarie	Newnes	1952
Macquarie	Sunny Corner	1961
Macquarie	Sunny Corner	1962
Macquarie	Sunny Corner	1963
Macquarie	Sunny Corner	1964
Macquarie	Sunny Corner	1968
Macquarie	Sunny Corner	1979
Macquarie	Sunny Corner	1980
Macquarie	Sunny Corner	1981
Macquarie	Vulcan	1932
Macquarie	Vulcan	1959
Macquarie	Vulcan	1963
Macquarie	Vulcan	1964
Macquarie	Vulcan	1965
Macquarie	Vulcan	1966
Macquarie	Vulcan	1971
Macquarie	Vulcan	1972
Macquarie	Vulcan	1966/1967
Macquarie	Vulcan	1969A

Macquarie	Vulcan	AOV0166*B2n*
Manning	Bowman	24
Manning	Bowman	25
Manning	Bulga	93
Manning	Bulga	94
Manning	Bulga	153
Manning	CL Res no. 44172	
Manning	Comboyne	153
Manning	Coopernook	211
Manning	Doyles River	194
Manning	Doyles River	195
Manning	Doyles River	201
Manning	Enfield	40
Manning	Enfield	53
Manning	Enfield	176
Manning	Enfield	177
Manning	Giro	5
Manning	Lansdowne	168
Manning	Lansdowne	169
Manning	Lansdowne	170
Manning	Lansdowne	171
Manning	Lansdowne	192
Manning	Lansdowne	193
Manning	Lansdowne	194
Manning	Lansdowne	195
Manning	Lansdowne	196
Manning	Lansdowne	197
Manning	Lansdowne	198
Manning	Mernot	2
Manning	Mernot	4
Manning	Mernot	8
Manning	Mernot	10
Manning	Mernot	11
Manning	Stewarts Brook	25
Manning	Stewarts Brook	27
Manning	Stewarts Brook	28
Manning	Stewarts Brook	29
Manning	Stewarts Brook	30
Manning	Stewarts Brook	24 part
Manning	Stewarts Brook	26 part
Manning	Styx River	24
Manning	Styx River	39
Manning	Styx River	40
Manning	Styx River	43
Manning	Styx River	48
Manning	Styx River	49
Manning	Tuggolo	282
Manning	Tuggolo	283
Manning	Tuggolo	285
Manning	Tuggolo	435
Manning	Tuggolo	436
Manning	Yarratt	74

Manning	Yarratt	75
Manning	Yarratt	76
Manning	Yarratt	77
Manning	Yarratt	79
Mid North Coast	Bagawa	775
Mid North Coast	Boundary Creek	247
Mid North Coast	Boundary Creek	249
Mid North Coast	Boundary Creek	250
Mid North Coast	Boundary Creek	260
Mid North Coast	Boundary Creek	261
Mid North Coast	Boundary Creek	262
Mid North Coast	Chaelundi	175
Mid North Coast	Chaelundi	182
Mid North Coast	Conglomerate	511
Mid North Coast	Conglomerate	527
Mid North Coast	Conglomerate	528
Mid North Coast	Divines	81
Mid North Coast	Divines	83
Mid North Coast	Ellis	51
Mid North Coast	Ellis	54
Mid North Coast	Ellis	198
Mid North Coast	Ellis	199
Mid North Coast	Ellis	201
Mid North Coast	Ingalba	434
Mid North Coast	Ingalba	436
Mid North Coast	Ingalba	479 plantation
Mid North Coast	Ingalba	480 plantation
Mid North Coast	Lower Bucca	595
Mid North Coast	Lower Bucca	598
Mid North Coast	Mistake	343
Mid North Coast	Mistake	344
Mid North Coast	Nambucca	317
Mid North Coast	Nambucca	318
Mid North Coast	Nambucca	319
Mid North Coast	Nambucca	320
Mid North Coast	Nambucca	321
Mid North Coast	Newry	294
Mid North Coast	Newry	295
Mid North Coast	Newry	296
Mid North Coast	Newry	297
Mid North Coast	Oakes	404
Mid North Coast	Orara East	561
Mid North Coast	Orara East	562
Mid North Coast	Orara East	565
Mid North Coast	Orara East	632
Mid North Coast	Tuckers Nob	81
Mid North Coast	Tuckers Nob	82
Mid North Coast	Way Way	481
Mid North Coast	Way Way	482
Mid North Coast	Way Way	492
Mid North Coast	Wild Cattle Creek	520
Mid North Coast	Wild Cattle Creek	521

Mid North Coast	Wild Cattle Creek	part 535 plantation
Mid North Coast	Wild Cattle Creek	556 plantation
Mid North Coast	Wild Cattle Creek	557 plantation
Mid North Coast	Wild Cattle Creek	part 549 plantation
Mid North Coast	Wild Cattle Creek	part 551 plantation
Mid North Coast	Wild Cattle Creek	part 552 plantation
Mid North Coast	Wild Cattle Creek	part 555 plantation
Mid North Coast	Wild Cattle Creek	part 558 plantation
Mid North Coast	Wild Cattle Creek	part 559 plantation
Monaro	Bondi	SBB0168*A0N*
Monaro	Bondi	SBB0181*S1N*
Monaro	Bondi	SBR0180-83*A0N*
Monaro	Coolangubra	SBC0173*A0N*
Monaro	Coolangubra	SBC0173*A1N*
Monaro	Cragie	SBD0175KD1N
Monaro	Meryla	SMM79A1
Monaro	Nalbaugh	SBN0176-78*A0N*
Monaro	Nalbaugh	SBN0N33XNC
Monaro	Penrose	SMP69A2
Monaro	Penrose	SMPA67B
Monaro	Penrose	SMPA67C
Monaro	Penrose	SMPA67E
Monaro	Penrose	SMPA68B2
Monaro	Pericoe	SBP0179KP1
Monaro	Tallaganda	SQT0168B97
Monaro	Tallaganda	SQT0175A97
Monaro	Wingello	SMW65AB9/3
Northern Rivers	Bookookoorara	163
Northern Rivers	Bookookoorara	164
Northern Rivers	Brothers	94
Northern Rivers	Brothers	95
Northern Rivers	Camira	75
Northern Rivers	Ewingar	604
Northern Rivers	Ewingar	605
Northern Rivers	Ewingar	606
Northern Rivers	Ewingar	607
Northern Rivers	Ewingar	608
Northern Rivers	Ewingar	661
Northern Rivers	Gibberagee	117
Northern Rivers	Gibberagee	118
Northern Rivers	Gibberagee	125
Northern Rivers	Gibberagee	126
Northern Rivers	Girard	40
Northern Rivers	Girard	41
Northern Rivers	Girard	42
Northern Rivers	Girard	44
Northern Rivers	Girard	45
Northern Rivers	Mebbin	1
Northern Rivers	Mebbin	2
Northern Rivers	Mt Belmore	399
Northern Rivers	Mt Belmore	406
Northern Rivers	Washpool	718

Northern Rivers	Washpool	719
Northern Rivers	Washpool	720
Northern Rivers	Washpool	721
Northern Rivers	Yabba	286
Northern Softwood	Banyabba	21/2,22/1,19,22,23,24
Northern Softwood	Banyabba	3-9,12,23
Northern Softwood	Beaury	102-104
Northern Softwood	Beaury	105-111
Northern Softwood	Beaury	1-4.
Northern Softwood	Clouds Creek	34
Northern Softwood	Clouds Creek	1-Apr
Northern Softwood	Clouds Creek	22,28,35,38-41
Northern Softwood	Clouds Creek	29,31
Northern Softwood	Clouds Creek	5-12,14-18,24,26,27
Northern Softwood	Koorelah	204
Northern Softwood	Koorelah	205
Northern Softwood	Koorelah	210
Northern Softwood	Koorelah	211
Northern Softwood	Mt. Mitchell	1-6,15-17
Northern Softwood	Mt. Mitchell	18pt,20pt,23,24pt
Northern Softwood	Mt. Mitchell	30-34,36,37
Northern Softwood	Mt. Mitchell	40,43
Northern Softwood	Mt. Mitchell	44,46,47
Northern Softwood	Pikapene	421-427
Northern Softwood	Toonumbar	305-309,314-316
Northern Softwood	Whiporie	157,158
Northern Softwood	Whiporie	148,164,170,177
Northern Softwood	Whiporie	104,126,127,149,150
Northern Softwood	Whiporie	120/2,121
Northern Softwood	Whiporie	144-147,151,152,156
Northern Softwood	Whiporie	175,176,195-200
Northern Softwood	Wild Cattle Creek	113
Northern Softwood	Wild Cattle Creek	105pt,110,111pt,112
Northern Softwood	Wild Cattle Creek	109/4
Riverina	Bago	65
Riverina	Bago	88
Riverina	Bago	89
Riverina	Bago	90
Riverina	Bago	91
Riverina	Buccluch	8020
Riverina	Buccluch	8021
Riverina	Buccluch	8022
Riverina	Buccluch	8059
South Coast	Bodalla	10
South Coast	Bodalla	38
South Coast	Bodalla	50
South Coast	Bodalla	51
South Coast	Bodalla	52
South Coast	Bolaro	242
South Coast	Bolaro	243
South Coast	Currowan	528
South Coast	Dampier	102

South Coast	Dampier	103
South Coast	Dampier	178
South Coast	Dampier	229
South Coast	Dampier	143
South Coast	Meryla	271
South Coast	Meryla	272
South Coast	North Brooman	42
South Coast	North Brooman	46
South Coast	North Brooman	47
South Coast	Tallaganda	209
South Coast	Tallaganda	210
South Coast	Tallaganda	436
South Coast	Tallaganda	459
South Coast	Tallaganda	463
South Coast	Tallaganda	472
South Coast	Tallaganda	473
South Coast	Tallaganda	422N
South Coast	Tallaganda	422S
South Coast	Wandella	287
South Coast	Wandella	289
South Coast	Wandella	297
South Coast	Wandella	298
South Coast	Wandella	299
South East	Bruces Creek/Nadgee	106
South East	East Boyd	4
South East	East Boyd	6
South East	East Boyd	7
South East	East Boyd	18
South East	East Boyd	19
South East	East Boyd	20
South East	East Boyd	32
South East	East Boyd	174
South East	East Boyd	175
South East	East Boyd	176
South East	East Boyd	180
South East	East Boyd	181
South East	East Boyd	182
South East	East Boyd	192
South East	East Boyd	195
South East	East Boyd	201
South East	East Boyd	202
South East	East Boyd	203
South East	East Boyd	204
South East	East Boyd	205
South East	East Boyd	207
South East	East Boyd/Timbillica	218
South East	Glenbog	2301
South East	Glenbog	2330
South East	Glenbog	2338
South East	Glenbog	2343
South East	Glenbog	2345
South East	Glenbog	2351

South East	Gnupa	731
South East	Gnupa	732
South East	Nadgee	142
South East	Nadgee	160
South East	Nadgee	164
South East	Nalbaugh	1309
South East	Nullica	659
South East	Nullica	661
South East	Nullica	664
South East	Nullica	666
South East	Tanatawangalo	2403
South East	Tantawangalo	2426
South East	Tantawangalo	2427
South East	Tantawangalo	2430
South East	Tantawangalo	2431
South East	Timbillica	219
South East	Timbillica	226
South East	Timbillica	234
South East	Timbillica	235
South East	Timbillica	236
South East	Timbillica	241
South East	Timbillica	242
South East	Timbillica	247
South East	Yambulla	258
South East	Yambulla	260
South East	Yambulla	261
South East	Yambulla	262
South East	Yambulla	263
South East	Yambulla	271
South East	Yambulla	278
South East	Yambulla	282
South East	Yambulla	289
South East	Yambulla	290
South East	Yambulla	291
South East	Yambulla	292
South East	Yambulla	293
South East	Yambulla	295
South East	Yambulla	299
South East	Yambulla	300
South East	Yambulla	304
South East	Yambulla	306
South East	Yambulla	315
South East	Yambulla	334
South East	Yambulla	336
South East	Yambulla	338
South East	Yambulla	342
South East	Yambulla	343
South East	Yambulla	344
South East	Yambulla	346
South East	Yambulla	353
South East	Yambulla	354
South East	Yambulla	356

South East	Yambulla	359
South East	Yambulla	361
South East	Yambulla	362
South East	Yambulla	363
South East	Yambulla	364
South East	Yambulla	369
South East	Yambulla	563
South East	Yambulla	566
South East	Yambulla/Nungatta	454
South East	Yurammie	990
South East	Yurammie	991
Western	Newnes	301
Western	Newnes	302
Western	Newnes	304
Western	Newnes	326
Western	Newnes	327

Division 3 Land on which logging operations will commence on or after 11 April 1998 and for which a Section 17D(3) notice was issued by the EPA before 11 April 1998 against the 1997/98 licences

Hume	Buccleuch	ATB64/66/67T N0
Hume	Greenhills N	AMH0167N1/N2
Hunter	Ourimbah	138
Hunter	Ourimbah	139
Hunter	Ourimbah	141
Hunter	Ourimbah	149
Hunter	Ourimbah	150
Macleay Hastings	Bulls Ground	59
Macleay Hastings	Bulls Ground	60
Macleay Hastings	Bulls Ground	61
Macquarie	Gurnang	1981
Macquarie	Gurnang	1978C
Macquarie	Newnes	1976
Macquarie	Newnes	1977
Macquarie	Newnes	1978
Macquarie	Newnes	1979
Manning	Nowendoc	220
Manning	Nowendoc	221
Manning	Stewarts Brook	35
Manning	Stewarts Brook	39
Manning	Stewarts Brook	40
Manning	Stewarts Brook	41
Manning	Stewarts Brook	42
Manning	Stewarts Brook	69
Manning	Stewarts Brook	24 part
Manning	Stewarts Brook	26 part
Mid North Coast	Bagawa	776
Mid North Coast	Ellis	55
Mid North Coast	Lower Bucca	599
Monaro	Bondi	SBB0176*A0N*
Monaro	Coolangubra	SBC0178*A0N*
Monaro	Nalbaugh	SBN0179*A0N*
Northern Rivers	Billilimbra	665
Northern Rivers	Billilimbra	666
Northern Rivers	Billilimbra	678
Northern Rivers	Billilimbra	679
Northern Rivers	Billimbra	667
Northern Rivers	Brothers	89
Northern Rivers	Brothers	90
Northern Rivers	Brothers	96
Northern Rivers	Ewingar	637
Northern Rivers	Ewingar	656
Northern Rivers	Ewingar	660
Northern Rivers	Ewingar	668
Northern Rivers	Gibberagee	115

Northern Rivers	Gibberagee	120
Northern Rivers	Gibberagee	121
Northern Rivers	Gibberagee	122
Northern Rivers	Gibberagee	123
Northern Rivers	Gilbraltar Range	66
Northern Rivers	Gilbraltar Range	68
Northern Rivers	Gilbraltar Range	71
Northern Rivers	Gilbraltar Range	71
Northern Rivers	Gilbraltar Range	73
Northern Rivers	Mt Belmore	442
Northern Rivers	Whian Whian	75
Northern Rivers	Whian Whian	77
Northern Rivers	Yabbra	196
Northern Rivers	Yabbra	199
Northern Softwood	Armidale	Jan-13
Northern Softwood	Gibberagee	301-310
Northern Softwood	Koorelah	214-215
Northern Softwood	Mebbin	Jan-17
Northern Softwood	Toonumbar	318
Northern Softwood	Toonumbar	309/2,3
Northern Softwood	Toonumbar	GMA308-2
Northern Softwood	Yabbra	713-715,718,720
South Coast	Bodalla	54
South Coast	Bodalla	93
South Coast	Bodalla	97
South Coast	Dampier	179
South Coast	Moruya	192

Division 4 Land on which logging operations will commence after 11 April 1998 and for which planning of the operation had commenced in accordance with the 1997/98 licences, but for which a Section 17D(3) notice has not been issued by the EPA before 11 April 1998 against the 1997/98 licences.

Hume	Bago A	AMB0170A
Hume	Bago A	AMB0174A
Hume	Carabost L	AMA0163L
Hume	Buccleuch	ATB64T2N
Hume	Buccleuch	ATB65G3N
Hume	Buccleuch	ATB85Y0N
Hunter	Myall River	17
Hunter	Myall River	18
Hunter	Myall River	19
Hunter	Myall River	20
Hunter	Myall River	21
Hunter	Myall River	45 plantation
Hunter	Myall River	46 plantation
Hunter	Masseys Creek	115
Hunter	Masseys Creek	116
Hunter	Masseys Creek	118
Hunter	Pokolbin	325
Hunter	Pokolbin	336
Hunter	Olney	24
Hunter	Olney	71
Hunter	Olney	73
Hunter	Olney	87
Hunter	Olney	88
Hunter	Watagan	6
Hunter	Watagan	8
Macleay Hastings	Middle Brother	228
Macleay Hastings	Middle Brother	247
Macleay Hastings	Mount Boss	45
Macleay Hastings	Mount Boss	46
Macleay Hastings	Mount Boss	47
Macquarie	Mullions Range	AMB62X01
Macquarie	Lidsdale	ABL0181X00
Manning	Mernot	1

Manning	Mernot	3
Manning	Mernot	5
Manning	Mernot	7
Manning	Mernot	12
Manning	Mernot	13
Manning	Mernot	18
Manning	Doyles River	276
Manning	Doyles River	278
Manning	Comboyne	Issacs Road
Manning	Enfield	297
Manning	Riamukka	168
Manning	Riamukka	169
Manning	Riamukka	173
Manning	Dingo	102
Manning	Dingo	103
Manning	Styx River	64
Manning	Styx River	65
Manning	Styx River	66
Mid North Coast	Conglomerate	512
Mid North Coast	Conglomerate	513
Mid North Coast	Conglomerate	521
Mid North Coast	Lower Bucca	596
Mid North Coast	Lower Bucca	600
Mid North Coast	Orara East	633
Mid North Coast	Buckra Bendinni	384
Mid North Coast	Buckra Bendinni	385
Mid North Coast	Buckra Bendinni	386
Mid North Coast	Boundary Creek	257
Mid North Coast	Boundary Creek	258
Mid North Coast	Boundary Creek	251
Mid North Coast	Boundary Creek	252
Mid North Coast	Clouds Creek	67
Mid North Coast	Clouds Creek	68
Mid North Coast	Clouds Creek	69
Mid North Coast	Clouds Creek	70
Mid North Coast	Clouds Creek	152
Mid North Coast	Clouds Creek	159
Mid North Coast	Clouds Creek	160
Mid North Coast	Clouds Creek	139
Mid North Coast	Clouds Creek	140
Mid North Coast	Clouds Creek	141
Mid North Coast	Clouds Creek	164

Mid North Coast	Clouds Creek	165
Mid North Coast	Irishman	210
Mid North Coast	Kangaroo River	232
Mid North Coast	Kangaroo River	209
Mid North Coast	Kangaroo River	210
Mid North Coast	Kangaroo River	212
Mid North Coast	Gladstone	224
Mid North Coast	Gladstone	229
Mid North Coast	Gladstone	230
Mid North Coast	Gladstone	233
Northern Softwood	Eden Creek	601-616
Northern Softwood	Pikapene	407, 412-415
Northern Softwood	Pikapene	428-439
Northern Softwood	Wild Cattle Creek	101,102pt,103,104pt
Northern Softwood	Wild Cattle Creek	106,108pt,109pt
Northern Softwood	Wild Cattle Creek	114pt,116
Northern Softwood	Mt. Mitchell	19,21,22,28
Northern Softwood	Mt. Mitchell	41-43,45
Northern Softwood	Mt. Mitchell	48-64
Northern Softwood	Koorelah	208,209
Northern Rivers	Ewingar	625
Northern Rivers	Ewingar	626
Northern Rivers	Ewingar	627
Northern Rivers	Ewingar	628
Northern Rivers	Mt Belmore	412
Northern Rivers	Mt Belmore	415
Northern Rivers	Mt Belmore	416
Northern Rivers	Mt Belmore	414
Northern Rivers	Mt Belmore	417
Northern Rivers	Mt Belmore	418
Northern Rivers	Boorook	95
Northern Rivers	Boorook	96
South Coast	Wandella	Duckhole Rd
South East	Glenbog	2352 (thin)
South East	Glenbog	2353 (thin)
South East	Glenbog	2338 (thin)
South East	Glenbog	2351 (thin)
South East	Timbillica	253
South East	Timbillica	254
South East	Timbillica	255

SCHEDULE 2

(Conditions 25; 31; 33; Schedules 3, 4 & 7)

Part A: Information to be assessed during the pre-operational planning and assessment of logging or roading operations

The following environmental and operational factors must be assessed by State Forests during the planning of logging operations in each compartment, age class or roading area, as required by conditions 25, 31 and 33 of this licence. State Forests must be able to demonstrate the manner in which the relevant factors were considered during the pre-operational planning process, and must identify special site-specific conditions to mitigate against water pollution associated with logging operations. This planning documentation, including the special site-specific conditions that have been developed to mitigate against water pollution must be kept on file in the Regional Office.

ENVIRONMENTAL FEATURES

A. Climate

- A1. rainfall characteristics for the proposed area of operations, including average annual rainfall and distribution;
- A2. temperature range, including maxima and minima; and
- A3. annual rainfall erosivity and maximum monthly rainfall erosivity values.

B. Geology

- B1. dominant rock types (occurrence and distribution);
- B2. bedding planes.

C. Soil Regolith

- C1. distribution of soil regolith types;
- C2. soil regolith characteristics;
- C3. nutrient status of the soil regolith;
- C4. presence and distribution of dispersible soils materials; and
- C5. location of soil or regolith boundaries (mapped at the same scale as the operational map).

D. Landform

- D1. total area (ha) for each of the slope classes as specified in the inherent hazard matrices in module 1 of Schedule 3;
- D2. aspect;
- D3. rockiness and rock outcrops;
- D4. mass movement or areas of potential mass movement hazard (occurrence and distribution marked on a map at the same scale as the operational map) as determined in accordance with module 2 of Schedule 3;
- D5. areas of inherent hazard level 4;
- D6. form, extent and location of any historical or existing erosion;
 - gully erosion
 - sheet and rill erosion
- D7. topographic position.

E. Hydrology

- E1. location of drainage lines, watercourses, swamps and wetland;
- E2. drainage pattern and density;
- E3. stream order as determined according to the methodology specified in part B of this Schedule;
- E4. stability of drainage lines and watercourses;
- E5. catchments to which drainage features within the compartment, age class or roading area flow, including the delineation of catchment boundaries.
- E6. logging operations which were carried out in the last two years or are proposed to occur in the next two years in the catchment (both immediate and larger catchments). This must be documented on a map by locating the compartments and age classes and indicating the type of logging operations that occurred or are proposed to occur.

F. Vegetation and ground cover management

- F1. forest type;
- F2. condition of existing vegetation and ground cover
 - forest litter,
 - existing logging slash,
 - seasonal conditions; and
 - impacts by recent fires.

OPERATIONAL SYSTEMS

G. New road construction (including major realignment work)

- G1. length of new road to be constructed;
- G2. maximum width of road prism;
- G3. maximum width of clearing on either side of road prism;
- G4. maximum ground slope of land to be used for road construction;
- G5. maximum site-specific road grade;
- G6. length of road which will exceed 10 degrees;
- G7. distance between road drainage structures for roads that exceed 10 degrees grade;
- G8. spacing of road drainage structures to be installed;
- G9. type of sediment trapping or soil erosion and sediment control devices to be used during road construction;
- G10. maximum height of cut and fill batters to be constructed;
- G11. maximum length of cut and fill batters to be constructed;
- G12. type of drop-down structures and dissipators to be used over fill batters;
- G13. site-specific design and stabilisation techniques to be used on any roading to be constructed on ground slopes exceeding 30 degrees;
- G14. site-specific design and soil stabilisation techniques to be used on any roading to be constructed on areas that, or are likely to have a mass movement hazard;
- G15. site-specific details for the disposal of dispersible spoil material from road construction;
- G16. site-specific soil stabilisation techniques of disturbed areas;
- G17. site-specific soil erosion and sediment control techniques;
- G18. stabilisation assessment intervals; and
- G19. proximity of road to nearest drainage feature;

H. Existing roads

- H1. form, extent and location of any historical or existing erosion;
- H2. total length of existing roads to be used in logging operations, including the length of roads which are passable and not passable prior to logging operations;
- H3. length of roads to be re-opened (reshaped/reformed);
- H4. length of road to be gravelled;
- H5. length of existing road to subject to maintenance works prior to operations;
- H6. type of road maintenance;
- H7. maximum width of existing running surface;
- H8. maximum width of clearing on either side of the road prism;
- H9. maximum road grade;
- H10. maximum ground slope on existing roads;
- H11. type of road drainage structures;
- H12. spacing of existing road drainage structures;
- H13. maximum height of cut and fill batters;
- H14. maximum length of cut and fill batters;
- H15. condition of existing cut and fill batters;
- H16. condition of existing drop-down structures;
- H17. site-specific stabilisation techniques to be used on any road on ground slope exceeding 30 degrees;
- H18. site-specific design and stabilisation techniques to be used on roads constructed on areas that, or are likely to have a mass movement hazard;
- H19. site-specific soil erosion and sediment control techniques;
- H20. future plans for the road (ie roads to be retained or closed);
- H21. site-specific details on roads to be re-opened:
 - level of disturbance on cut and fill batters;
 - length of road re-alignment;
 - lowering of road grade; and
 - placement/disposal of spoil material.

I. Construction of new drainage feature crossings

- I1. types of drainage feature crossings;
- I2. location of drainage feature crossings to be constructed (shown on operational map);
- I3. maximum width of drainage feature crossings including areas adjacent to crossings that will be disturbed by construction activities;
- I4. site-specific techniques to be used to prevent the deposition of spoil material into the drainage feature during construction (including sediment control structures);
- I5. approach reforming to be undertaken:
 - road drainage within 30 metres of the drainage feature;
 - distance to nearest drainage structures from the drainage feature;
 - outlet control of nearest drainage structure; and
 - table-drain checking devices;
- I6. reshaping of the bed and banks that will be required;
- I7. site-specific soil stabilisation techniques within 20 metres of drainage feature crossing;
- I8. permanence of water flow;
- I9. site-specific techniques to provide temporary protection of construction area from approach drainage;
- I10. site-specific soil erosion and sediment control techniques; and
- I11. site-specific techniques to dispose of excess spoil material.

Culvert

- I12. method by which culverts will be removed;
- I13. site-specific techniques to be used to prevent spoil entering the drainage feature when removing culverts;
- I14. site-specific techniques to be used to stabilise fill material around inlets and outlets of pipes;
- I15. site-specific techniques to be used to stabilise outlet discharge areas; and
- I16. site-specific techniques to be used to prevent road pavement material from entering the drainage feature.

Bridge

- I17. site-specific techniques to be used to stabilise the banks from table drain discharge; and
- I18. site-specific techniques to be used to prevent road pavement material from entering the drainage feature.

Causeway

- I19. site-specific techniques to be used to protect the bed and banks of the drainage feature

J. Existing Drainage Feature Crossings

- J1. type of existing drainage feature crossings;
- J2. location of existing drainage feature crossings (shown on operational map)
- J3. approach reforming to be undertaken:
 - road drainage within 30 metres of the drainage feature;
 - distance to nearest drainage structures from the drainage feature;
 - distance to nearest drainage structures;
 - outlet control of nearest drainage structure;
 - table-drain checking devices;
- J4. type of pavement surface to be used on the drainage feature crossing.
- J5. reshaping of the bed and banks that will be required;
- J6. site-specific soil stabilisation techniques within 20 metres of drainage feature crossing;
- J7. site-specific soil erosion and sediment control techniques; and
- J8. site-specific techniques to dispose of excess spoil material.

Existing culvert crossings

- J9. method by which existing culverts will be removed;
- J10. site-specific techniques to be used to prevent spoil entering the drainage feature when removing culverts;
- J11. site-specific techniques to be used to stabilise fill material around inlets and outlets of pipes;
- J12. site-specific techniques to be used to stabilise outlet discharge areas; and
- J13. site-specific techniques to be used to prevent road pavement material from entering the drainage feature.

Existing bridges crossings

- J14. site-specific techniques to be used to stabilise the banks from table drain discharge; and
- J15. site-specific techniques to be used to prevent road pavement material from entering the drainage feature.

Existing causeway crossings

- J16. site-specific techniques to be used to protect the bed and banks of the drainage feature;
- J17. type and stability of running surface on causeway crossings.

K. Borrow Pits & Gravel Pits

- K1. location of borrow pits or gravel pits
- K2. site-specific techniques to stabilise borrow pits or gravel pits
- K3. proximity of borrow pits or gravel pits to drainage features
- K4. site-specific techniques to drain borrow pits or gravel pits

L. Harvesting Factors

- L1. volume per hectare to be removed;
- L2. gross area of the compartment, age class or roading areas (hectares)
- L3. net available area of the compartment, age class or roading areas (hectares);
- L4. net harvestable area of the compartment, age class or roading areas (hectares);
- L5. per cent canopy retention;
- L6. felling method (manual or machine);
- L7. extraction method (eg crawler tractor, wheeled skidder, forwarder, etc);
- L8. areas within the compartment or age class where ground based harvesting must not occur;
- L9. seasonality restrictions on logging operations as specified in module 4 of Schedule 3 of this licence.

M. Log Dumps & Log Landings

- M1. location of log dumps;
- M2. location along roads where log landings are not permitted (if applicable);
- M3. loading method.

N. Post-logging Burning

- N1. seasonal timing of the burn;
- N2. method of ignition.

State Forests must assess the interaction of the attributes listed above. The interpretation process must concentrate on those factors most relevant to mitigating soil erosion and water pollution associated with the proposed logging operation. Operational and environmental factors that must be considered:

- inherent soil erosion and water pollution hazard;
- periods of high rainfall erosivity;
- season of poorest ground cover recovery;
- rock bedding planes limiting side-cut roads and side-cut snig track construction;
- mass movement hazard;
- rocky outcrops;
- dispersible soils;
- areas of inherent hazard level 4;
- extraction method;
- sensitive areas; and
- soil compaction.

State Forests must develop site-specific conditions for the each compartment, age class or roading area, following the above site-specific assessment. Special site-specific conditions must deal with:

- crossing of drainage features by roads;
- crossing of drainage features by snig tracks and extraction tracks;
- roading construction, upgrading and maintenance operations;
- road drainage within 30 metres of drainage feature crossings;
- ground cover management for soil erosion and sediment control;
- filter strips and buffer strips;
- snig or timber extraction tracks;
- log dumps and log landings;
- borrow pits and gravel pits;
- soil stabilisation techniques;
- seasonality restrictions;
- soil erosion and sediment controls; and
- post-harvest burning.

Part B: Determination of Stream Order for Drainage Feature Protection

The determination of stream order must be undertaken by State Forests during the pre-operational planning of logging operations in each compartment, age class or roading area, as required by condition 7 of Schedule 4 of this licence. Stream order must be determined according to the methodology outlined below.

1. A first order stream is defined as that part of a drainage system between its point of origin and the first junction with another stream. A second order stream commences at the junction of two first order streams. A third order system commences at the junction of two second order streams. A schematic diagram of stream order is provided in Figure 2 of this licence.
2. Downstream from the junction of two streams of different stream order, the higher stream order is maintained.
3. The determination of stream order must commence from the catchment boundary, even if that is outside the compartment, age class or roading area.
4. For the purpose of this licence, all streams that have a stream order greater than third order must be given, as a minimum, the same level of drainage feature protection as third order streams.
5. Stream order must be derived from the drainage network provided on the relevant topographic map(s) for the proposed compartment, age class or roading area, from a 1:25 000 map sheet produced by the Land Information Centre (formerly the Central Mapping Authority). Where a 1:25 000 topographic map sheet is not available for the compartment, age class or roading area, then the best available scale map sheet produced by the Land Information Centre must be used.

Part C: Design Methods for Crossing and Drainage Structures

1. Design of bridges, culverts and causeways

Design calculations used to determine the peak discharge for the specified recurrence intervals relating to the design of bridges, causeways or culverts, must be undertaken in accordance with the "Modified McArthur rational method" as specified in the State Forests' roading manual (Forestry Commission, 1983). This design methodology must only be applied to catchments less than 1000 hectares.

Where State Forests chooses to use an alternative method for calculating the peak discharge for the specified recurrence intervals required by this licence for bridges, causeways or culverts, State Forests must have the prior written approval of the EPA.

2. Design of road and snig track drainage structures

Design calculations used to determine the design capacity for the specified recurrence interval relating to road and snig/extraction track drainage structures must be undertaken in accordance with the following methodology:

The design calculation to determine the capacity of road and snig/extraction track drainage structures is a two stage calculation.

- i) Determine the peak discharge (Q) using the "Rational Method" described in Australian Rainfall and Runoff (1987, page 293). The rational method uses the equation:

$$Q = C.I.A/360 \quad \dots(1)$$

where

Q = peak discharge (cubic metres/second)

C = runoff coefficient (set at 0.85)

I = rainfall intensity (mm/hr)

A = catchment area (ha)

Note: The rainfall intensity (I) factor to be used in this equation must be derived using the "Kinematic Wave Equation" provided in Australian Rainfall and Runoff (1987, page 300).

- ii) Once the peak discharge (Q) has been calculated, State Forests must use the "Vee-Notch Weir Equation" (King, 1954) to determine the minimum depth of water flow in the drainage structure. The "Vee-Notch Weir Equation" is provided in equation 2:

$$d = 55Q^{0.04} \quad \dots(2)$$

where

Q = peak discharge (cubic metres/second)

d = depth of flow (mm)

Where State Forests chooses to use an alternative method for calculating the peak discharge for the specified recurrence intervals required by this licence for road and snig/extraction track drainage structures, State Forests must have the prior written approval of the EPA.

SCHEDULE 3

(Conditions 25; 31; 33; 47; 68; Definitions; Schedules 2, 4, 5, 6 & 7)

Methods for assessing the soil erosion and water pollution hazard associated with logging operations

OBJECTIVES

For the purpose of this licence, "soil erosion and water pollution hazard" is a relative measure of the potential for soil erosion and water pollution to occur in a forested area in which logging operations are proposed to be carried out. Determining the soil erosion and water pollution hazard involves assessing the intensity and extent of the factors that contribute to the hazard. The objective of this assessment procedure is to ensure that the appropriate management practices and site-specific conditions are in place to control and mitigate the hazard associated with logging operations covered by this licence.

This schedule specifies the methods and procedures that must be used to assign soil erosion and water pollution hazard prior to the commencement of logging operations. The data requirements, data sources, and the calculation of soil erosion and water pollution hazard are provided. Methods and data sources not specified in this Schedule are not permitted to be used in determining the soil erosion and water pollution hazard.

Four site and soil assessment protocols and one seasonality assessment are required by this Schedule and have been developed for assessing the inherent sensitivity of a compartment, age class or roading area to soil erosion and water pollution processes. A module for updating existing logging operations has also been developed. The five modules are:

- inherent soil erosion and water pollution assessment (Module 1);
- mass movement assessment (Module 2);
- dispersibility assessment (Module 3);
- seasonality (Module 4); and
- updating procedure (Module 5).

State Forests must apply all four assessment modules during the pre-operational planning phase which precedes the commencement of logging operations, as required by conditions 25, 31 and 33 of the licence. These modules include a definition of what is being assessed; the type of assessment required; the standard of expertise and the reporting requirements.

The final module (Module 5) provides the process for updating logging operations which were planned, approved and/or commenced under the conditions of previous licences. Under the transitional arrangements of the licence, logging operations listed in Schedule 1 are allowed to operate under the water pollution hazard assessment and best management practice conditions of the licence under which they were approved or commenced. Where these logging operations will be complete by 10 April 1999, they may be completed under the previous conditions to avoid confusing the operators in the field. Where these logging operations will not be complete by 10 April 1999, to the extent that State Forests wishes to retain licence coverage, there is a need for the operations to be updated so that the same water pollution hazard assessment and best management practices apply across all licensed logging operations in New South Wales.

In carrying out the requirements of this schedule, State Forests must take a conservative approach in assessing or updating a compartment, age class or roading area for the inherent soil erosion and water pollution hazard, mass movement, dispersibility and seasonality.

Module 1:

Inherent Soil Erosion & Water Pollution Hazard.

This assessment module must be used to determine the inherent soil erosion and water pollution hazard assessment for all harvesting operations covered by this licence. This assessment module applies only to the general harvest area and is not applicable to roading operations.

1.1. Introduction

Soil erosion and water pollution hazard assessment is a process by which the relative hazard of a particular logging operation is determined on the basis of the following three interrelated factors:

- rainfall erosivity, which is a measure of rainfall intensity (energy);
- slope, measured in degrees; and
- soil regolith stability, which is an indication of the likelihood that the soil and/or underlying rock will erode and be delivered to receiving waters.

Soil and regolith stability is divided into two key components:

- soil regolith cohesion; and
- soil regolith sediment delivery potential.

Soil regolith cohesion refers to the soil regolith's ability to resist deformation and/or detachment by the forces of erosion, principally water, wind or gravity. The level of regolith cohesion is directly influenced by the intrinsic properties of the material's matrix strength and density. For example, a coherent regolith can withstand high bearing loads or resist shearing, whereas non-coherent materials may have low strength, poor trafficability and be easily disturbed or displaced by machinery (Murphy et al., 1998).

Soil and regolith sediment delivery potential refers to the soil regolith's potential to produce fine grained sediment, in the form of silt and clay, that can be transported and delivered to receiving waters. This soil regolith approach incorporates both soil and regolith cohesion and sediment delivery potential reflects the nature of the two concepts of soil erosion and water pollution (Murphy et al., 1998).

State Forests must take a conservative approach in categorising the inherent soil erosion and water pollution hazard of a compartment or age class.

1.2. Definitions

For the purpose of this assessment module, the following terms are defined as follows:

"approved soil assessor" means a person who has undertaken a training program in soil and regolith assessment, identification and management and who has demonstrated competency at the completion of the program, to the satisfaction of the Environment Protection Authority (EPA) for the purposes of this module. Before being eligible to undertake the training program, the person must be able to demonstrate competency in soil survey procedures to the satisfaction of the EPA;

"gross area" means the total area of land within a compartment, age class or roading area, before exclusion areas are removed (in hectares);

"net harvestable area" means the portion of a compartment or age class available for logging operations (in hectares). This does not include any exclusion areas within the compartment or age class;

"soil regolith" means the mantle of earth and rock, including rocks and sediment altered or formed by land surface processes. Regolith may be either saprolite or sediment.

"saprolite" means part of the weathered soil regolith profile. It is characterised by the preservation of structures that are present in the unweathered rock material.

1.3. Data Sources for Inherent Soil Erosion & Water Pollution Hazard

The soil erosion and water pollution hazard assessment must be carried out using only the following data sets:

DATA TYPE	DATA DESCRIPTION	DATA SOURCE
Compartment Boundary Data	State Forests' GIS compartment layer	State Forests GIS as supplied to the EPA.
Slope Class	State Forests' GIS slope layer	Land Information Centre (LIC) 25 x 25m grid cell
Rainfall Erosivity	Table of rainfall erosivity and zone by compartment	State Forests' (1998)
Soil Regolith Stability	Soil Regolith Stability Classification for State Forests' in Eastern New South Wales (1998)	Murphy, C; Fogarty, P; and Ryan, P. ISSN 1324-6860

The use of alternative data sets to derive the inherent soil erosion and water pollution hazard must not occur without the prior written approval by the EPA.

Updating Data Sources

State Forests may only make amendments, changes or additions to the data sources used in this assessment module, according to the following procedures:

- State Forests is not permitted to make any amendments, changes or additions to the slope information held in the State Forests GIS without the prior written approval of the EPA;
- State Forests is not permitted to make any amendments, changes or additions to the Table of rainfall erosivity for each State Forests' compartment without the prior written approval of the EPA;
- Where State Forests make any amendments, changes or additions to the compartment boundary information, then State Forests must advise the EPA of any such amendment or change within 21 days and provide the modified GIS layer to the EPA; and
- State Forests is not permitted to make any amendments, changes or additions to the soil regolith information held in the State Forests' GIS without the prior

written approval of the EPA.

Where State Forests requires any amendments, changes or additions to the soil regolith information, then they must bring their case forward for any such amendment or change on a six monthly basis to the EPA and DLWC.

Inherent hazard matrix table

The data sources identified above are combined using the inherent hazard tables. There are eight different inherent hazard tables, based on the forest type, harvesting intensity and extraction method, as follows:

1. Native forest logging with greater than or equal to 50% canopy removal within the net harvestable area (dozer/skidder extraction);
2. Native forest logging with less than 50% canopy removal within the net harvestable area (dozer/skidder extraction);
3. Plantation thinning (forwarder extraction);
4. Plantation thinning (dozer/skidder extraction);
5. Plantation clearfall (forwarder extraction);
6. Plantation clearfall (dozer/skidder extraction).
7. Skyline harvesting; and
8. Native forest thinning (forwarder extraction).

Native forest logging with greater than 50% canopy removal within the net harvestable area (Dozer/Skidder extraction)

Average Annual R-factor	Slope Class (Degrees)									
	0<10		10<20		20<25		25<30		30+	
0<2000	1	1	1	2	1	2	2	2	4	4
	1	2	2	2	2	2	2	2	4	4
2000<3000	1	1	1	2	1	2	2	2	4	4
	1	2	2	2	2	2	2	4	4	4
3000<4000	1	2	2	2	2	2	2	2	4	4
	1	2	2	2	2	4	4	4	4	4
4000<5000	1	2	2	2	2	2	2	4	4	4
	2	2	2	2	4	4	4	4	4	4
5000<6000	2	2	2	2	2	2	2	4	4	4
	2	2	2	4	4	4	4	4	4	4
6000+	2	2	2	2	2	4	4	4	4	4
	2	2	4	4	4	4	4	4	4	4

Key:

Level 1: Low soil erosion and water pollution hazard;

Level 2: High soil erosion and water pollution hazard;

Level 3: Very high soil erosion and water pollution hazard;

Level 4: Extreme hazard of soil erosion and water pollution hazard - logging operations prohibited for this proposed method of timber harvesting and extraction.

**Native forest logging with less than 50% canopy removal within the
net harvestable area (Dozer/Skidder extraction)**

Average Annual R-factor	Slope Class (Degrees)									
	0<10		10<20		20<25		25<30		30+	
0<2000	1	1	1	2	1	2	1	2	4	4
	1	2	1	2	2	2	2	2	4	4
2000<3000	1	1	1	2	1	2	2	2	4	4
	1	2	2	2	2	2	2	2	4	4
3000<4000	1	2	2	2	2	2	2	2	4	4
	1	2	2	2	2	2	2	4	4	4
4000<5000	1	2	2	2	2	2	2	3	4	4
	1	2	2	2	2	3	3	4	4	4
5000<6000	1	2	2	2	2	2	2	3	4	4
	2	2	2	3	2	3	3	4	4	4
6000+	2	2	2	2	2	3	3	4	4	4
	2	2	2	3	3	3	4	4	4	4

Key:

Level 1: Low soil erosion and water pollution hazard;

Level 2: High soil erosion and water pollution hazard;

Level 3: Very high soil erosion and water pollution hazard;

Level 4: Extreme hazard of soil erosion and water pollution hazard - logging operations prohibited for this proposed method of timber harvesting and extraction.

Plantation Thinning Operation (Forwarder Extraction)

Average Annual R-factor	Slope Class (Degrees)									
	0-10		10-19		20-24		25-30		30+	
0-2000	1	1	1	1	1	1	1	1	4	4
	1	1	1	1	1	1	1	1	4	4
2000-3000	1	1	1	1	1	1	1	1	4	4
	1	1	1	1	1	2	1	2	4	4
3000-4000	1	1	1	1	1	1	1	2	4	4
	1	1	1	1	1	2	1	2	4	4
4000-5000	1	1	1	1	1	2	1	2	4	4
	1	1	1	2	1	2	2	2	4	4
5000-6000	1	1	1	1	1	2	2	2	4	4
	1	1	1	2	2	2	2	2	4	4
6000+	1	1	1	1	1	2	2	2	4	4
	1	1	1	2	2	2	2	2	4	4

Key:

- Level 1:** Low soil erosion and water pollution hazard;
- Level 2:** High soil erosion and water pollution hazard;
- Level 3:** Very high soil erosion and water pollution hazard;
- Level 4:** Extreme hazard of soil erosion and water pollution hazard - logging operations prohibited for this proposed method of timber harvesting and extraction.

**Plantation Thinning Operation
(Dozer/Skidder extraction)**

Average Annual R-factor	Slope Class (Degrees)									
	0<10		10<20		20<25		25<30		30+	
0<2000	1	1	1	1	1	1	1	2	4	4
	1	1	1	1	1	1	2	2	4	4
2000<3000	1	1	1	1	1	1	1	2	4	4
	1	1	1	2	1	2	2	2	4	4
3000<4000	1	1	1	1	2	2	2	2	4	4
	1	1	1	2	2	2	2	2	4	4
4000<5000	1	1	1	2	2	2	2	2	4	4
	1	2	2	2	2	2	2	2	4	4
5000<6000	1	1	2	2	2	2	2	2	4	4
	1	2	2	2	2	2	2	4	4	4
6000+	1	1	2	2	2	2	2	2	4	4
	2	2	2	2	2	4	4	4	4	4

Key:

Level 1: Low soil erosion and water pollution hazard;

Level 2: High soil erosion and water pollution hazard;

Level 3: Very high soil erosion and water pollution hazard;

Level 4: Extreme hazard of soil erosion and water pollution hazard - logging operations prohibited for this proposed method of timber harvesting and extraction.

**Plantation Clearfall Operation
(Forwarder extraction)**

Average Annual R-factor	Slope Class (Degrees)									
	0<10		10<20		20<25		25<30		30+	
0<2000	1	1	1	1	1	1	1	1	4	4
	1	1	1	1	1	2	1	2	4	4
2000<3000	1	1	1	1	1	1	1	1	4	4
	1	1	1	1	1	2	1	2	4	4
3000<4000	1	1	1	1	1	2	2	2	4	4
	1	1	1	1	2	2	2	2	4	4
4000<5000	1	1	1	1	2	2	2	2	4	4
	1	1	1	2	2	2	2	2	4	4
5000<6000	1	1	1	1	2	2	2	2	4	4
	1	1	2	2	2	2	2	2	4	4
6000+	1	1	1	1	2	2	2	2	4	4
	1	1	2	2	2	2	2	2	4	4

Key:

Level 1: Low soil erosion and water pollution hazard;

Level 2: High soil erosion and water pollution hazard;

Level 3: Very high soil erosion and water pollution hazard;

Level 4: Extreme hazard of soil erosion and water pollution hazard - logging operations prohibited for this proposed method of timber harvesting and extraction.

**Plantation Clearfall Operation
(Dozer/Skidder extraction)**

Average Annual R-factor	Slope Class (Degrees)									
	0<10		10<20		20<25		25<30		30+	
0<2000	1	1	1	2	1	2	1	2	4	4
	1	2	1	2	2	2	2	2	4	4
2000<3000	1	1	1	2	1	2	2	2	4	4
	1	2	2	2	2	2	2	2	4	4
3000<4000	1	2	2	2	2	2	2	2	4	4
	1	2	2	2	2	2	2	4	4	4
4000<5000	1	2	2	2	2	2	2	2	4	4
	2	2	2	2	4	4	4	4	4	4
5000<6000	1	2	2	2	2	2	2	4	4	4
	2	2	2	4	4	4	4	4	4	4
6000+	2	2	2	2	2	4	4	4	4	4
	2	2	4	4	4	4	4	4	4	4

Key:

Level 1: Low soil erosion and water pollution hazard;

Level 2: High soil erosion and water pollution hazard;

Level 3: Very high soil erosion and water pollution hazard;

Level 4: Extreme hazard of soil erosion and water pollution hazard - logging operations prohibited for this proposed method of timber harvesting and extraction.

Native Forest Thinning Operation

Average Annual R-factor	Slope Class (Degrees)									
	0<10		10<20		20<25		25<30		30+	
0<2000	1	1	1	1	1	1	1	2	4	4
	1	1	1	1	1	1	2	2	4	4
2000<3000	1	1	1	1	1	1	2	2	4	4
	1	1	1	1	1	2	2	2	4	4
3000<4000	1	1	1	1	1	1	2	2	4	4
	1	1	1	2	1	2	2	2	4	4
4000<5000	1	1	1	1	1	2	2	2	4	4
	1	1	1	2	2	2	2	2	4	4
5000<6000	1	1	1	1	2	2	2	2	4	4
	1	1	1	2	2	2	2	4	4	4
6000+	1	1	2	2	2	2	2	2	4	4
	1	1	2	2	2	2	2	4	4	4

Key:

Level 1: Low soil erosion and water pollution hazard;

Level 2: High soil erosion and water pollution hazard;

Level 3: Very high soil erosion and water pollution hazard;

Level 4: Extreme hazard of soil erosion and water pollution hazard - logging operations prohibited for this proposed method of timber harvesting and extraction.

Skyline Logging

Average Annual R-factor	Slope Class (Degrees)											
	0<10		10<20		20<25		25<30		30<40		40+	
0<2000	1	1	1	1	1	1	1	1	2	2	2	2
	1	1	1	1	1	1	1	2	2	2	2	4
2000<3000	1	1	1	1	1	1	1	2	2	2	2	2
	1	1	1	2	1	2	2	2	2	2	2	4
3000<4000	1	1	1	1	1	1	1	2	2	2	2	2
	1	1	1	2	1	2	2	2	2	2	2	4
4000<5000	1	1	1	1	1	1	1	2	2	2	2	4
	1	1	1	2	1	2	2	2	2	2	4	4
5000<6000	1	1	1	1	1	1	2	2	2	2	2	4
	1	1	1	2	2	2	2	2	2	4	4	4
6000+	1	1	1	1	1	2	2	2	2	2	2	4
	1	1	1	2	2	2	2	2	2	4	4	4

Key:

Level 1: Low soil erosion and water pollution hazard;

Level 2: High soil erosion and water pollution hazard;

Level 3: Very high soil erosion and water pollution hazard;

Level 4: Extreme hazard of soil erosion and water pollution hazard - logging operations prohibited for this proposed method of timber harvesting and extraction.

Where a combination of harvesting or extraction methods or techniques is proposed to be used within one compartment or age class, then State Forests must use the most conservative inherent hazard matrix table in determining the inherent hazard level.

Where Australian Group Selection procedures are applied to a compartment or age class, so that more than 25% of the net harvestable area is subject to this silvicultural procedure, then State Forests must assume that the harvesting operation for the compartment or age class will result in a greater than 50% canopy removal within the net harvestable area.

1.4. Soil Erosion & Water Pollution Hazard Assessment Procedure

The soil erosion and water pollution hazard assessment procedure must be carried out separately for each individual compartment or age class. Compartments or age classes must not be amalgamated for the purpose of determining the inherent soil erosion and water pollution hazard.

Information on slope, rainfall intensity and soil regolith class for each compartment or age class must only be taken from the data sources specified in section 1.3 of this schedule.

STEP 1: Determine soil regolith class of a compartment or age class

The following methodology must be used to verify the soil regolith class within the compartment or age class.

- a. An approved soil assessor must determine which soil regolith class(es) are present within the compartment or age class, using the State Forests geographical information system (GIS) layer, as specified in section 1.3 of this schedule.

Where there is no existing soil regolith information held in the State Forests' GIS, then the approved soil assessor must undertake a site and soil assessment of the compartment or age class. The approved soil assessor must undertake this site and soil investigation using all field inspections, investigations and testing procedures that are necessary to determine all soil regolith class(es) present within the compartment or age class;

- b. The same approved soil assessor must verify that the soil regolith class(es) specified in the GIS layer are consistent with the soil regolith that actually occurs within the compartment or age class, and must mark any soil regolith boundaries on a map at the same scale as the operational map.
- c. The approved soil assessor must undertake this verification using all field inspections, investigations and testing procedures that are necessary to confirm that the soil regolith in the compartment or age class is consistent with that presented by the GIS layer.
- d. The approved soil assessor must document all field inspections and investigations that he/she made and the tests that he/she performed to verify the soil regolith class(es). The approved soil assessor must also document the results of those investigations, inspections and tests and the reasons why he/she was able to reach the conclusion made about the soil regolith.
- e. Where the soil regolith class(es) is not consistent with the information specified in the GIS layer, the approved soil assessor must undertake a field investigation of the compartment or age class to determine the soil regolith class(es).
- f. All investigations of soil regolith must be undertaken using the classification scheme

specified in "Soil Regolith Classification for State Forests in Eastern New South Wales" (Murphy, Fogarty and Ryan, 1998).

- g. The approved soil assessor must document the field investigation that he/she made in accordance with points (e) and (f), the results of that investigation, and the reasons why he/she classified the soil regolith class(es).
- h. In all field inspections and investigations referred to in points (a) to (g), the approved soil assessor must take a conservative approach. The level of investigation, inspection and testing required is to be determined by the approved soil assessor, based on their professional judgement.
- i. If it is found by the EPA that the approved soil assessor has conducted the verification and classification of soil regolith negligently, or has demonstrated a lack of competency, or has not applied a conservative approach, then the EPA may choose to dis-approve the approved soil assessor. In such cases, the approved soil assessor will cease to be approved from the date specified in writing by the EPA and will no longer be accepted for conducting work in accordance with this schedule.
- j. The approved soil assessor must certify in writing that he/she has conducted all necessary investigations, inspections and tests to verify and (if required) determine the soil regolith class, in accordance with this schedule and giving regard to the most sensitive soil regolith within the proposed net harvestable area.
- k. All documentation referred to in points (a) to (j) above, must be kept on the compartment or age class file at the Regional Office.

STEP 2: Applying the inherent hazard tables

The combination of slope class, rainfall intensity and regolith class from the inherent hazard tables is used to determine the overall inherent hazard class.

- a. Using the State Forests' geographic information system (GIS) slope layer (25 x 25 m), determine the percentage of the gross area of the compartment or age class that falls into the slope classes given in the inherent hazard matrices for the proposed operation type;
- b. Select the appropriate inherent hazard table applicable to the proposed logging operation (based on the forest type, harvesting intensity and extraction method);
- c. Determine the rainfall erosivity value for the compartment or age class by referring to the table referenced in Section 1.3 of this module.
- d. Using the rainfall erosivity value for the proposed compartment or age class, locate the row on the inherent hazard table that is applicable for the compartment or age class.

(For example, if the rainfall erosivity factor for the compartment or age class is 2734, use the row labelled 2000-3000).

- e. Using the soil regolith class provided in writing by the approved soil assessor for the proposed compartment or age class, identify the inherent hazard levels that correspond to the slope classes, and hence the percentage of the gross area of the compartment or age class classified as inherent hazard levels 1, 2, 3 or 4.

STEP 3: Identification of areas of inherent hazard level 4

- a. The combination of slope class, rainfall intensity and soil regolith class(es) from the inherent hazard table is used to determine the overall inherent hazard class and areas of logging exclusion. All slope classes that have been identified as inherent hazard level 4 within the compartment or age class must be excluded from logging operations;
- b. Where 90% or more of the gross area of the compartment or age class is inherent hazard class 4, then all of the compartment or age class must be classified inherent hazard class 4 for that particular forest type, harvesting intensity and extraction method;
- c. Where less than 90% of the gross area of the compartment or age class is inherent hazard class 4, then all logging activities must be excluded from the slope classes in which inherent hazard level 4 is applicable. This exclusion applies regardless of the application of step 4.

STEP 4: Determination of net harvestable area.

The following procedure must be used to determine the net harvestable area for the compartment or age class:

- a. After removing the areas within the compartment or age class of inherent hazard level 4, State Forests must remove all other exclusion areas, known at the time of pre-operational planning from the compartment or age class, with the exception of filter strips. These exclusion areas may include, but are not restricted to the following:
 - riparian buffers;
 - fauna and flora buffers;
 - flora reserves; and
 - cultural heritage.

The remaining area within the compartment or age class is known as the net harvestable area (actual area on the ground that is proposed to be harvested).

- b. The net harvestable area must be documented as part of the pre-operational planning and assessment in accordance with Schedule 2 of this licence. These areas must not be changed or recalculated once the logging operation commences.

STEP 5: Determination of inherent hazard class for the net harvestable area.

The following procedure must be used to determine the inherent hazard level for the net harvestable area from the percentage breakdown of the various inherent hazard levels throughout the compartment or age class. Only one hazard level must be determined for the net harvestable area for each compartment or age class.

- a. State Forests must identify the percentage of the net harvestable area within each of the inherent hazard levels 1, 2 and 3.
- b. Where the whole of the net harvestable area is contained within one inherent hazard level, then that level must apply to the compartment or age class.
- c. Where 20% or more of the net harvestable area is classified as hazard level 3, then all of the net harvestable area must be assigned inherent hazard level 3.

- d. Where less than 20% of the net harvestable area is classified as hazard level 3, then State Forests must proceed to step (e).
- e. Where 40% or more of the net harvestable area is classified as hazard level 2 or a combination of 2 and 3, then all of the net harvestable area must be assigned inherent hazard level 2.
- f. Where less than 20% of the net harvestable area is classified as hazard level 3 and less than 40% of the net harvestable area is classified as hazard level 2, or a combination of hazard levels 2 and 3, then State Forests must process to step (g).
- g. Where 60% or more the net harvestable area is classified as hazard level 1, then all of the net harvestable area must be assigned inherent hazard level 1.

Module 2: Mass Movement Assessment

This assessment module must be used to determine the mass movement hazard for logging operations that involve the:

- i) the maintenance or upgrading of existing roads;
- ii) the construction of new roads; or
- iii) the use of side-cut snig tracks that have batters greater than one metre in height.

2.1 Introduction

A careful evaluation of the mass movement hazard in any proposed logging operation is critical for good forest resource management. Megahan (1972) and Swanson et al., (1972) have shown that the existence of mass movement activity in forest environments can have a major impact on water quality and site productivity.

Management-induced mass movement is most effectively handled in the planning phase by providing appropriate management direction and prescriptions for activities taking place on land units which have a mass movement hazard. Mass movement processes are very different from water erosion processes. For this reason, soil material resulting from management-induced mass movement is considered separately to that resulting from soil erosion and subsequent processes identified in modules 1 and 3 of this Schedule.

Mass movement comprises erosional processes in which gravity is the primary force acting to dislodge and transport land surface materials. The dynamics of the process are a function of the gravitational stress acting on the land surface and the resistance of the soil and rock to displacement. There are two broad categories of mass movement: movement of colluvial materials down steep slopes, and the movement of deep subsoils on slopes of various gradients.

This assessment module requires an evaluation of the relative stability of the proposed compartment, age class or roading area, using soils, geological, topographic and vegetative indicators from reports, aerial photographs and field observations. Mass movement is rarely the function of a single event or environmental factor, but usually a combination of a number of important factors. Evaluation of these characteristics within the compartment, age class or roading area and within the general catchment area must ensure that the appropriate site-specific management prescriptions are employed to mitigate the impacts of mass movement hazard.

2.2. Definitions.

For the purposes of this assessment module, mass movement is defined as follows:

"mass movement" means the downslope movement greater than 10 cubic metres of soil regolith, where gravity is the primary force and where no transporting medium such as wind, flowing water, or ice are involved. The key factors which affect mass movement are slope angle, material strength, vegetal cover and site drainage. This may include, but is not limited to earth slumps, translational slides and earth flows;

"suitably qualified person" means a person who has experience or qualifications, or both which means that they are able to carry out the requirements of this module in a competent and professional manner. A suitably qualified person would also preferably, but not necessarily, have experience in or knowledge of the geographic area or the type of landscape(s) being investigated.

2.3. ASSESSMENT PROCEDURE FOR MASS MOVEMENT.

This section of the assessment module specifies the procedure that must be used to identify areas of existing or potential mass movement, prior to the commencement of logging operations. This approach uses field assessment at the compartment, age class or roading area scale and consideration of existing information regarding mass movement hazard at a broader scale. This process must be supplemented with air photograph interpretation (API) for the areas where State Forests needs to confirm whether there is an existing or potential mass movement hazard. The basis of the approach taken in this assessment module is to undertake a qualitative evaluation of the landscape, both with the proposed area of operations and the surrounding landscape and geological units to identify indicators of slope instability.

State Forests must undertake steps 1 and 2 of this module in all cases in which this assessment module applies. Once the application of steps 1 and 2 have been completed, the following steps apply:

- i) where the investigation and results from steps 1 and 2 indicates that there is no existing or potential mass movement hazard, then State Forests is not required to do any further assessment for mass movement; or
- ii) where the investigation and results from both steps 1 and 2 indicates that there is an existing or potential mass movement hazard, then State Forests must proceed to section 2.4 of this module; or
- iii) where the investigation and results from steps 1 and 2 are in conflict between each other, then State Forests must undertake API to establish if the geological and landscape units have a mass movement hazard, in accordance with the requirements of step 3 of this assessment module.

STEP 1: Consideration of existing information

State Forests must consider all existing information which is relevant to mass movement within the geological unit or State forest within which logging operations are proposed. This information could include, but is not restricted to:

- i) published reports and surveys;
(For example, such published reports and surveys may include, but are not restricted to:
 - *local investigations or studies of mass movement;*
 - *soil conservation reports and technical notes;*
 - *DLWC soil landscape map series);*
- ii) consultation with the local Department of Land and Water Conservation (DLWC) office; and
- iii) historical evidence, either in the form of internal reports or file notes, or as anecdotal evidence.

State Forests must retain copies of all information or advice obtained in accordance with this section of the module on file at the Regional Office.

STEP 2: Field Assessment

The purpose of the field assessment is to determine if there is evidence of existing or potential mass movement within the proposed area of logging operations. The field assessment of the compartment, age class or roading must be carried out by a suitably qualified and competent

person. It is State Forests' responsibility to ensure, and be able to demonstrate that the person who carries out the field assessment is competent and qualified to do so.

The following procedure must be used to identify mass movement or areas of potential mass movement:

- a. State Forests must undertake a field survey of each compartment, age class or roading area and determine if any mass movement is present or likely to occur.
- b. The field survey and investigation must include, but is not restricted to existing roads, side-cut snig tracks, gravel pits, quarries, major excavations and cleared slopes;
- c. Evidence of mass movement or potential mass movement includes, but is not restricted to:
 - recent or revegetated scars, where more than 10 cubic metres of soil has slipped or moved downslope;
 - slumped or slipped road batters;
 - bedding planes which dip at an angle parallelling the ground surface;
 - mixed or buried soil profiles;
 - hummocky terrain;
 - bent or split timber; and
 - springs at the toe of the slope.

Evidence of mass movement or potential mass movement within the compartment, age class or roading area must be documented by the person carrying out the investigation and held on the compartment, age class or roading area file at the Regional Office.

- d. The person carrying out the field assessment must certify that he/she has carried out the assessment in a competent manner and in accordance with the requirements of the licence.

State Forests must retain details of the field assessment on file at the Regional Office, including all field notes and the name of the person who undertook the assessment.

STEP 3: Air Photo Interpretation

If after completing steps 1 and 2, there is conflict in the findings between these two steps, then State Forests must undertake API to establish if the geological and landscape units have a mass movement hazard

The purpose of this assessment procedure is to determine whether there is evidence of mass movement hazard or slope instability on land within the compartment, age class or roading areas, or on areas outside the compartment, age class or roading area that have similar geological and geomorphological characteristics. In determining the areas of existing or potential mass movement, State Forests must take a conservative approach; that is, a potentially unstable area which shows no signs of actual mass movement but is similar in other aspects to nearby unstable areas, must be considered to have a mass movement hazard.

API must only be undertaken by persons with experience and competency in this technique. It is State Forests' responsibility to ensure and to be able to demonstrate that the person undertaking the API assessment are suitably qualified and competent.

The following procedure must be adopted to identify areas of potential or actual mass movement using API:

- a. API must be undertaken on the largest scale of photographs available for the total extent of each geological unit which occurs within the compartment, age class or roading area. API must be undertaken on the most recent series held by State Forests unless older photographs held by State Forests have a better resolution;
- b. API must be undertaken on the entire geological unit, which may include tenures outside State forest;
- c. Areas of the landscape within the geological unit that show evidence of mass movement must be identified and mapped. Evidence of mass movement includes those described in part c of step 2 of this section; and
- d. State Forests must retain notes and information relating to the API work on file at the Regional Office, including the name and qualifications of the person who carried out the API work.

2.4. Operations on Land with a Mass Movement Hazard

The purpose of this section is to ensure that appropriate site-specific conditions and prescriptions are developed to mitigate against potential or actual mass movement hazard. Where State Forests has identified, using the procedures in section 2.3 of this module, that a potential or actual mass movement hazard exists, then expert advice must be sought. This advice must be provided by a person who is suitably qualified to assess and recommend mitigative measures for mass movement and slope instability. State Forests must obtain from the suitably qualified person detailed written advice about whether the operation should proceed, and if so, provide details about the site-specific conditions and mitigative techniques that must be applied. The development of site-specific conditions and mitigative techniques must ensure that mass movement is prevented to the greatest extent practicable. State Forests must retain a copy of this advice on file at the Regional Office, including the recommendation to proceed with the operation and any special site-specific conditions that have been developed.

It is State Forests' responsibility to ensure and be able to demonstrate that the person who develops the mitigative measures is suitably qualified and competent to do so. The assessment of whether to proceed, and the development of mitigative measures, must be applied to but is not restricted to the following :

- road construction;
- road upgrading and maintenance;
- road drainage design and management;
- road batter stabilisation;
- seasonal or weather restrictions;
- exclusion area from logging operations;
- side-cut snig track construction techniques;
- side-cut snig track drainage;
- side-cut snig track batter stabilisation;
- harvesting restrictions and prescriptions; and
- proximity of unstable areas to drainage features .

The suitably qualified person undertaking this assessment module must conduct all necessary investigations and inspections to verify and determine if there is an existing or potential mass movement hazard, in accordance with this schedule. All persons undertaking this assessment module must take a conservative approach in assessing the existing or potential mass movement.

Module 3: Soil Dispersibility

This assessment module must be used to determine the dispersibility hazard for logging operations covered by this licence. This assessment module applies to roading and harvesting operations.

3.1 Introduction

The stability of the fine earth fraction of a soil aggregate when subjected to mechanical disturbance and/or wetting has the potential for significant on-site (surface crusting) and off-site impacts (water quality).

The interaction in water of the clay sized particles in aggregates can largely determine the structural stability of the soil. When an unstable soil becomes wet, the fine particles react as individuals and are readily eroded from the profile. Because of their fine nature, once they are entrained they tend to remain in suspension and this can cause serious turbidity problems in waterways for considerable periods following storm events.

The determination of dispersibility with this assessment module is based upon the dispersibility methodology used in SOILpak (NSW Agriculture, 1994). The actual methodology that must be followed for the purposes of this licence is detailed below in Section 3.3. State Forests must take a conservative approach in assessing dispersibility.

3.2 Definitions.

For the purpose of this assessment module, the following terms are defined as follows:

"aggregate" means a unit of soil structure consisting of primary soil particles held together by cohesive forces or by secondary soil materials such as iron oxides, silica or organic matter;

"approved soil assessor" means a person who has undertaken a training program in the identification of dispersible soils using the SOILpak method and who has demonstrated competency at the completion of the program, to the satisfaction of the Environment Protection Authority (EPA) for the purposes of this schedule. Before being eligible to undertake the training program, the person must be able to demonstrate competency in soil survey procedures to the satisfaction of the Environment Protection Authority;

"air-dry aggregate" means the state of dryness of a soil aggregate at equilibrium with the water content in the surrounding atmosphere. The actual water content will depend upon the relative humidity and temperature of the surrounding atmosphere;

"dispersibility" means the behaviour of a soil material, whereby soil aggregates break down and separate into their constituent particles in water, due to deflocculation.

"dispersion" means the process whereby soil aggregates break down and separate into their constituent particles in water, due to deflocculation;

"slaking" means the partial breakdown of soil aggregates in water due to the swelling of clay and the expulsion of air from pore spaces.

"slight dispersion" means the partial breakdown of soil aggregates in water, where there is partial dispersion with less than 50% of the aggregate affected (see Craze and Hamilton, 1991 - page 159);

"strong dispersion" means the partial breakdown of soil aggregates in water, where there is partial dispersion with more than 50% of the aggregate affected (see Craze and Hamilton, 1991 - page 159);

"complete dispersion" means total breakdown of the aggregate into its constituent particles (clay, silt and sand), leaving only the sand grains.

3.3 Detection of Dispersible Soils

The following methodology must be used to identify dispersible soils within the compartment or age class.

- a. An approved soil assessor must identify the distribution and extent of dispersible soils within the compartment or age class and mark the boundary on a map at the same scale as the operational map.
- b. The approved soil assessor must identify these soils using all field inspections, investigations and soil dispersibility testing procedures that are necessary.
- c. The approved soil assessor must document all field inspections and investigations that he/she made and the results of soil dispersibility testing that he/she performed to identify dispersible soils within the compartment or age class.
- d. Where the approved soil assessor chooses to use a soil test to confirm the presence of dispersible soils, the only test which will be accepted by the licence is the testing procedure outlined in Section 3.4 of this schedule. No other tests are allowed.
- e. In all field inspections, investigations and testing carried out in accordance with points (a) to (d), the approved soil assessor must take a conservative approach. The level of investigation, inspection and testing is to be determined by the approved person based on their professional judgement.
- f. If it is found by the EPA that the approved soil assessor has conducted the dispersibility identification negligently, or has demonstrated a lack of competency, or has failed to identify dispersible soils that are present, or has not applied a conservative approach, then the EPA may choose to dis-approve the approved person. In such cases, the approved soil assessor will cease to be approved from the date specified in writing by the EPA and will no longer be accepted for conducting work in accordance with this schedule.
- g. The approved soil assessor must certify in writing that he/she has conducted all necessary investigations, inspections and tests to identify dispersible soils within the compartment or age class, in accordance with this schedule.
- h. All documentation referred to in points (a) to (g) above, must be kept on the compartment or age class file at the Regional Office.

3.4 Soil Dispersibility Testing Method

If the approved soil assessor chooses to undertake soil dispersibility testing to identify or confirm the presence of dispersible soil within the compartment or age class, then only the following method can be used.

STEP 1: Method

- a. Select three air-dry aggregates from each layer of the soil at whichever site is being tested;
- b. Place approximately 75 millilitres of deionised water in a clean, wide-bottomed container. Place the three aggregates in the container of deionised water, spaced equally around the side. The deionised water must completely cover the aggregate. Do not stir, or otherwise disturb; and
- c. Record the degree to which the soil aggregate have dispersed and/or slaked at 10 minutes and 2 hours from when they were placed into the water.

Step 2: Dispersibility rating

- a. Once the behaviour of the soil aggregates has been recorded in accordance with step 1, determine the dispersion rating, as follows:

Score 0	for no dispersion within 2 hours;
Score 1	for slight dispersion within 2 hours;
Score 2	for slight dispersion within 10 minutes or complete dispersion within 2 hours;
Score 3	for strong dispersion within 10 minutes or complete dispersion within 2 hours; or
Score 4	for complete dispersion within 10 minutes.
- b. Soil aggregates that score a dispersibility rating of 2, 3 or 4 are deemed to be dispersible for the purpose of this schedule.
- c. Where the three soil aggregates react differently, then State Forests must adopt the most conservative dispersibility rating.
- d. Where the approved soil assessor has deemed that the soil regolith within a compartment or age class is dispersible, then State Forests must ensure that the relevant conditions of Schedule 4 and 5 must be applied in the compartment, age class or roading area.

Module 4: **Seasonality**

This assessment module must be used to determine whether seasonal limitations on the timing and maximum ground slope of operations apply to logging operations covered by this licence, including roading and harvesting operations.

4.1 **Introduction**

The appropriate timing of logging operations is an effective management practice that can be used to mitigate the on-site and off-site impacts of logging operations from periods of high intensity rainfall.

The determination of seasonality is a combination of the annual average rainfall erosivity, the distribution of this rainfall erosivity throughout the year and the soil regolith class(es) present within the compartment or age class.

The implementation of seasonality restrictions is triggered by the combination of inherent hazard level and annual average rainfall erosivity where:

- the proposed compartment or age class has been classified as inherent hazard level 3 and has an average annual rainfall erosivity between 4000-6000; or
- the annual average rainfall erosivity is greater than 6000, regardless of inherent hazard level of the compartment or age class.

Each of these two broad classes is further subdivided on the basis of three broad rainfall erosivity zones.

In determining the seasonality restriction required by this licence, State Forests must take a conservative approach.

4.2. **Definitions**

"rainfall erosivity" means a measure of the ability of rainfall to cause erosion and must be determined using the data source referred to in section 1.3 of Module 1 of this schedule;

"rainfall zone" means the areas of land within New South Wales that have the same seasonal distribution of rainfall erosivity and must be determined from the table referred to in section 1.3 of Module 1 of this schedule;

"seasonality" means the management practice used to determine the timing of logging operations based on the seasonal variation of rainfall erosivity, spatial distribution of rainfall and soil regolith stability.

4.3. **Assessment Procedure for Seasonality**

This section of the assessment module specifies the procedure that must be used to identify logging operations in which seasonality prescriptions must be applied.

STEP 1: **Requirements for seasonality determination**

- a. Determine the rainfall zone and the average annual rainfall erosivity for the proposed compartment, age class or roading area from the table specified in section 1.3 of Module 1 of this schedule.

Where the seasonality restrictions are to be determined for a length of road, State Forests must use the most conservative (highest) value from the compartments or age classes adjacent to that road.

- b. Using the methodology given in section 1.4 of Module 1 of this schedule, determine the soil regolith class(es) within the proposed compartment or age class. Where the seasonality determination is being carried out for a roading area then State Forests must either verify the soil regolith class in accordance with Section 1.4 of Module 1 of this schedule, or must accept as a default that the soil regolith class is 2, 3 or 4;
- c. Using the methodology given in section 1.4 of Module 1 of this schedule determine the inherent hazard level of the proposed compartment, age class or roading area;
- d. Proceed to step 2:
 - i) where a logging operation is proposed to be carried out in a compartment or age class that has been classified as inherent hazard level 3 which have an annual rainfall erosivity value between 4000 and 6000; or
 - ii) where a new road is to be constructed on ground slopes greater than 30 degrees and where the annual rainfall erosivity value is between 4000 and 6000.

or
- e. Proceed to step 3 where a logging operation (including new road construction) is proposed to be carried out in a compartment, age class or roading area that has an annual average rainfall erosivity greater than 6000.

STEP 2: Identifying seasonality restrictions for logging operations in a compartment or age class identified as inherent hazard level 3 and for new road construction on ground slopes greater than 30 degrees.

- a. For a compartment or age class that has been classified as inherent hazard level 3 with an average annual rainfall erosivity between 4000 and 6000 in rainfall zone 1 or 3, logging operations are not permitted within the compartment or age class during the periods specified in Table 1 (inclusive).
- b. New roads which are proposed to be constructed on ground slopes greater than 30 degrees and which have an annual erosivity value of between 4000 and 6000, must not be constructed during the periods specified in Table 1.

Table 1: Seasonality restrictions for logging operations in a compartment or age class identified as inherent hazard level 3 and for new road construction on ground slopes greater than 30 degrees in rainfall zones 1 or 3 (inclusive).

Annual Average Rainfall Erosivity	Rainfall Erosivity Zone 1 & 3	Rainfall Erosivity Zone 2
>4000 and less than or equal to 6000	1 January to 31 March	1 December to 31 March

STEP 3: Identifying seasonality restrictions for logging operations in planning units and roading areas that occur in areas that have an average annual rainfall erosivity of greater than 6000.

- a. For a compartment, age class or roading area that has an average annual rainfall erosivity greater than 6000 in rainfall zone 1 or 3, logging operations are not permitted on the specified ground slopes during the prescribed periods (inclusive) in the Table 2.

Table 2: Seasonality and slope restrictions for a compartment, age class or roading area with an average annual rainfall erosivity greater than 6000 in rainfall erosivity zone 1 or 3.

Annual Average Rainfall Erosivity	Soil Regolith Stability Class 1	Soil Regolith Stability Class 2, 3 or 4
>6000 and less than or equal to 8000	Greater than or equal to 25 degrees 1 January to 31 March	Greater than or equal to 20 degrees 1 December to 30 April
>8000	Greater than or equal to 25 degrees 1 October to 31 March	Greater than or equal to 20 degrees 1 October to 31 May

- b. For a compartment, age class or roading area that has an average annual rainfall erosivity greater than 6000 in rainfall zone 2, logging operations are not permitted on the specified ground slopes during the prescribed periods (inclusive) in the Table 3.

Table 3: Seasonality and slope restrictions for a compartment, age class or roading area with an average annual rainfall erosivity greater than 6000 in rainfall zone 2.

Annual Average Rainfall Erosivity	Soil Regolith Stability Class 1	Soil Regolith Stability Class 2, 3 or 4
>6000 and less than or equal to 8000	Greater than or equal to 25 degrees 1 December to 31 March	Greater than or equal to 20 degrees 1 December to 30 April
>8000	Greater than or equal to 25 degrees 1 October to 31 March	Greater than or equal to 20 degrees 1 October to 31 May

Module 5:

Updating Existing Logging Operations

This module must be used for updating existing logging operations in accordance with the requirements of condition 25 of this licence.

5.1 Introduction

This module provides the process for updating logging operations which were planned, approved and/or commenced under the conditions of previous licences. Under the transitional arrangements of the licence, logging operations listed in Schedule 1 are allowed to operate under the water pollution hazard assessment and best management practice conditions of the licence under which they were approved or commenced. Where these logging operations will be complete by 10 April 1999, they may be completed under the previous licence conditions and assessment requirements.

Where these logging operations will not be complete by 10 April 1999, and to the extent that State Forests wishes to retain licence coverage, there is a need to the operations to be updated so that the same water pollution hazard assessment and best management practices apply across licensed logging operations in NSW.

This module specifies the methodology that must be used to update the planning documentation (usually a harvesting plan or roading plan) and the practices applying to the logging operation, and specifies who must undertake this work. The methodology contains a recognition that where site-specific soils investigations of a compartment, age class or roading area have already been carried out for the purposes of determining dispersible soils, then the information should be able to be correlated to the SOILpak classes for use in the updating process.

In carrying out the updating of existing logging operations, State Forests must take a conservative approach.

5.2. Definitions

This module adopts all of the definitions given in modules 1 to 4 of this schedule.

5.3. Updating Soil Erosion & Water Pollution Hazard

State Forests must update the soil erosion and water pollution hazard assessment in the compartment or age class by complying with the requirements of Module 1 of this schedule.

5.4. Updating Mass Movement Requirements

State Forests must assess mass movement hazard in the compartment or age class or roading area by complying with the requirements of Module 2 of this schedule.

5.5. Updating Soil Dispersibility

State Forests must determine if dispersible soils exist within the compartment or age class by complying with the requirements of Module 3 of this schedule. Notwithstanding Section 3.4 of Module 3, where information relating to dispersibility was collected as part of site assessments required by previous licences, this information may be used to identify or confirm the presence of

dispersible soils within the compartment or age class. Such soils information which is acceptable for the updating process are Emerson Aggregate Test results and dispersion percentage test results. Results of these tests must be correlated to the SOILpak classes using the following methods. Where more than one type of test was carried out then State Forests must adopt the most conservative results.

Emerson Aggregate Test

Where Emerson Aggregate Test (EAT) results exist for the compartment or age class then EAT Classes 1, 2, 3(3) and 3(4) must be taken to be dispersible aggregates for the purposes of this licence.

Dispersion Percentage

Where dispersion percentage tests were carried out the results are not directly comparable to the SOILpak methodology. In these cases State Forests must update the dispersibility using the overall Proportion of Dispersible soils (PDS) determined in accordance with the previous licence. Where the PDS was greater than or equal to 10 per cent, then the soils of the compartment or age class or roading area must be taken to be dispersible.

5.6. Updating Seasonality Requirements

The method to be used to update the seasonality restrictions of the existing logging operation is that specified in Module 4 of this schedule.

5.7. Difficulties in Updating Existing Harvesting Plans or Roading Plans

Where State Forests is unable to update an existing logging operation in accordance with this schedule because the information that was collected during the previous planning phase is different to the options that are presented here, then State Forests must undertake site and soil assessment modules 1 to 4 of this schedule as if the existing operation was a new operation.

5.8. Implementation of Updated Logging Operations

Once State Forests has updated the logging operations in accordance with this Schedule then it must implement the best management practice conditions contained in schedules 4, 5 and 6, as well as any site-specific conditions determined in accordance with schedules 2 and 3, from the date on which the summary of operations was submitted to the EPA in accordance with condition 32 of this licence.

SCHEDULE 4

(Conditions 25; 26; 31; 33; 38; 40; Schedules 3, 6 & 7)

OPERATING CONDITIONS FOR LOGGING OPERATIONS

The following conditions must be complied with in undertaking all logging operations commenced during this licence period and permitted by this licence. Note that the environmental outcomes specified in this schedule must be complied with and that the italicised notes are guidance only. Compliance with the guidance notes may not necessarily achieve the required environmental outcomes, and site-specific techniques must be developed and applied.

A. SITE-SPECIFIC CONDITIONS

1. If prior to, or during logging operations, it becomes apparent that the conditions of this licence are not capable of achieving the objectives of this licence, State Forests must:
 - a) formulate additional special site-specific conditions aimed at achieving the objectives of this licence; and
 - b) place the site-specific conditions determined in 1(a) of this schedule on file at the Regional Office and produce them on request to an EPA officer.
2. Site-specific techniques to achieve the conditions of Schedule 4 must be identified during the planning process. These site-specific techniques must be documented and placed on file at the Regional Office prior to the commencement of logging operations, and produced on request to an EPA officer.

B. MAXIMUM SLOPE LIMITS

3. No harvesting is permitted on land mapped as inherent hazard level 4 in accordance with module 1 of Schedule 3 of this licence. Where there is an area of unmapped inherent hazard level 4 land within the net harvestable area, trees may be felled and the logs subsequently extracted by winching, provided that this unmapped areas is:
 - a) no larger than 50 metres by 50 metres in extent; and
 - b) no larger than 2500 square metres; and
 - c) not contiguous with any other inherent hazard level four land, either within the compartment or age class or adjoining it.

Where harvesting operations occur within this unmapped area of inherent hazard level 4, the following restrictions must be applied:

- a) machinery must not enter this area; and
- b) harvesting operations must only be conducted in months where the monthly erosivity value is less than 300; and
- c) the water flow or potential water flow does not occur along the log furrow surface for a distance exceeding 10 metres; and
- d) State Forests must achieve 70% groundcover on all disturbed areas within five days

of the completion of felling of trees in the area. This level of groundcover must not be achieved by:

- i) the resspreading or retaining of slash or logging debris; or
- ii) the spreading of topsoil and seed,
- e) the area must be clearly identified on the operational map prior to the felling of trees in the area.

C. SEASONALITY RESTRICTIONS

- 4. For land classified as inherent hazard level 3 with an average annual rainfall erosivity between 4000 and 6000, no logging operations are permitted within the compartment or age class during the periods specified in module 4 of Schedule 3 of this licence.
- 5. For a compartment, age class or roading area that has an average rainfall erosivity greater than 6000, no logging operations are permitted on the specified groundslopes for the periods specified in module 4 of Schedule 3 of this licence.

D. PROTECTION OF DRAINAGE FEATURES

DRAINAGE FEATURE PROTECTION FOR NATIVE FORESTS, NATIVE PLANTATIONS & SOFTWOOD PLANTATIONS.

- 6. Filter strips must be retained along all drainage lines, prescribed streams and watercourses and must have a minimum width in accordance with Table 1.

Table 1: Minimum filter strip width for mapped and unmapped drainage lines, prescribed streams and watercourses in native forests, native plantations and softwood plantations (metres).

Stream Order	Inherent Hazard Level 1	Inherent Hazard Level 2	Inherent Hazard Level 3
Unmapped	10	10	15
1st order	10	15	20
2nd order	15	20	25
3rd order or greater	20	25	30

- 7. The determination of stream order for the purposes of Table 1 must be carried in accordance with Part B of Schedule 2 of this licence.
- 8. Filter strips must be retained around all wetlands and swamps and must have a minimum width in accordance with Table 2.

Table 2: Minimum filter strip width for mapped and unmapped wetlands and swamps in native forests, native plantations and softwood plantations (metres).

Total Area of Wetlands or Swamps		
	0.01 - 0.5 (ha)	>0.5 (ha)
Wetlands or Swamps	10	40

9. Filter strips must be retained around all major water storages and must have a minimum width of 100 metres.
10. Notwithstanding condition 9 of this Schedule, State Forests may carry out logging operations within 100 metres of the top water level of Blowering Dam on the Tumut River.
11. The width of filter strips on watercourses, prescribed streams and drainage lines must be measured from the top of the bank of the incised channel or, where there is no defined bank, from the edge of the channel.
12. The width of filter strips on wetlands and swamps must be measured from the edge of the current saturated zone or from the outer edge of where the vegetation type indicates a wetter micro-environment than the surrounding country, whichever is larger.
13. The area of wetlands and swamps must be measured from the edge of the current saturated zone or from the outer edge of where the vegetation type indicates a wetter micro-environment than the surrounding country, whichever is larger.
14. Where a filter strip extends beyond the boundary of the catchment of the drainage feature that is the subject of the filter strip then the filter strip may be terminated at the catchment boundary.
15. Buffer strips must be retained along all drainage depressions and must have a minimum width of five metres.
16. The width of buffer strips on drainage depressions must be measured from the apparent centre of the drainage depression.
17. Logging operations are not permitted within 20 metres of the bank of a prescribed stream without the prior written approval of the Commissioner of Soil Conservation. Written approval by the Commissioner of Soil Conservation must be kept on file in the Regional Office.

OPERATIONS WITHIN NATIVE FOREST FILTER STRIPS

18. Trees located in a filter strip must not be felled, except for the purposes of constructing a road, extraction track or snig track crossing.
19. Trees must not be felled into filter strips.
20. Where a tree is felled into filter strip, then no part of that tree can be removed from the filter strip.

(Note: The EPA does not intend to take proceedings where State Forests can demonstrate that the tree was accidentally felled into the filter strip. The tree will not be considered to have been accidentally felled if the felling is a result of poor judgement on the part of the faller.)

21. Machinery must not enter a filter strip except for the construction and use of a road, extraction track or snig track crossing.

OPERATIONS WITHIN NATIVE PLANTATION FILTER STRIPS

22. During native plantation thinning operations, native forest retention areas within filter strips must not be harvested. The remainder of the filter strip may be thinned under the same silvicultural prescription as the rest of the stand, but only where the trees can be directed out of the filter strip. Trees may also be felled where necessary for the construction of a road, extraction track or snig track crossing.
23. Native plantation filter strips must not be clearfelled, and native forest retention areas within filter strips must not be harvested. A minimum canopy cover of 50 per cent within native plantation filter strips must be retained when the adjacent plantation outside the filter strip is clearfelled. The retained canopy must be evenly spread throughout the strip, with no gaps or clusters of trees.
24. During clearfelling operations, trees to be felled out of native plantation filter strips must be marked by State Forests.
25. Where a tree is felled out of a filter strip in accordance with conditions 22, 23 and 24 of this Schedule, State Forests must ensure that any furrows resulting from removal of the tree are diverted at the edge of the filter strip. The furrow must be diverted onto an undisturbed area or onto a stable surface capable of handling concentrated flow.
26. Trees must not be felled into filter strips.
27. Where a tree is felled into filter strip, then no part of that tree can be removed from the filter strip.
28. Machinery must not enter a filter strip except for the construction and use of a road, extraction track or snig track crossing.

OPERATIONS WITHIN SOFTWOOD PLANTATION FILTER STRIPS

29. Trees may be felled within a filter strip where they form part of the plantation and where it is necessary to avoid later windthrow, or where it is necessary for the construction of a road, extraction track or snig track crossing.
30. Directional felling must be used to prevent to the greatest extent practicable the felling of trees into drainage features.
31. Where necessary to avoid later windthrow, trees may be felled into watercourses. In such cases, crowns, logs and substantial debris resulting from logging must be removed, unless removal would result in more damage to the bed and banks than non-removal. Where crowns, logs and substantial debris are removed, State Forests must prevent to the greatest extent practicable disturbance to the bed and banks of the watercourses.

32. Where necessary to avoid later windthrow, trees may be felled into drainage lines, wetlands or swamps. In such cases crowns and logs of felled trees must be removed, unless removal would result in more damage than non-removal. Where crowns, logs and substantial debris are removed, State Forests must prevent to the greatest extent practicable disturbance to the bed and banks of the drainage lines, wetlands or swamps.
33. Where it is necessary to avoid later windthrow, machinery may enter a filter strip on a watercourse, drainage line, swamp or wetland to fell or extract felled trees, providing the machinery does not enter the five metre zone and providing that soil disturbance is prevented to the greatest extent practicable.
34. During the clearfelling stage of harvesting a plantation, State Forests may use felling machinery inside the five metre zone if:
 - a) weather and soil conditions are sufficiently dry so that soil disturbance will be prevented to the greatest extent practicable; and
 - b) the use of such machinery is likely to result in less disturbance to the bed and banks of the drainage feature or any retained riparian vegetation than manual felling and subsequent extraction.
35. When falling logs in accordance with condition 34 of this Schedule, State Forests must ensure that as many trees as possible are lifted out of the five metre zone before felling machinery enters the five metre zone, and that skewing of machinery tracks is prevented to the greatest extent practicable.
36. Machinery other than felling machinery must not enter the five metre zone, except for the construction and use of a road, extraction track or snig track crossings.

OPERATIONS WITHIN BUFFER STRIPS FOR NATIVE FORESTS, NATIVE PLANTATION & SOFTWOOD PLANTATION.

37. Machinery must not operate in buffer strips when the soil is saturated.
38. Machinery operating within buffer strips must:
 - a) use walkover techniques wherever possible;
 - b) prevent to the greatest extent practicable the skewing of machinery tracks;
 - c) operate with blade up at all times except when conducting earthworks in accordance with condition 39 of this schedule; and
 - d) not snig along drainage depressions.
39. Earthworks must not be undertaken within buffer strips except for the construction of a road, extraction track or snig track crossing.

E. BORROW PITS AND GRAVEL PITS

40. Runoff from borrow pits and gravel pits must not be discharged into drainage features.
41. Borrow pits and gravel pits must be located outside filter strips.

F. LOG DUMPS

42. Runoff from log dumps must not be discharged into drainage features.

LOCATION

43. Log dumps must be located outside filter strips and buffer strips.
44. For land classified as inherent hazard level 2, log dumps must be located at least 10 metres from the boundary of filter strips, unless the construction of the log dumps at least 10 metres from the filter strip would result in additional excavation compared to a log dump located closer to the filter strip.
45. For land classified as inherent hazard level 3, log dumps must be located at least 20 metres from the boundary of filter strips, unless the construction of the log dump at least 20 metres from the filter strip would result in additional excavation compared to a log dump located closer to the filter strip.

DEBRIS MANAGEMENT

46. Debris from log dumps must be located outside filter strips and buffer strips.
47. For land classified as inherent hazard level 2, debris from log dumps must be located at least 5 metres from the boundary of filter strips.
48. For land classified as inherent hazard level 3, debris from log dumps must be located at least 15 metres from the boundary of filter strips.

WET WEATHER RESTRICTIONS

49. Forwarders, excavators and truck mounted loaders may be used as stationary loaders when there is runoff from the log dump surface. All other machinery on the log dump must remain stationary when there is runoff from the log dump surface. This condition does not apply to gravelled log dumps.

G. BURNING

50. Post-harvest burning must be carried out in a manner that avoids burning the filter strip to the greatest extent practicable. Deliberate or negligent burning of filter strips must not occur.
51. Where a post-harvest burn has intruded into a filter strip, State Forests must put in place soil erosion and sediment control measures within 5 days to prevent water pollution.
52. For land classified as inherent hazard level 2 or 3, post-harvest burning must not be carried out during or within one month prior to those months of the year with an average monthly rainfall erosivity of greater than 1100.
53. For land classified as inherent hazard level 2 or 3, post-harvest burning carried out during months of the year with an average monthly rainfall erosivity of 900 to 1100 inclusive must use a ground burning (top disposal) method only.

H. SNIG TRACKS AND EXTRACTION TRACKS.

54. Spoil from snig track or extraction track construction, upgrading or maintenance must not be placed in watercourses, drainage lines, prescribed streams, swamps or wetlands.
55. Spoil from snig track or extraction tracks construction, upgrading or maintenance must not be placed in filter strips or buffer strips.
56. Blading-off on snig tracks or extraction tracks is not permitted.
57. For land classified as inherent hazard level 2 or 3, the grade of snig tracks must not exceed 25 degrees except to:
 - a) negotiate poorly drained land, rock outcrops or unstable soils; or
 - b) to take advantage of favourable terrain, such as to reach a geologically stable bench or saddle; or
 - c) to take advantage of soil which is more suitable for the construction and drainage.

EXTRACTION TRACK AND SNIG TRACK CROSSING OF DRAINAGE FEATURES

58. Snig tracks or extraction tracks must not cross wetlands or swamps.
59. For land classified as inherent hazard level 3, snig tracks or extraction tracks must not cross watercourses.
60. For land classified as inherent hazard level 3, drainage lines must only be crossed using permanent snig track or extraction track crossing structures.
61. The location and type of drainage line and watercourse crossings must be approved by State Forests and marked in the field prior to crossing construction.
62. Drainage features must be crossed using stable structures comprising either a causeways, culverts or bridges. Log dams and gully stuffers must not be constructed.
63. Notwithstanding condition 62 of this schedule, existing log dams and gully stuffers may be used where the stability of the structure can be ensured for the duration of the logging operation. A suitably qualified person must assess the stability of the structure prior to the commencement of logging operations.
64. The stability of existing log dams or gully stuffers must be inspected twice weekly during logging operations. Where an existing log dam or gully stuffer becomes unstable, State Forests must replace the crossing structure within five days.
65. Where existing log dams or gully stuffers are used during logging operations, State Forests must ensure that the crossing structure are stable at the completion of operations at that crossing.
66. Drainage feature crossings must be designed, constructed, upgraded and maintained to wholly convey a peak flow from a 1:5 year storm event. The determination of the peak flow must be carried out in accordance with Part C of Schedule 2.

67. Drainage feature crossings must be designed, constructed, upgraded and maintained to withstand the peak flow from a 1:10 storm event. The determination of the peak flow must be carried out in accordance with Part C of Schedule 2.
68. Clearing associated with crossing construction, maintenance and upgrading must be undertaken at, or as close as practicable to, right angles to the water flow unless an angled approach reduces ground and soil disturbance.
69. Drainage feature crossing construction, maintenance and upgrading must be undertaken in a manner which prevents disturbance to the bed and banks of the drainage feature to the greatest extent practicable.
70. Disturbed areas resulting from drainage feature crossing construction, upgrading or maintenance must be re-shaped and soil stabilisation measures put in place within five days to achieve a stable cross section, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.
71. The construction, upgrading and maintenance of drainage feature crossings must restrict disturbance of vegetation and groundcover in the filter strip or buffer strip to a maximum length of 3 metres upstream and downstream of the crossing. Where clearing beyond 3 metres is necessary during construction, upgrading and maintenance of drainage feature crossings, State Forests may approve additional clearing and document the approval and the reasons why it was necessary. This documentation must be kept on file at the Regional Office.
72. Soil erosion and sediment control measures must be employed and maintained during drainage feature crossing construction, maintenance and upgrading operations that takes more than one day to complete. Soil erosion and sediment control measures must be:
 - a) properly installed, constructed and maintained;
 - b) prevent to the greatest extent practicable the flow from the extraction track or snig track entering the disturbed areas; and
 - c) prevent to the greatest extent practicable the deposition of spoil into the drainage feature.
73. Soil stabilisation must be undertaken to all disturbed areas within 20 metres either side of snig track or extraction track crossing of watercourses or drainage lines. This does not include the track surface or track drainage structures within 20 metres either side of the watercourse or drainage line. Soil stabilisation must be completed within five days of crossing construction, upgrading and maintenance operations.

BRIDGES

74. Soil stabilisation measures must be used to protect bridge embankments from table drain discharge. This must be completed within five days of construction, upgrading and maintenance operations at that crossing.
75. Where soil or gravel is used as the pavement for the bridge surface, structures must be installed to prevent soil or gravel from entering the drainage feature. Soil or gravel deposited within the drainage feature must be removed. Removal of soil or gravel must be undertaken in a manner,

which prevents disturbance to the bed and bank of the drainage feature to the greatest extent practicable.

76. Disturbed areas resulting from the removal of soil or gravel from the drainage feature must be re-shaped and soil stabilisation measures put in place within five days to achieve a stable cross section, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.

CULVERTS

77. Fill material, including soil or gravel, placed on pipes and used as the crossing surface must not be placed upstream of the culvert inlet or in the downstream flowpath of the culvert outlet.
78. Soil stabilisation measures must be used to protect the upstream and downstream fill batters surrounding the culvert pipe(s). This must be completed within five days of crossing construction and maintenance operations.
79. Pipe outlets must discharge onto a stable surfaces capable of handling concentrated water flow. Scouring at the pipe outlet must not undermine the crossing structure or initiate gully erosion.
80. Culvert recovery and removal of associated soil fill must be undertaken in a manner which prevents disturbance to the bed and banks of the drainage feature to the greatest extent practicable.
81. Where a culvert is removed, the disturbed areas within the drainage feature must be re-shaped and soil stabilisation measures put in place within five days to achieve a stable cross section, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.

CAUSEWAYS

82. The bed and banks of causeway crossings must consist of a stable surface or be constructed of an erosion resistant material.

TEMPORARY EXTRACTION TRACK AND SNIG TRACK CROSSINGS

83. Temporary crossings must be immediately removed at the completion of their use. Removal of temporary crossings must prevent disturbance to the greatest extent practicable to the bed and banks of the drainage line or watercourse.
84. Where a temporary crossing is removed, the crossings must be re-shaped and soil stabilisation measures put in place within five days to achieve a stable cross section, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.

DISPERSIBLE SOILS

85. Where snig track or extraction track crossings of drainage lines or watercourses are constructed, upgraded or maintained in dispersible soils, State Forests must achieve at least 70% groundcover on the track surface within 20 metres either side of the crossing. This must be achieved at the completion of operations at each crossing.

(For example this could be achieved by one of the following techniques, or a combination thereof:

- a) retain at least 70% existing ground cover using walkover techniques;*
- b) retain or respread slash and logging debris over at least 70% of the snig track or extraction track surface within 20 metres; or*
- c) providing a non-dispersive cover, over at least 70% of snig track or extraction track surface within 20 metres).*

DRAINAGE OF EXTRACTION TRACKS AND SNIG TRACKS.

86. Snig track and extraction track drainage must be located and constructed to ensure that water flow or potential water flow does not occur on snig or extraction track surfaces for distances exceeding those given in Table 3.

(For example this could be achieved by one of the following techniques, or a combination thereof:

- a) retain existing ground cover using walkover techniques;*
- b) retain or cover track surface with slash and logging debris; or*
- c) construct or maintain track with outfall drainage; or*
- d) constructed track drainage structures).*

87. Where extraction tracks are used, existing groundcover must be retained by using walkover techniques, or cover the track surface with slash and logging debris. Where concentrated water flow or potential water flow occurs along bare ground in wheel ruts, State Forests must ensure that the distance of the water flow does not exceed those specified in Table 3.

Table 3: Maximum distance of water flow or potential water flow along snig track or extraction track surface (metres)

Track Grade (degrees)	Maximum Distance (metres)
5	100
10	60
15	40
20	25
25	20
30	15

Table 3 may be interpolated to derive site-specific maximum spacings

88. Where track drainage structures are used they must be located, constructed and maintained to:
- a) have sufficient capacity to convey the peak flow from a 1:2 year storm event. The determination of the peak flow must be carried out in accordance with Part C of Schedule 2.; and
 - b) divert water onto stable surfaces capable of handling concentrated flow and which provide for efficient sediment trapping.
89. Where crossbanks are used, State Forests may elect not to calculate the capacity of the crossbanks in accordance with condition 88(a) of this schedule. In these cases the crossbanks must be constructed to a minimum unconsolidated effective height of 35 cm or a consolidated effective bank height of 25 cm. A maximum height of 50 cm unconsolidated is recommended. Where State Forests elects to calculate the capacity of the crossbank in accordance with condition 88(a) of this schedule, the calculations must be kept on file at the Regional Office.
90. Snig tracks and extraction tracks must be drained between 5 metres and 20 metres from drainage line or watercourse crossings. This distance must be measured from the top of the bank of the incised channel, or where there is no defined bank, from the edge of the channel. Where this cannot be achieved between 5 metres and 20 metres from the drainage line or watercourse, site-specific techniques must be employed to prevent the pollution of waters.
91. Where practicable, constructed snig tracks must be drained between 5 metres and 20 metres from drainage depression crossings. The distance must be measured from the apparent centre of the depression.
92. Where a storm event exceeding the design criteria of track drainage structures occurs within 12 months of the completion of logging operations. State Forests must assess track drainage structures and repair any that do not comply with the requirements of condition 88 of this schedule, unless such track repair work increases the risk of water pollution. Additional track drainage structures must be constructed and soil stabilisations works undertaken, where this would reduce the risk of water pollution.
93. Crossbanks must not be constructed of bark.
94. Windrows resulting from snig track construction, upgrading or maintenance operations must be removed from the shoulders of snig tracks unless specifically constructed to prevent erosion of fill batters or where infall drainage is used. Where it is not possible to remove windrows they must be cut through at regular intervals to ensure that water flow on track surface does not exceed the distances specified in Table 3.
95. Drainage must be effected as soon as practicable at the completion of operations on each extraction or snig track, and in any event within two days, unless the soil is saturated. State Forests must document instances where saturated soil conditions preclude the construction of effective drains.
96. Drainage must be installed if the use of an extraction track or snig track is to be temporarily discontinued in excess of five days, unless the soil is saturated. State Forests must document instances where saturated soil conditions preclude the construction of effective drains.

WET WEATHER RESTRICTIONS

97. Tracks must not be used where:

- a) there is run off from the snig track surface; or
- b) there is a likelihood of significant rutting leading to turbid runoff from the track surface.

DOWNHILL SNIGGING

98. Where downhill snig tracks connect directly with a log dump, one of the following techniques or a combination thereof must be used:

- a) snig tracks must enter the log dump from the side or below; or
- b) a drainage structure must be in place immediately before a snig track enters the log dump at the end of each day's operation.

I. STORAGE AND HANDLING OF HAZARDOUS SUBSTANCES AND WASTE

99. Fuel oils must be stored and handled in compliance with the requirements of AS1940 (1993)- "The storage and handling of flammable and combustible liquids".

100. Mobile fuel tanks must not be located within, or within 10 metres of boundary of a filter strip.

101. The transportation and storage of fuel and the refuelling of equipment must be carried out in a manner which prevents the pollution of waters as a result of the escape of fuel.

102. Chemicals must be stored and handled in compliance with the requirements of the Control of Workplace Hazardous Substances - National Model Regulation and National Code of Practice, June 1991, published by Worksafe Australia.

103. Plant and equipment and other substances and materials on the site of logging operations must be handled, operated, moved and stored in a proper and efficient manner for the purposes of preventing the pollution of waters.

104. All servicing and repairs of equipment must be carried out in a manner which prevents the pollution of surface and ground waters.

105. Waste must not be buried or otherwise deposited in a compartment, age class or roading area.

106. The general work area must be kept free of waste generated during logging operations.

107. Waste must be properly and efficiently stored until it can be removed from the forest.

108. Waste stored for removal must be removed no less than seven days after completion of harvesting or roading operations in the compartment, age class, or roading area.

109. Waste must be removed from the forest and disposed of in a proper and efficient manner at an appropriate facility.

110. In conditions 105 to 109 of this Schedule, "waste" includes but is not limited to tyres, drums, wire rope, sump oil and litter, but does not include forest or logging debris.

SCHEDULE 5

(Conditions 25; 26; 31; 33; 38; 40; Schedules 3, 6 & 7)

OPERATING CONDITIONS FOR ROADS

The following conditions must be complied with in undertaking all logging operations commenced during this licence period and permitted by this licence. Note that the environmental outcomes specified in this schedule must be complied with and that the italicised notes are guidance only. Compliance with the guidance notes may not necessarily achieve the required environmental outcome, and site-specific techniques must be developed and applied.

A. SITE-SPECIFIC CONDITIONS

1. If prior to, or during logging operations, it becomes apparent that the conditions of this licence are not capable of achieving the objectives of this licence, State Forests must:
 - a) formulate special site-specific conditions aimed at achieving the objectives of this licence; and
 - b) place the site-specific conditions determined in condition 1(a) of this Schedule on file at the Regional Office and produce them on request to an EPA officer.
2. Site-specific techniques to achieve the conditions of Schedule 5 must be identified during the planning process. These site-specific techniques must be documented and placed on file at the Regional Office prior to the commencement of logging operations, and produced on request to an EPA officer.

B. ROADS

3. Location of roads must be marked in the field prior to construction.
4. Roads must be constructed, upgraded or maintained with a maximum grade of 10 degrees. The maximum grade may be increased to 15 degrees in the following circumstances:
 - a) to negotiate difficult terrain such as rock outcrops, unstable soils or poorly drained soils; or
 - b) to take advantage of favourable terrain such as to reach a geologically stable bench or saddle; or
 - c) to take advantage of soil which is more suitable for the construction and drainage of the road; or
 - d) to reduce the catchment area above the road.
5. Where clearing outside the road prism for road construction, upgrading or maintenance operations exceeds 3 metres either side of the road prism the following techniques or a combination thereof must be implemented within 5 days of the completion of road construction, upgrading or maintenance operations:
 - a) retaining at least 70 % ground cover within the cleared area;
 - b) retaining or respreading slash and logging debris over at least 70 % of the

- c) retaining or respreading a minimum of 5 centimetres of topsoil, seeded with appropriate grasses in order to achieve 70 % ground cover over the cleared area; and
 - d) provide artificial groundcover, in order to achieve 70 % ground cover within the cleared area using geotextile, mulch or erosion control mats.
- 6. Substantial tree debris resulting from road construction, upgrading or maintenance operations must be placed outside the boundary of filter strips and where practicable outside the boundary of buffer strips.

C. ROAD DRAINAGE

- 7. Roads must be drained in accordance with the conditions of this schedule during and upon the completion of logging operations.
- 8. Road drainage structures must be located and constructed in such a way that they will have sufficient capacity to convey the peak flow from a 1:5 year storm event. The determination of the peak flow must be carried out in accordance with Part C of Schedule 2.
- 9. Water flow or potential water flow along road surfaces or table drains, or both must not exceed the distances specified in Table 1. The maximum length of water flow or potential water flow along roads and table drains must be determined by measuring the grade of the road and referring to the maximum distances specified in Table 1.

(For example this could be achieved by one of the following techniques or a combination thereof:

- a) *outfall drainage;*
- b) *relief pipes;*
- c) *mitre drains;*
- d) *crossbanks constructed to convey the peak flow from a 1:5 year storm event. The determination of the peak flow must be carried out in accordance with Part C of Schedule 2. Copies of the calculations used to determine crossbank height must be kept on file at the Regional Office. State Forests may elect not to calculate the capacity of the crossbanks, in which case they must be constructed to a minimum unconsolidated effective bank height of 35 cm, or a minimum consolidated effective bank height of 20 cm; and*
- e) *spoon drains constructed to convey the peak flow from a 1:5 year storm event. The determination of the peak flow must be carried out in accordance with Part C of Schedule 2. Copies of the calculations used to determine spoon drain depth must be kept on file at the Regional Office. State Forests may elect not to calculate the capacity of the spoon drains in which case they must be constructed to a minimum depth of 15 cm).*

Table 1: Maximum distance of water flow or potential water flow along road surfaces and table drains (metres).

Road grade (degrees)	Maximum Distance (metres)
1	200
2	175
3	150
4	125
5	100
6	90
7	80
8	70
9	65
10	60
11	55
12	50
13	45
14	40
15	40

10. Road drainage structures must be inspected twice weekly during haulage operations to ensure that they comply with the conditions of this schedule. Where road drainage structures do not comply with the conditions of this schedule, State Forests must repair the road and road drainage structures:

- a) within 2 days where the repair work does not require the use of machinery; or
- b) within 7 days where the repair work requires the use of machinery.

11. Road drainage structures must be located, constructed and maintained in such a way that water is diverted onto a stable surface capable of handling concentrated water flow and that provides efficient sediment trapping and energy dissipation.

(For example this could be achieved by one of the following techniques or a combination thereof:

- a) *diverting flow onto undisturbed vegetation;*
- b) *diverting flow onto slash and logging debris;*

- c) *diverting flow onto a natural or artificial non-erosive surface; or*
- d) *installing natural or artificial sediment traps below the outlet of the road drainage structure).*

12. Notwithstanding condition 11 of this schedule, road surface drainage may be discharged onto a snig track or extraction track surface, where such a discharge point will reduce the height of the fill batter over which the road drainage is to be discharged. The length of water flow or potential water flow along the snig track or extraction track surface must not exceed 15 metres. This distance must be measured from the edge of the road surface.
13. Soil erosion and sediment control measures required by this schedule must be:
 - a) properly installed and constructed; and
 - b) maintained in a manner so that they are in a proper and efficient condition.
14. Soil erosion and sediment control measures must be inspected twice weekly during logging operations. These inspections must ensure that such soil erosion and sediment control measures comply with the requirements of this schedule. The date and type of any remedial action required must be recorded and kept on file at the Regional Office.
15. Earth windrows resulting from road construction and upgrading operations must be removed from the shoulders of all roads unless specifically constructed to prevent erosion of fill batters or where infall drainage is used. Earth windrows from road maintenance must be cut through at regular intervals to ensure that water flow on road surfaces does not exceed the distances in Table 1.
16. Where a storm event exceeding the design criteria of road drainage structures occurs within the period of licence coverage then all road drainage structures and sediment control measures must be inspected within 14 days of the storm event to assess whether they comply with requirements of this schedule.
17. Where a storm event exceeds the design criteria for road drainage structures and they do not comply with the requirements of this schedule, then additional road drainage structures, sediment control techniques and soil stabilisation measures must be implemented within 21 days of the storm event.
18. Harvesting debris and spoil which is likely to impede the flow of water in road drainage structures must be removed from such structures twice weekly.

D. WET WEATHER RESTRICTIONS

19. Haulage on natural surface roads must cease when there is runoff from the road surface. Loaded trucks and partially loaded trucks may complete their journey.

E. BLADING OFF ROADS

20. Blading-off of roads:
 - a) may be permitted only where damage to the road surface and road drainage structures is minimal and subsequent drainage and repair is possible; and

- b) must be approved and documented by State Forests; and
- c) if carried out in accordance with conditions 20(a) and 20(b) of this schedule, must include the stockpiling, in a recoverable position, of all soil material removed, and respreading of such material, once the logging operation is completed.

F. MAXIMUM SLOPES FOR ROADS

- 21. Where an existing road traverses groundslopes in excess of 30 degrees, a suitably qualified person must verify the stability of the road and specify the site-specific conditions required to ensure the stability of the road, road drainage structures and batters.
- 22. Where an existing road traverses groundslopes in excess of 30 degrees, the investigation and specification of site-specific conditions must be documented, including the name and qualifications of the person carrying out the investigation and kept on file at the Regional Office.
- 23. Where an existing road traverses groundslopes in excess of 30 degrees, the road, road drainage structures and batters must be maintained in accordance with the site-specific conditions developed in accordance with condition 21 of this Schedule.
- 24. New roads must not be constructed or existing roads must not be upgraded on groundslopes in excess of 30 degrees, unless an engineering design has been undertaken for the road and site-specific conditions have been developed to ensure stability of the road, road drainage structures and batters. This engineering design must be undertaken by a suitably qualified person.
- 25. The engineering design, including all associated calculations and the site-specific conditions developed in accordance with condition 24 of this Schedule must be held on file in the Regional Office, including the name and qualifications of the person that carrying out the engineering design.
- 26. All new and existing roads on ground slopes in excess of 30 degrees must be constructed or upgraded in accordance with the engineering design and site-specific conditions developed in accordance with conditions 24 and 25 of this Schedule.

G. MASS MOVEMENT HAZARD

- 27. Where road construction, upgrading or maintenance is proposed in areas identified with a mass movement hazard, a suitably qualified person must design the road and develop site-specific stabilisation conditions which must be used to ensure stability of the road, road drainage structures and batters.
- 28. Where road construction, upgrading or maintenance is proposed in areas identified with a mass movement hazard, the investigation and specification of site-specific conditions must be documented, including the name and qualifications of the person carrying out the investigation and kept on file at the Regional Office. The assessment of mass movement hazard must be undertaken in accordance with module 2 of Schedule 3 of this licence.
- 29. Where road construction, upgrading or maintenance is proposed in areas identified with a mass movement hazard, the road must be constructed in accordance with the site-specific

prescriptions and soil stabilisation techniques.

H. ROAD BATTERS

30. Where during road construction, the toe of a fill batter intrudes into a filter strip, site-specific mitigating techniques must be employed to prevent water pollution to the greatest extent practicable.

(For example this could be achieved by using one of the following techniques, or a combination thereof:

- a) *retaining or respreading a minimum of 5 centimetres of topsoil, seeded with appropriate grasses in order to achieve 70 % groundcover; or*
- b) *providing artificial groundcover, in order to achieve 70 % groundcover over the batter, using geotextile, mulch, erosion control mats; or*
- c) *use of retaining walls).*

31. Road batters must be constructed and maintained to prevent erosion and water pollution to the greatest extent practicable.

32. Where a stable road batter will not result through natural means, batter stabilisation measures must be undertaken within 14 days of the completion of road construction, upgrading or maintenance operations.

33. Road drainage structures which discharge onto:

- a) newly constructed fill batters greater than one metre in height; or
- b) existing fill batters greater than one metre in height and having unstable surfaces or surfaces with less than 70% ground cover;

must have a drop down structure and dissipater installed. The drop down structure and dissipater must not be constructed of bark or slash. The dissipater may be constructed of logging debris greater than 100 mm diameter.

I. ROAD CROSSINGS WITHIN 30 METRES OF DRAINAGE FEATURES

34. Roads must be drained using a crossbanks, relief pipe, spoon drains or mitre drains between 5 metres and 30 metres from the drainage feature crossing. This distance must be measured from the top of the bank of the incised channel, or where there is no defined bank, from the edge of the channel.

35. Notwithstanding condition 34 of this Schedule, where a crossbank, relief pipe, spoon drain or mitre drain cannot be installed between 5 metres and 30 metres from the drainage feature crossing, site-specific techniques must be employed to prevent the pollution of water.

(For example this could be achieved by one of the following techniques, or a combination thereof:

- a) *armouring the road surface and/or table drain;*
- b) *grassing the road surface and/or table drain;*
- c) *covering the surface of the table drain with an erosive resistant fabric;*

- d) *or*
installing sediment traps or sediment fences).

In addition, a crossbank, relief pipe, spoon drain or mitre drain must be installed at the first opportunity from the drainage feature crossing.

J. DRAINAGE FEATURE CROSSINGS

36. Drainage feature crossings must be designed, constructed, upgraded and maintained to wholly contain a peak flow from a 1:5 year storm event. The determination of the peak flow must be carried out in accordance with Part C of Schedule 2.
37. Drainage feature crossings must be designed, constructed upgraded and maintained to withstand the peak flow from a 1:10 year storm event. The determination of the peak flow must be carried out in accordance with Part C of Schedule 2.
38. Drainage features must only be crossed using stable structures, being either causeways, culverts or bridges.
39. Notwithstanding condition 38 of this Schedule, existing log dams and gully stuffers may be used where the stability of the structure can be ensured for the duration of the logging operation. A suitably qualified person must determine the stability of the structures prior to the commencement of logging operations.
40. The stability of existing log dams and gully stuffers must also be inspected twice weekly during logging operations. Where an existing log dam or gully stuffer becomes unstable, State Forests must replace the crossing structure within five days.
41. Clearing associated with the construction, upgrading or maintenance of drainage feature crossings must be undertaken at, or as close as practicable to, right angles to the water flow unless an angled approach reduces ground and soil disturbance.
42. Drainage feature crossing construction, maintenance and upgrading must be undertaken in a manner which prevents disturbance to the bed and banks of the drainage feature to the greatest extent practicable.
43. Disturbed areas resulting from the drainage feature crossing construction, upgrading or maintenance must be re-shaped and soil stabilisation measures put in place within five days to achieve a stable cross section, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.
44. The construction and maintenance of drainage feature crossings must restrict disturbance of vegetation and groundcover in the filter strip or buffer strip to a maximum length of 3 metres upstream and downstream of the crossing. Where clearing beyond 3 metres is necessary during construction and maintenance of drainage feature crossings, State Forests may approve additional clearing and document the approval and the reasons why it is necessary.
45. Soil erosion and sediment control measures must be employed and maintained during drainage feature crossing construction, maintenance and upgrading operations that require

greater than one day to complete. Soil erosion and sediment control structures and measures must:

- a) be properly installed, constructed and maintained; and
 - b) prevent to the greatest extent practicable the flow of water from the road surface and road drainage structures entering the disturbed areas; and
 - c) prevent to the greatest extent practicable the deposition of spoil into the drainage feature.
46. Spoil from crossing construction, upgrading and maintenance operations must not be deposited into drainage features. Spoil from crossing construction, upgrading and maintenance operations must be removed from drainage features. Removal of spoil must be undertaken in a manner, which prevents disturbance to the bed and bank of the drainage feature to the greatest extent practicable.
47. Disturbed areas resulting from the removal of spoil from the drainage feature must be re-shaped and soil stabilisation measures put in place within five days to achieve a stable cross section, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.
48. Spoil from road construction, upgrading and maintenance operations must not be placed in filter strips or buffer strips.
49. Soil stabilisation must be undertaken to all disturbed areas within 20 metres either side of a watercourse, drainage line, wetland or swamp. This area does not include the road surface, road drainage structures or cut batters within 20 metres of watercourse, drainage line, wetlands or swamps. Soil stabilisation measures must be completed within five days of crossing construction, upgrading or maintenance operations, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.
50. Notwithstanding condition 49 of this schedule, where roads are constructed in dispersible soils, the road surface, batters and table drains, within 20 metres either side of a drainage feature crossing, must be covered with a stable, non-dispersible surface no more than five days after the completion of crossing construction.

BRIDGES

51. Soil stabilisation measures must be used to protect bridge embankments from table drain discharge. This must be completed within five days of crossing construction, upgrading and maintenance operations.
52. Where soil or gravel is used as the pavement for the bridge surface, structures must be installed to prevent soil or gravel from entering the drainage feature. Soil or gravel deposited within the drainage feature must be removed. Removal of soil or gravel must be undertaken in a manner, which prevents disturbance to the bed and bank of the drainage feature to the greatest extent practicable.

53. Disturbed areas resulting from the removal of soil or gravel from the drainage feature must be re-shaped and soil stabilisation measures put in place within five days to achieve a stable cross section, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.

CULVERTS

54. Culvert recovery and removal of associated soil fill must be undertaken in a manner which prevents disturbance to the bed and banks of the drainage feature to the greatest extent practicable. Disturbed areas within the drainage feature must be re-shaped and soil stabilisation measures put in place within five days to achieve a stable cross section, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.
55. Fill material, including soil or gravel, placed on pipes and used as the crossing surface must not be placed upstream of the culvert inlet or in the downstream flowpath of the culvert outlet.
56. Soil stabilisation measures must be used to protect the upstream and downstream fill batters surrounding the culvert pipe(s). This must be completed within five days of crossing construction and maintenance operations.
57. Pipe outlets must discharge onto stable surfaces capable of handling concentrated water flow. Scouring at the pipe outlet must not undermine the crossing structure or initiate gully erosion.

CAUSEWAYS

58. The bed and banks of causeway crossings must consist of a stable natural surface or be constructed of an erosion resistant material. Causeway crossings must be inspected twice weekly during haulage operations to assess the stability of the crossing.
59. If the use, construction, upgrading or maintenance of a causeway crossing results in erosion or deformation of the road surface or the bed and banks of the drainage feature, then:
- a) the causeway crossing must be replaced with a bridge or pipe culvert(s); or
 - b) the causeway surface and approaches must be armoured with a non-erosive material.

Repair or replacement of causeway crossings must include all sections of the crossing and crossing approaches where erosion or deformation has occurred.

SCHEDULE 6

(Condition 64)

Information that must be recorded and maintained by State Forests

All of the information required to be recorded and documented by this schedule must be held on file of the Regional Office and provided to an EPA officer upon request.

A. Information that must be recorded during the pre-operational planning of logging operations

1. State Forests must record and document the following information that is collected or calculated during the site-specific pre-operational planning of logging operations:

Schedule 3

- a) documentation on the inherent soil erosion and water pollution hazard assessment as required in module 1 of Schedule 3 of this licence;
- b) documentation on the mass movement assessment as required in module 2 of Schedule 3 of this licence;
- c) documentation on the soil dispersibility assessment as required in module 3 of Schedule 3 of this licence;
- d) documentation on the seasonality procedure as required in module 4 of Schedule 3 of this licence; and
- e) documentation on the updating of existing logging operations as required in module 5 of Schedule 3 of this licence

Schedule 4

- f) documentation of the site specific conditions developed in accordance with condition 2 of Schedule 4 of this licence;
- g) written approval from the Commissioner of Soil Conservation permitting logging operations within 20 metres of a bank on a prescribed stream, in accordance with condition 17 of Schedule 4 of this licence;
- h) documentation of the repair and remediation of existing log dams and gully stuffers in accordance with condition 65 of Schedule 4 of this licence;
- i) design calculations for drainage feature crossings by snig tracks or extraction tracks in accordance with conditions 66 and 67 of Schedule 4 of this licence;
- j) design calculations for snig track and extraction track drainage structures drainage in accordance with condition 89 of Schedule 4 of this licence;

Schedule 5

- k) documentation of the site specific conditions developed in accordance with

- condition 2 of Schedule 5 of this licence;
- l) design calculations for road drainage structures drainage in accordance with condition 8 of Schedule 5 of this licence;
- m) documentation of the site investigation where an existing road traverses groundslopes in excess of 30 degrees in accordance with conditions 21 and 22 of Schedule 5 of this licence;
- n) documentation and engineering road design where a new road traverses groundslopes in excess of 30 degrees in accordance with conditions 24 and 25 of Schedule 5 of this licence;
- o) documentation and engineering road design where a new road or proposed road traverses an area with a mass movement hazard in accordance with conditions 27 and 28 of Schedule 5 of this licence;
- p) design calculations for drainage feature crossings by roads in accordance with conditions 36 and 37 of Schedule 5 of this licence; and
- q) documentation of the site investigation of existing log dams and gully stuffers in accordance with condition 39 of Schedule 5 of this licence.

The dates of commencement and completion that must be recorded during logging operations

2. State Forests must record the dates of commencement and completion of the following activities during logging operations approved and commenced in accordance with Part 2 of Section 5 and during logging operations updated in accordance with Division 5 of Part 1 of Section 3:
 - a) logging operations in the compartment, age class or roading area;
 - b) logging operations for each log dump;
 - c) road construction, upgrading or maintenance operations in the compartment, age class or roading area;
 - d) construction, upgrading or maintenance of drainage feature crossings by roads in the compartment, age class or roading area;
 - e) construction, upgrading or maintenance of drainage feature crossings by snig tracks or extraction tracks in the compartment or age class;
 - f) post-harvest burning;
 - g) temporary cessation of logging operations in the compartment, age class or roading area;
 - h) implementation of soil stabilisation techniques at drainage features crossings by roads; and
 - i) implementation of soil stabilisation techniques at drainage features crossings by snig tracks or extraction tracks.
3. State Forests must record the dates of commencement and completion of the following during logging operations approved and commenced pursuant to a variation under condition 16(b) of the 1997/98 licences and on land listed in Division 2 of Schedule 1, unless those operations have been updated in accordance with Division 5 of Part 1 of Section 3:

- (a) logging operations on each log dump, where constructed drainage on snig or extraction tracks servicing that dump are required to comply with conditions 108-110 of Schedule 4 of the 1997/98 licences; and
 - (b) road construction in accordance with Part F of Schedule 4 of the 1997/98 licences; and
 - (c) construction of drainage feature crossings by roads and snig tracks; and
 - (d) post-harvest burning; and
 - (e) temporary cessation of logging operations; and
 - (f) logging operations in the compartment, age class or roading area.
4. State Forests must record the dates of commencement and completion of the following during logging operations approved and commenced:
- (i) pursuant to a variation under condition 16(b) of the 1996/97 licences and on land listed in Division 2 of Schedule 1; or
 - (ii) pursuant to a variation under condition 16(b) of the 1995/96 licences and on land listed in Division 2 of Schedule 1; or
 - (iii) pursuant to a variation under condition 11(3)(e) of the 1994/95 licences and on land listed in Division 2 of Schedule 1

unless those operations have been updated in accordance with Division 5 of Part 1 of Section 3:

- (a) logging operations on each log dump, where constructed drainage on snig or extraction tracks servicing that dump is required to comply with conditions 108-110 of Schedule 4 of the 1996/97 licences; and
- (b) road construction in accordance with Part F of Schedule 4 of the 1996/97 licences; and
- (c) construction of drainage feature crossings by roads and snig tracks; and
- (d) post-harvest burning; and
- (e) temporary cessation of logging operations; and
- (f) logging operations in the compartment, age class or roading area.

Information that must be recorded during logging operations

5. State Forests must record and document the following information during logging operations approved and commenced in accordance with Part 2 of Section 5 and during logging operations updated in accordance with Division 5 of Part 1 of Section 3:
- a) the reasons why the clearing adjacent to a drainage feature crossing by a snig track or extraction track exceeds 3 metres upstream and downstream of the crossing in accordance with condition 71 of Schedule 4 of this licence;
 - b) documentation where State Forests elects to re-calculate the effective height

of crossbank used on snig tracks or extraction tracks in accordance with condition 89 of Schedule 4 of this licence;

- c) instances where the installation of snig track or extraction track drainage is precluded due to saturated soil conditions in accordance with conditions 95 and 96 of Schedule 4 of this licence;
- d) the reasons why the clearing adjacent to a drainage feature crossing by a road exceeds 3 metres upstream and downstream of the crossing in accordance with condition 44 of Schedule 5 of this licence.

SCHEDULE 7

(Conditions 10; 13; 16; 29; 40 & 42)

Part A: Forms to be used to notify the EPA

- Form 1:** Summary of logging operations prepared in accordance with Condition 16 and submitted in accordance with Condition 17 (applying to updated operations).
- Form 2:** Summary of logging operations prepared in accordance with Condition 31 and submitted in accordance with Condition 32 (applying to new operations)
- Form 3:** Notification of licence ceasing to apply to logging operations in accordance with Condition 42 (applying to all operations regardless of when they commenced)

Part B: Operational map requirements

Part C: Location map requirements

Part A - FORM 1

SUMMARY OF NEW LOGGING OPERATIONS
SUBJECT TO DIVISION 4 of SCHEDULE 1

1. GENERAL INFORMATION

State Forest: _____ Compartment/Age Class: _____

Region: _____ State Forest Number: _____

Total Area: _____ (ha) Net Harvest Area: _____ (ha)

Operation Type: _____ Commencement Date: _____ *

* (not to be filled in until operation commences)

SOIL EROSION AND WATER POLLUTION HAZARD ASSESSMENT

2. SOIL EROSION/WATER POLLUTION HAZARD

WPHC CLASS	Slope Range (degrees)	% Net Harvest Area
1		%
2		%
3		%
4		%

Rainfall Erosivity: _____

Rainfall Zone: _____

Soil Erodibility (K factor): _____

Seasonality Restrictions apply: _____ Yes/No

3. PROPORTION DISPERSIBLE SOIL (PDS) - (Rounded to nearest whole number)

A Horizon: %D: _____ x %C: _____ /100 = _____

B Horizon: %D: _____ x %C: _____ /100 = _____

Dispersible soil identified by: _____

SITE-SPECIFIC OPERATIONAL CONDITIONS

4. ROAD CONSTRUCTION:

Length of new roads to be constructed: _____ m

Length of new roads to be constructed with a grade greater than 10°: _____ m

Length of new roads to be constructed on a ground slope greater than 30°: _____ m

5. EXISTING ROADS & OPENING OF EXISTING ROADS

Length of roads to be maintained/upgraded/re-opened: _____ m

Length of existing roads with a grade greater than 10°: _____ m

Length of existing roads with a ground slope greater than 30°: _____ m

6. ROAD DRAINAGE FEATURE CROSSINGS TO BE CONSTRUCTED

Number of new drainage line, watercourse, swamps and wetlands road crossings to be constructed: _____

Number of new drainage line, watercourse, swamps and wetlands road crossings where the road cannot be drained with a crossbank, mitre drain, relief pipe or spoon drain within 30 metres on either side of the crossing: _____

7. EXISTING ROAD DRAINAGE FEATURE CROSSINGS

Number of existing drainage line, watercourse, swamps and wetlands road crossings to be used: _____

Number of existing drainage line, watercourse, swamps and wetlands road crossings proposed for maintenance or upgrading: _____

Number of existing drainage line, watercourse, swamps and wetlands crossings where the road cannot be drained with a crossbank, mitre drain, relief pipe or spoon drain within 30 metres on either side of the crossing: _____

8. SNIG TRACKS & EXTRACTION TRACKS

Estimated number of snig tracks & extraction track crossings of watercourses and drainage line: _____

Is sidecut snig track construction proposed (greater than 1m in height): Yes/No

9. BORROW PITS & GRAVEL PITS

Number of borrow pits or gravel pits to be used: _____

10. POST-HARVEST BURNING

Is post-harvest burning proposed: _____ Yes/No

Preferred season of burn and method of ignition: _____

11. COMPLIANCE

I certify that this is a true and accurate record of this proposed logging operation and that the following requirements have been fulfilled:

- a) the planning of this proposed logging operation has been undertaken in accordance with Schedule 2 of the Pollution Control Licence;
- b) the site assessments for dispersibility, mass movement and the determination of the inherent hazard level have been undertaken in accordance with Schedule 3 of the Pollution Control Licence; and
- c) site-specific prescriptions have been identified and developed in accordance with Schedules 2, 3 and 4 of the Pollution Control Licence.

Regional Manager Name: _____
(Block letters)

Regional Manager Signature: _____

Date: _____

SUMMARY OF NEW LOGGING OPERATIONS
COMMENCED ON OR AFTER 11 APRIL 1998

1. GENERAL INFORMATION

State Forest: _____ Compartment/Age Class: _____

Region: _____ State Forest Number: _____

Total Area: _____ (ha) Net Harvest Area: _____ (ha)

Operation Type: _____ Commencement Date: _____ *

* (not to be filled in until operation commences)

SOIL EROSION AND WATER POLLUTION HAZARD ASSESSMENT

2. INHERENT HAZARD LEVEL

Slope Class	% Total Compartment/Age Class
0-10	%
10-20	%
20-25	%
25-30	%
30+	%

Inherent Hazard Level: _____

Rainfall Erosivity: _____

Rainfall Zone: _____

Soil Regolith Class(es): _____

Soil Regolith verified by: _____

Seasonality Restrictions apply: _____ Yes/No

3. DISPERSIBLE SOIL ASSESSMENT

Dispersible soil present within the compartment/age class: _____ Yes/No

Dispersible soil identified by: _____

4. MASS MOVEMENT

Mass movement hazard within the compartment/age class (actual or potential): Yes/No

Mass movement identified by: _____

SITE-SPECIFIC OPERATIONAL CONDITIONS

5. ROAD CONSTRUCTION

Length of new roads to be constructed: _____ m

Length of new roads to be constructed with a grade greater than 10°: _____ m

Length of new roads to be constructed on a ground slope greater than 30°: _____ m

6. EXISTING ROADS & OPENING OF EXISTING ROADS

Length of roads to be maintained/upgraded/re-opened: _____ m

Length of existing roads with a grade greater than 10°: _____ m

Length of existing roads with a ground slope greater than 30°: _____ m

7. ROAD DRAINAGE FEATURE CROSSINGS TO BE CONSTRUCTED

Number of new drainage line, watercourse, swamps and wetlands road crossings to be constructed: _____

Number of new drainage line, watercourse, swamps and wetlands road crossings where the road cannot be drained with a crossbank, mitre drain, relief pipe or spoon drain within 30 metres on either side of the crossing: _____

8. EXISTING ROAD DRAINAGE FEATURE CROSSINGS

Number of existing drainage line, watercourse, swamps and wetlands road crossings to be used: _____

Number of existing drainage line, watercourse, swamps and wetlands road crossings proposed for maintenance or upgrading: _____

Number of existing drainage line, watercourse, swamps and wetlands crossings where the road cannot be drained with a crossbank, mitre drain, relief pipe or spoon drain within 30 metres on

either side of the crossing: _____

9. SNIG TRACKS & EXTRACTION TRACKS

Estimated number of snig tracks & extraction track crossings of watercourses and drainage lines: _____

Is sidecut snig track construction proposed (greater than 1m in height): _____ Yes/No

10. BORROW PITS & GRAVEL PITS

Number of borrow pits or gravel pits to be used: _____

11. POST-HARVEST BURNING

Is post-harvest burning proposed: _____ Yes/No

Preferred season of burn and method of ignition: _____

12. COMPLIANCE

I certify that this is a true and accurate record of this proposed logging operation and that the following requirements have been fulfilled:

- a) the planning of this proposed logging operation has been undertaken in accordance with Schedule 2 of the Pollution Control Licence;
- b) the site assessments for dispersibility, mass movement and the determination of the inherent hazard level have been undertaken in accordance with Schedule 3 of the Pollution Control Licence; and
- c) site-specific prescriptions have been identified and developed in accordance with Schedules 2, 3, 4, 5 and 6 of the Pollution Control Licence.

Regional Manager Name: _____
(Block letters)

Regional Manager Signature: _____

Date: _____

**NOTIFICATION OF LICENCE CEASING TO
APPLY TO A LOGGING OPERATION**

On behalf of State Forests I hereby notify the EPA that the licence is to cease to apply to the land identified below:

State Forest: _____

Compartment/age class: _____

Region: _____

State Forest number: _____

Operation Type: _____

Commencement date: _____

Description of roading area (if applicable): _____

Regional Manager Name: _____
(Block letters)

Regional Manager Signature: _____

Date: _____

Part B

OPERATIONAL MAP REQUIREMENTS

(Conditions 16 & 19)

Information to be provided on the harvesting or roading operational map

The following environmental and operational factors must be presented by State Forests on an operational map for each compartment, age class or roading area, as required by conditions 16 & 19 of this licence. The harvesting or roading operational map must be presented at map scale of 1:15 000 or larger.

A. Operational Area

- A1. net harvest area;
- A2. non-harvest area;
- A3. areas of inherent hazard level 4 (indicative boundary);
- A4. compartment, age class or roading areas boundaries;
- A5. coupe boundaries (if applicable);
- A6. State Forests boundary (if applicable);
- A7. areas of plantation (only applicable to areas of mixed native and plantation operations);
- A8. areas of mass movement hazard.

B. Drainage Feature Protection

- B1. Location of watercourses and drainage lines as marked on a 1:25000 topographic map;
- B2. Filter strip widths for each identified watercourses and drainage lines within the compartment, age class or roading area;
- B3. Location of swamps and wetlands as identified on a 1:25000 topographic map (as supplied by the Land Information Centre).

C. Roads

Only the road marked on the operational map are covered by the requirements of this licence. Roads not identified on the operational map are not covered by the requirements of the licence. The operational map must clearly differentiate between existing and new roads to be constructed.

- C1. Location of existing roads:
 - natural surface roads;
 - sealed or gravelled roads;
 - four wheel drive/fire trails;
- C2. Location of new roads to be constructed:
 - natural surface roads;
 - sealed or gravelled roads;

- C3. Names of major roads;
- C4. Names of minor roads (where applicable).

D. Drainage Feature Crossing by Roads

- D1. Location of drainage line, watercourses, swamp or wetland road crossings. (All crossings must be labelled or coded on the operational map so that the descriptions are consistent with the planning documentation)

E. Log Dumps & Log Landings

- E1. Location of log dumps (including the numbering of log dumps);
- E2. Where log dumps are not used, the areas along roads where log landings are not permitted;
- E3. Location of gravelled loading bays (if applicable).

F. Other Factors

- F1. Map scale;
- F2. Australian Map Grid co-ordinates (Eastings and Northings);
- F3. Contour lines;
- F4. Name and location of significant landmarks (if applicable);
- F5. Map title (including the name and number of compartment, age class or roading area);
- F6. Topographic map sheet name and number.

Part C

Information to be presented on a location map

(Conditions 16 and 29)

State Forests must provide a map that clearly identifies the location of the compartment, age class or roading area, in relation to its surrounding region. This map must show the roads that are to be used to access the compartment, age class or roading area.

SCHEDULE 8

(Conditions 18 & 32)

Contact numbers and addresses for EPA offices

FORESTRY UNIT

Citadel Towers
BOC Gases Building
799 Pacific Highway
CHATSWOOD NSW 2057
PO Box 1135
CHATSWOOD NSW 2057
Phone: (02) 9325 5804
Fax: (02) 9415 2949

REGIONAL OFFICES

Albury: PO Box 544
ALBURY NSW 2640
Phone: (02) 6041 4963
Fax: (02) 6041 4973

Armidale: PO Box 494
ARMIDALE NSW 2350
Phone: (02) 6773 7133
Fax: (02) 6772 2336

Bathurst: PO Box 1388
BATHURST NSW 2795
Phone: (02) 6332 1838
Fax: (02) 6332 2387

Dubbo: Level 2
NSW Government Offices
37-39 Carrington Street
DUBBO NSW 2830
Phone: (02) 6881 1390
Fax: (02) 6882 9217

Grafton: PO Box 498
GRAFTON NSW 2460
Phone: (02) 6640 2500
Fax: (02) 6642 7743

Newcastle: PO Box 488G
NEWCASTLE NSW 2300

Phone: (02) 4926 9971
Fax: (02) 4929 6712

Queanbeyan: PO Box 622
QUEANBEYAN NSW 2620
Phone: (02) 6299 3330
Fax: (02) 6299 3525

Wollongong: PO Box 513
WOLLONGONG EAST NSW 2520
Phone: (02) 4226 8100
Fax: (02) 4227 2348

DISTRICT OFFICES

Gosford: Suite 14, William Court
Cnr Paul Lane & William Street
GOSFORD NSW 2250
Phone: (02) 4323 9875
Fax: (02) 4323 9879

Murwillumbah: PO Box 723
MURWILLUMBAH NSW 2484
Phone: (02) 6672 6134
Fax: (02) 6672 6134

Muswellbrook: Suite 1, 56 Brook Street
MUSWELLBROOK NSW 2333
Phone: (02) 6542 5016
Fax: (02) 6541 1634

Penrith: Suite 2, Level 1, Neale Court
311 High Street
PENRITH NSW 2750
Phone: (02) 4721 3700
Fax: (02) 4721 3259

Wyong: Shop 5
64 Pacific Highway
WYONG NSW 2259
Phone: (02) 4352 2762
Fax: (02) 4352 2760

EPA offices are open 8.30am to 5.00pm weekdays, except public holidays.

POLLUTION LINE (24 HOURS) Phone: (02) 9325 5555 or 131 555

Figure 1: Land West of the Great Dividing Range

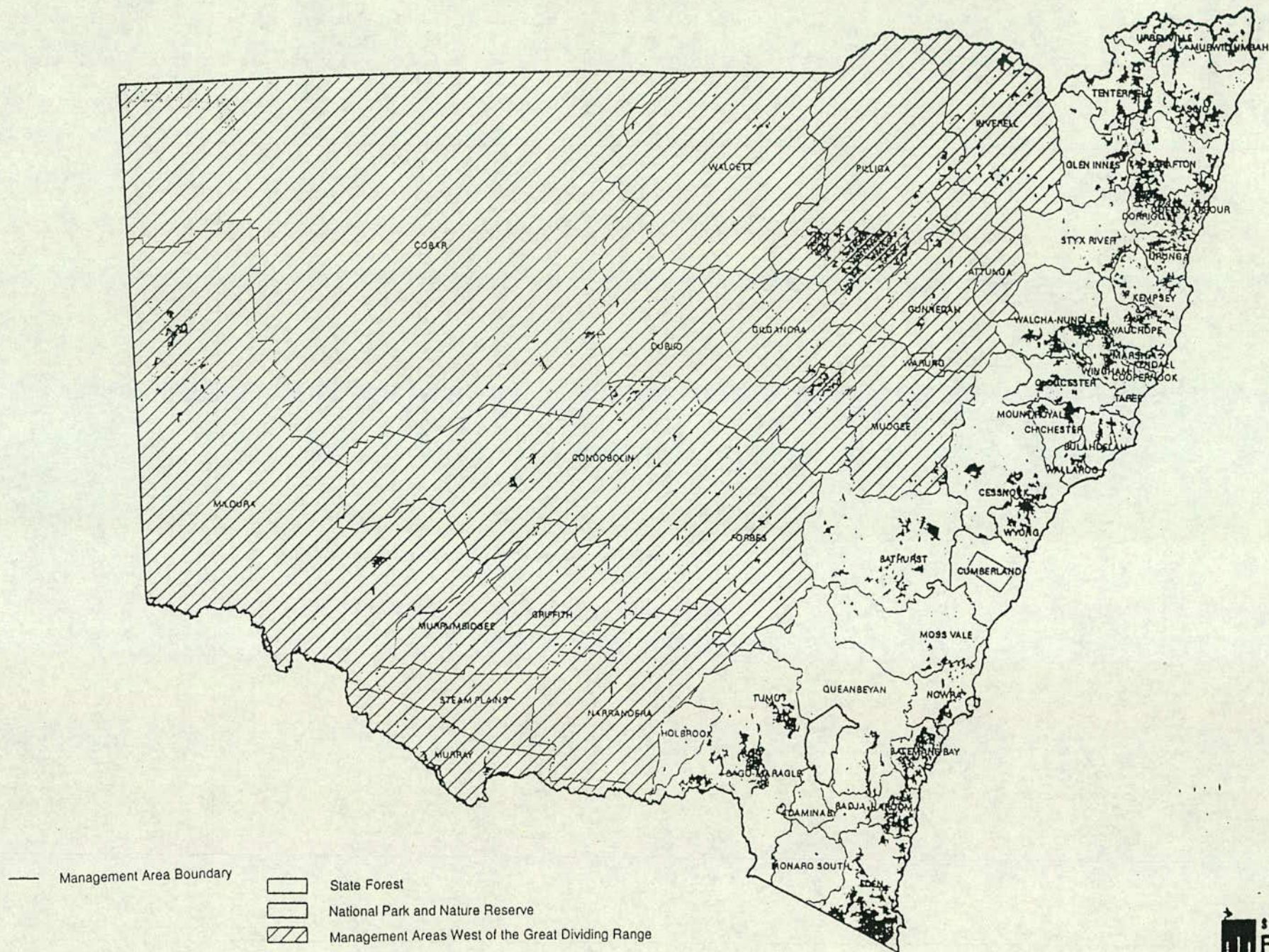


Figure 2: Schematic Diagram of Stream Order

