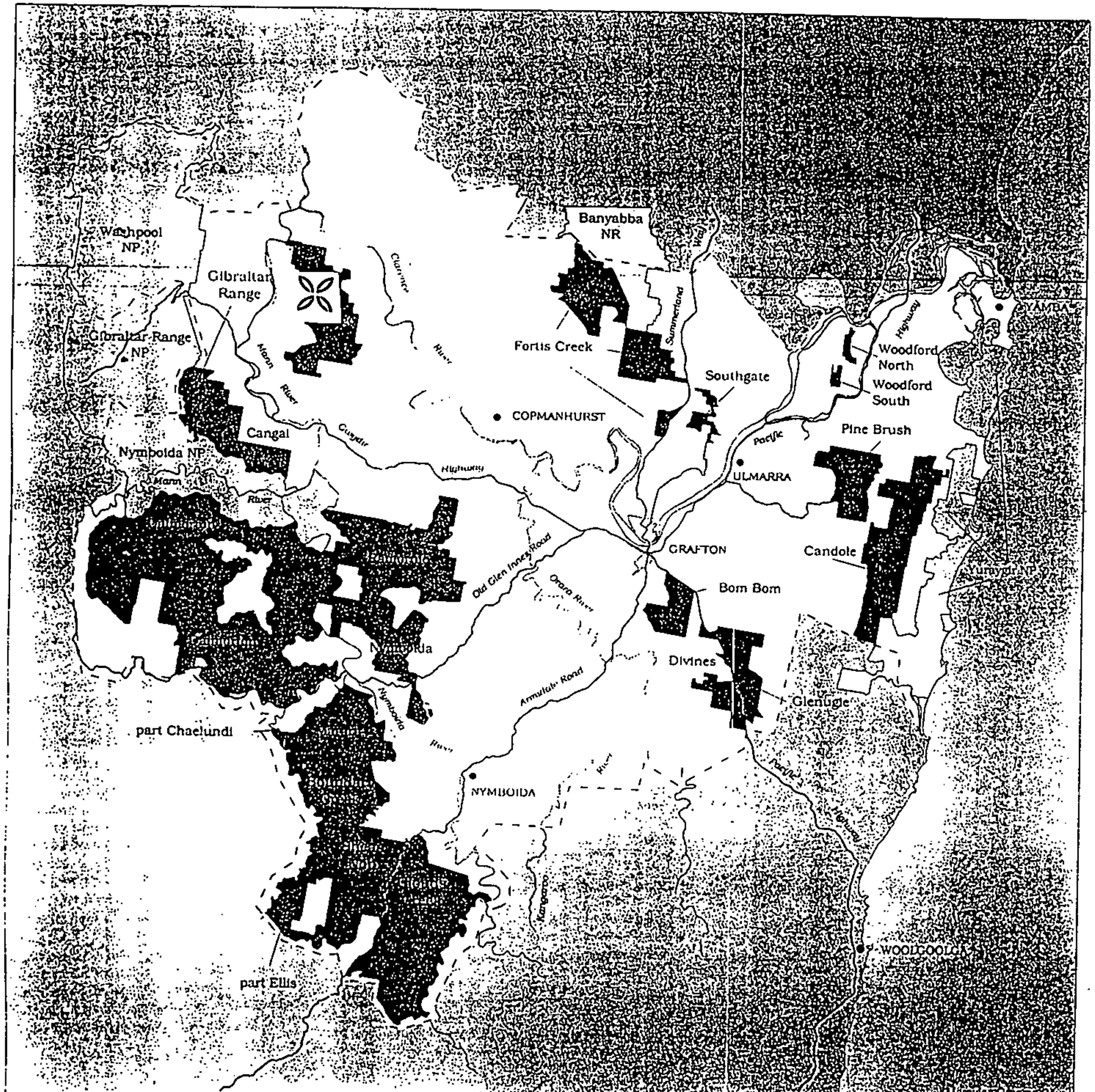
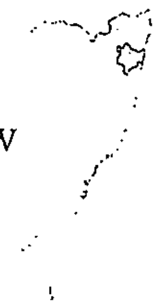
GRANGE
386-388, 395

Grafton District
Northern Region



Washpool NP
Gibraltar Range
Gibraltar Range NP
Cangal
Nymboida NP
Mann River
Gwydir Highway
Clarence River
Banyabba NR
Fortis Creek
Summerland Way
Southgate
Woodford North
Woodford South
Pine Brush
COPMANHURST
ULMARRA
Pacific Highway
GRAFTON
Candole
Bom Bom
Old Glen Innes Road
Orara River
Divines
Glenugie
Nymboida
Nymboida River
NYMBOIDA
part Chaelundi
part Ellis

GRAFTON MANAGEMENT AREA



STATE FORESTS

NATIONAL PARKS

MANAGEMENT BOUNDARY

TOWNS

ROADS

RIVERS

0 20km N

LOCATION

Compartments 386, 387, 388 and 395

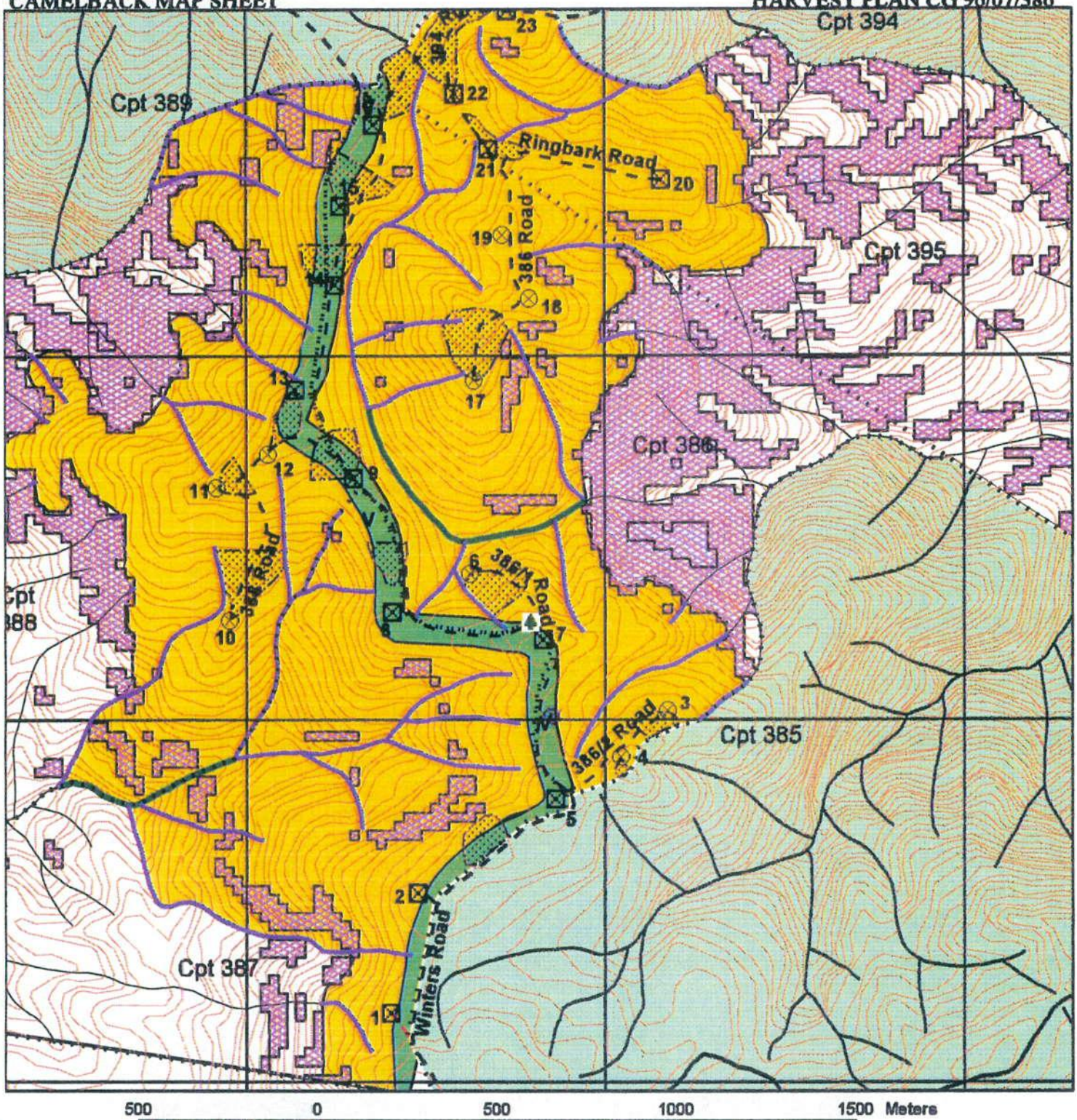
URE 1.2

NORTHERN REGION - GRAFTON DISTRICT
HARVEST PLAN OPERATIONAL MAP
COMPARTMENTS 386, 387, 388 AND 395
GRANGE STATE FOREST

STATE FORESTS

SCALE 1:15250
CAMELBACK MAP SHEET

31 AUGUST 1996
HARVEST PLAN CG 96/07/386



500 0 500 1000 1500 Meters

BOUNDARIES
- State Forest Boundary
- Compartment Boundaries

ROADS (Proposed in Red)
- Natural Surface
- Sealed or Gravelled

NORMAL PRESCRIPTIONS
- Harvestable Area
- Downhill Snigging

MODIFIED PRESCRIPTIONS
- Visual Resource Protection
- Permanent Growth Plot

DUMP SITES OR LANDINGS
- Permanent Dry
- Permanent Wet

NON HARVEST AREAS
- Slopes likely over 30 degrees
- Non Harvestable
- Riparian Habitat Zones
- Elite Tree

WATERCOURSES & DRAINAGE
- Filter Strip
- Drainage Line
- Approved Crossings

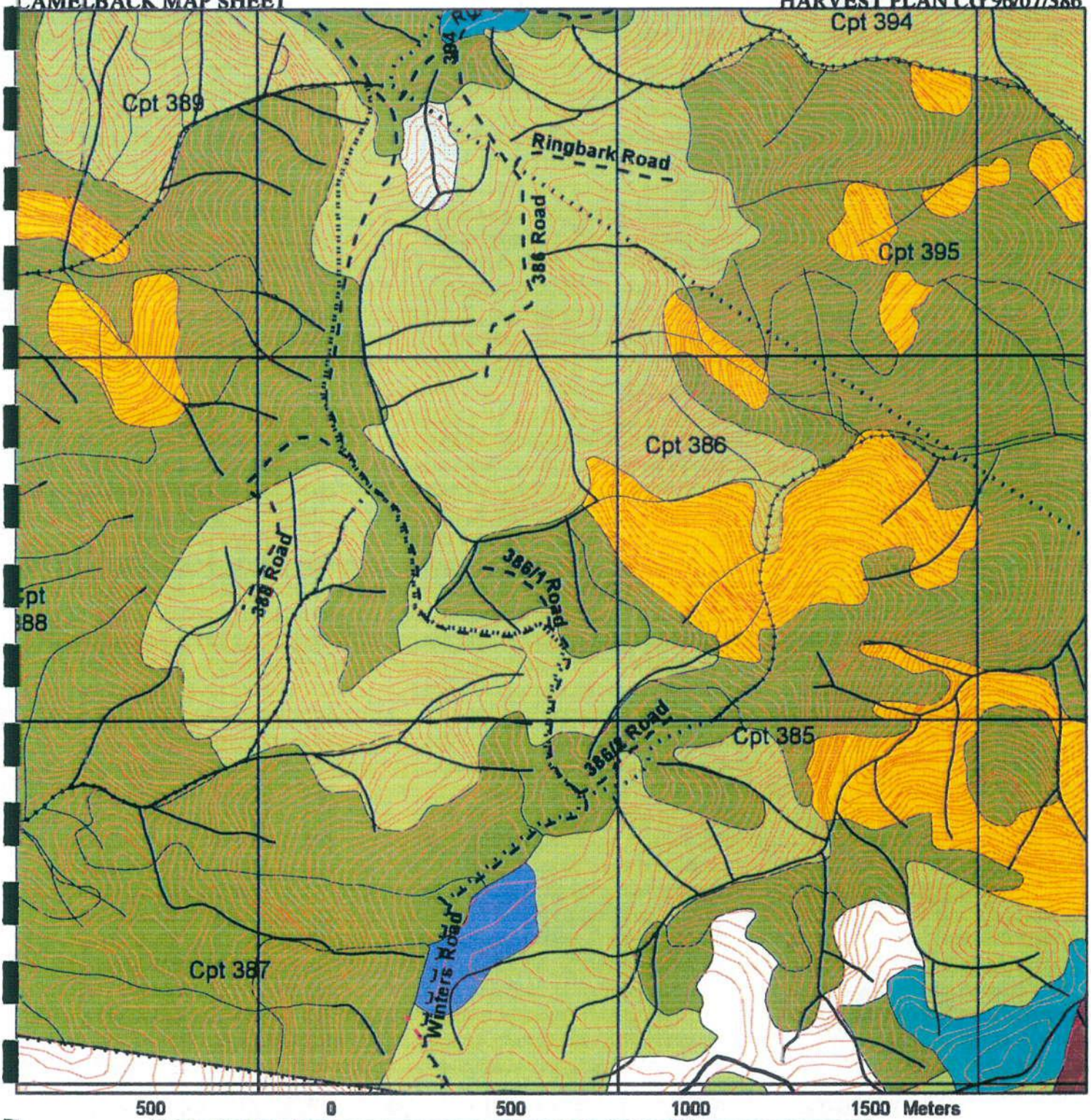
MN

NORTHERN REGION - GRAFTON DISTRICT
FOREST TYPES MAP
COMPARTMENTS 386, 387, 388 AND 395
GRANGE STATE FOREST

STATE FORESTS

SCALE 1:15250
CAMELBACK MAP SHEET

10 SEPT 1996
HARVEST PLAN CG 96/07/386



500 0 500 1000 1500 Meters

BOUNDARIES

Compartment Boundaries

FOREST TYPES

- 23 - Myrtle
- 36 - Moist Blackbutt
- 39 - Blackbutt - Spotted Gum
- 46 - Sydney Blue Gum
- 47 - Tallowwood - Sydney Blue Gum
- 53 - Brush Box

FOREST TYPES

- 60 - Narrowleaved White Mahogany - Red Mahogany - Grey Gum
- 62 - Grey Gum - Grey Ironbark - White Mahogany
- 70 - Spotted Gum
- 163 - New England Blackbutt
- 220 - Cleared / Partially Cleared
- 234 - Rock

MN

Harvesting Plan No CG 96/07/386

Contents

Part 2 FOREST MANAGEMENT & ENVIRONMENTAL CONSIDERATIONS

2.1 PHYSICAL FEATURES

Description 1 Physical Description of the Area

STATE FOREST	**Grange No 771**	DISTRICT	**Grafton**
REGION	**Northern**	COMPARTMENT	386 / 387 / 388 / 395

MANAGEMENT AREA **Grafton**

NORTH-EASTERN CORNER **457829 / 6745310**

SOUTH-WESTERN CORNER **453795 / 6743217**

Natural Features

General: The compartments contain undulating / moderate to very steep slopes with some rocky and inacccessible areas.

Catchment: Clarence River Catchment.

The eastern boundary of compartment 395 is formed by Gorge Creek, which flows north out of the forest and into the Clarence River. Compartments 386 and 395 drain into Gorge Creek. Compartments 387 and 388 drain into Welshs and Fishers Creeks, which flow west into the Mann River.

Altitude range: 703 - 245 m above sea level.

Aspect: Compartments 386 and 395 have an east to south-easterly aspect. Compartments 387 and 388 have a westerly aspect.

Topography: The compartments vary from undulating to steep. The eastern part of compartment 386 includes very steep areas with slopes over 30°.

Artificial Features

Roads: Access to the compartments is along Winters Road (off Western Boundary Road) forming the western boundary of compartment 386, the eastern boundary of compartments 387 and 388 and part of the western boundary of compartment 395.

Minor Roads: Five minor roads 386, 386/1, 386/2 Roads, 388 Road, 394 Road and Ringbark Road give access to the compartments as shown on the Operational Maps.

Description 2 Special Warning of Critical Boundaries or Non-harvest Areas

A Wildlife Corridor (PMP 1.1.7) exists along Gorge Creek; the eastern boundary of compartment 395. The Net Harvest Area, however, does not approach this corridor, and it will not be referred to further in this plan.

Riparian Habitat Zones exist 20m either side of streams (watercourses, drainage lines and drainage depressions) with catchments greater than 40 hectares.

A Special Emphasis Visual Resource Protection Zone (PMP 1.1.6) exists along the main central ridge as shown on the Operational Maps.

Permanent Growth Plot 326 is located in the southern section of compartment 386.

As shown on the Operational Maps, the eastern sections of compartments 386 and 395, and the western sections of compartments 387 and 388, are very steep and will not be accessed during this operation.

Private Property adjoins the southern and western boundaries of compartment 387 and the western boundary of compartment 388. The southern boundary of compartment 387 is marked by a fence along the top of the ridge. Below the ridge the boundary has been surveyed and blazed with yellow paint. The western boundary of compartments 387 and 388 do not need to be marked as they occur in steep and inaccessible areas and logging operations will not take place in these areas.

A derelict fence exists on the north-eastern boundary of compartment 395 has not recently been maintained. This fence must not be damaged and must be left in the state that it is at the commencement of operations. Any damage caused to the fence must be rectified before the completion of the operations.

Reference Grafton Management Area Environmental Impact Statement

2.2 FOREST MANAGEMENT AND SILVICULTURE

Description 3 Compartment Subdivision, Forest Types

Areas:	**Cpt 386**	**Cpt 387**	**Cpt 388**	**Cpt 395**
Gross Area of Compartment	166 ha	153 ha	185 ha	168 ha
Wildlife Corridor	0 ha	0 ha	0 ha	0 ha
Riparian Habitat Zones	3.2 ha	0 ha	0 ha	0 ha
Filter Strips	8.5 ha	9.3 ha	7.8 ha	2.8 ha
Steep/Inaccessible	46.5 ha	70.6 ha	92.4 ha	121.7 ha
Proposed for Logging	**107.8 ha**	**73.1 ha**	**84.8 ha**	**43.5 ha**

Logging History:

Although records of logging only exist for operations in compartment 386 in the early and mid-1970s, field inspection has revealed extensive evidence of logging in each of the other compartments around the same period.

Forest Types:

	Forest Types	Area (ha)			
		cpt 386	**cpt 387**	**cpt 388**	**cpt 395**
46	Sydney Blue Gum	4.1	nil	nil	0.2
47	Tallowood - Sydney Blue Gum	nil	0.7	nil	nil
62a&b	Grey Gum - Grey Ironbark - White Mahogany	49.6	122.8	146.9	126.8
70	Spotted gum	93.1	30.0	28.7	28.5
163	New England Blackbutt	nil	nil	nil	2.5
234	Rock	19.2	nil	9.4	10.0

Reference For Commission NSW (1989). Research Note 17. *Forest Types in New South Wales*

Description 4 Broad Description of Vegetation

(a) Forest Types

- Type 46 occurs in a small patch in the northern corner of compartment 386 and a very small patch on the south-western boundary of compartment 395.
- Type 62 occurs on the north-eastern border spreading down into the southern part of compartment 386. It occurs over the majority of compartment 387, covering the areas from the southern section right up to the northern boundary, excluding a small patch near the northern boundary. This type also occurs over the majority of compartment 388, excluding some small patches on the northern and southern boundaries and over the majority of compartment 395.
- Type 70 occurs over the majority of compartment 386 covering the central part up to the northern boundary, in a small band across the northern end of compartment 387, in a patch on the southern end and a very small area in the northern section of compartment 388 and in a band in the north-western part of compartment 395.
- Type 163 occurs in a small patch on the north-western boundary of compartment 395.
- Type 234 occurs in a small patch on the north-eastern boundary of compartment 386, in a small patch on the northern boundary of compartment 388 and in scattered areas in the northern and central parts of compartment 395.

Overstorey species

The overstorey species are Spotted Gum, White Mahogany, Blue Gum, Brushbox, Tallowwood, Red Mahogany, Bloodwood and Grey Box.

(b) Understorey

The understorey on the ridges and the upper slopes is typically dry and open, being eucalypt regeneration, Forest Oak, Backhousia, scattered Grass Trees and other xerophytic shrubs, Geebung, Indigo, Hakeas and Native Cherry. There are small patches in the gullies that are more moist having Native Ginger, Tobacco Bush, Soft Tree Fern, Blechnum sp, Black Wattle, Tree Heath and Forest Oak.

(c) Ground-cover

The ground cover is mostly grass (kangaroo, poa and bladey) and.litter.

(d) Rare or threatened species

No occurences of rare or threatened flora are recorded on the compartments and none were encountered during field inspections.

(e) Rainforest

There are no areas of rainforest in the compartments.

(f) Exotic weeds

Lantana occurs in patches through the compartments.

(g) Regeneration and serial stages

The compartments carry multi-age forests consisting of few remnants of the original stand and a high proportion of regrowth resulting from earlier harvesting operations and possible fire.

Description 5 Forest and Crop Condition

Previous operations have removed most of the original stand on the ridge tops producing areas of significant regeneration. The ridge tops consist of fairly open forest with few remnant mature trees and regrowth of varying stages. The lower slopes, which are mostly inaccessible, consist of stands of mainly mature or maturing with fewer groups of younger regrowth.

The current stand would exhibit a low average growth rate. There is a need to free existing regeneration through selective removal of larger mature trees not required for fauna habitat and competing co-dominants. Increased growth rates on the retained higher quality stems will improve the overall productivity of the stand.

There is evidence of ring barking for silvicultural purposes (Timber Stand Improvement) in compartments 388 and 395, although this is not recorded in the compartment histories.

The forest has been managed for grazing more or less since European settlement in the mid 1800's, originally as part of the *Newbold Grange* station, and since State Forest dedication by way of lease or permit. Grazing has seemingly been light in recent years and there is little evidence of it in these compartments.

Description 6 Forest Management Activities

(a) Silviculture

The main silvicultural objectives are to:

- Maintain the natural forest in a healthy condition, with some areas in a relatively undisturbed state. This will include the provision of habitat trees and provide for their future replacement.
- Obtain adequate post-harvesting regeneration that is similar in species composition to that of the original forest.
- Provide for growth and development of regeneration.
- Produce multi-aged stands on a broader area basis.

The Wildlife Corridor Riparian Habitat Zones, filter strips and inaccessible areas on the compartment will remain in a relatively undisturbed state.

Habitat trees will be retained to meet wildlife habitat requirements.

On the balance of the area selective logging techniques, including the Australian Group Selection system, will be implemented.

(b) Harvesting Method

The harvesting method proposed for the area is based on current accepted operational practices. It comprises:

- Chainsaw felling using directional felling techniques where required.
- Snigging of logs using a crawler tractor and/or a rubber tyred skidder.
- Debarking and loading of logs at the dump using an excavator or forklift.
- Transport of logs from the site using a jinker and prime mover.

A number of different log types will be produced by the harvesting. These will be segregated at the dumps and usually transported to different purchasers.

(c) Fire Management

Fire management is required to;

- limit damage to stands caused by wildfires
- ensure the establishment and survival of regeneration
- maintain wildlife habitat
- maintain hydrological conditions
- meet State Forests' obligations under the Bush Fires Act.

Fire management entails the quick response to wild fire occurrence to limit fire spread, and the maintenance of fine fuels at low levels, usually by burning under mild conditions, to decrease wild fire intensities. Activities are coordinated with other fire control agencies through the Nymboida District Fire Plan.

In Compartments 386, 387, 388 and 395 bark and logging debris will be progressively spread through the logged area and/or accumulated in small heaps on the dump during the harvesting operation. Logging debris will be kept approximately 5 metres clear of identified habitat trees. Bark and logging debris will be burnt, and in the longer term fine fuels will be managed as detailed in the **Grafton District Fuel Management Plan 1993** and the **Nymboida District Fire Plan**.

2.3 FLORA PROTECTION

Description 7 Presence of Protected or Endangered Plant Species

No species as rare or threatened have been recorded from the compartments and none are expected to occur.

Reference Briggs, J.H. and Leigh J. H., 1988. Rare and Threatened Australian Plants, Aus NPWS
Grafton Management Area Environmental Impact Statement

Description 8 Presence of Rainforest

There are no areas of rainforest in these compartments.

Description 9 Protection of Plant Species

Not applicable to these compartments.

2.4 FAUNA PROTECTION

Description 10 Endangered and Protected Fauna Occurrence

(a) General

No Threatened species have been recorded from compartments 386, 388 and 395. A pair of Glossy Black Cockatoos were recorded in compartment 387. A V-notch tree was located in compartment 387 near dump 1. Threatened species expected to occur in or in the vicinity of the compartments are;

Glossy Black Cockatoo	**Powerful Owl**	**Sooty Owl**
Masked Owl	**Stephen's Banded Snake**	**Pale-headed Snake**
Spotted-tailed Quoll	**Brush-tailed Phascogale**	**Yellow-bellied Glider**
Squirrel Glider	**Rufous Bettong**	**Red-legged Pademelon**
Common Planigale	**Koala**	**Long-nosed Potoroo**
Great Pipistrelle	**Golden-tipped Bat**	**Little Bent-wing Bat**
Common Bent-wing Bat	**Large-footed Mouse-eared Bat**	

References Grafton Management Area Environmental Impact Statement
SFNSW GIS Records

(b) Habitat Trees

Compartments 386, 387, 388 and 395 contain Dry Hardwood forest and Moist Hardwood forest with xeromorphic understorey and limited areas of Moist Hardwood forest with mesic understorey. Sufficient potential habitat and recruitment habitat trees exist in the net harvest area to allow for the retention of enough trees to meet prescription requirements.

(c) Wildlife Corridor

A designated Wildlife Corridor exists along Gorge Creek forming the eastern boundary of compartment 395, as shown on the Operational Map. The corridor is 40 metres wide on either side of the creek. This is not near the area to be harvested.

(d) Riparian Habitat Zones

Riparian Habitat Zones exist 20 metres either side of streams (watercourses, drainage lines and drainage depressions) with catchments greater than 40 hectares, as shown on the Operational Map.

(e) Refugia Areas

No areas of critical habitat for Threatened Species have been located in the net harvest area and no refugia areas have been set aside.

Description 11 Species and Habitats Descriptions

Brief habitat descriptions for Threatened Species that might be adversely impacted by forest management activities on Compartments 386, 387, 388 and 395 are stated below:

(a) Critical Weight Range Species

Critical Weight Range Species likely to occur in compartments 386, 387, 388 and 395 are the Rufous Bettong, Red-legged Pademelon, Long-nosed Potoroo and Spotted-tailed Quoll. Rufous Bettongs inhabit well-grassed open forests and are commonly associated with Spotted Gum. Long-nosed Potoroos prefer dense understorey vegetation and will forage in open areas. Red-legged Pademelons are dependent on dense cover for refuge and will feed in adjacent open areas. Spotted-tailed Quoll occur in a variety of forest types favouring moister areas.

(b) Glossy Black Cockatoos

Glossy Black Cockatoos require stands containing species of Casuarina for food and large tree hollows for nesting in a range of hardwood forest types. Casuarina occurs in the compartments and there are also large tree hollows present.

(c) Powerful/Masked/Sooty Owl

These Owls inhabit forest margins and open areas, require large tree hollows for nesting, roost in large trees and require a large home range.

(d) Stephen's Banded Snake and Pale-headed Snake

These snakes require tree hollows and old trunk scars.

(e) Brush-talied Phascogale

This species requires tree hollows for nesting and prefers open forest areas, foraging generally in large rough barked trees.

(f) Yellow-bellied Glider

Yellow-bellied Gliders require tree hollows for nesting, feed on Eucalypt sap by cutting V-notches into the bark of certain eucalypts, eucalypt nectar and insects harvested beneath the loose bark-shedding eucalypts. A single V-notch tree was recorded in compartment 387.

(g) Squirrel Glider

This species requires tree hollows for nesting, feeds in upper canopies on flowers and insects and on sap from Yellow-bellied Glider V-notches.

(h) Koala

Koalas feed on eucalypt leaves from a range of species and prefer high nutrient areas. There might be suitable habitat in the compartments, however the higher nutrient areas in the nearby private property might be more suitable.

(i) Golden-tipped Bat

This bat roosts in moist forests, seemingly preferring dense vegetation.

(j) Little Bent-wing Bat/Common Bent-wing Bat

These bats roost in caves and similar structures and occur in most forest woodland habitats.

(k) Large-footed Mouse-eared Bat

This bat inhabits moist riparian forest areas and requires open water bodies for feeding.

References Grafton Management Area Environmental Impact Statement.
State Forests' Response to Submissions to the Grafton Environmental Impact Statement.

2.5 SOIL EROSION AND WATER POLLUTION CONTROL

Description 12 Site Soil and Water Data and Other Information

(a) Location

Compartments 386, 387, 388 and 395 are located in the northern section of the Grange State Forest, which in turn is located some 60 km north-west of Grafton. See location map attached.

(b) Climate

Generally the climate in the Grafton area is sub-tropical with hot summers, mild winters and a distinct winter/spring dry season.

Rainfall

The average annual rainfall for the Grange area is about 1300 mm

The annual rainfall erosivity - **R = 3000**

January to March is the wettest period while June to August is the driest period. Heavy rainfall events are common during summer and autumn. The compartments are in rainfall zone 2. There are no rainfall recordings available. The monthly erosivity details are:

	J	F	M	A	M	J	J	A	S	O	N	D
Erosivity	570	510	360	120	60	90	60	60	180	210	330	450

Reference Rosewell C.J. & Turner J.B. (1992). *Rainfall Erosivity in New South Wales*. Technical Handbook No 11 (1st Edition), Soil Conservation Service of New South Wales.
Grafton Management Area Environmental Impact Statement.

Temperature

Mean maximum temperatures range from 30° in January/February down to about 20° in July/August. The mean minimum temperature range is from about 15° mid summer to around 0° July/August. These data give an indication that ground cover growth can be prolific during the warmer months but slows down considerably during the cooler drier winter periods and at times is basically nil.

(c) Geology

Compartments 386, 387, 388 and 395 are on Metasediments, being argillites, phyllites, slates and intermediate volcanics, all with abundant quartz veins of Ordovician-Silurian age.

Bedding planes

There are no obvious bedding or fracture planes in the area and no indications of mass movement.

References Veness & Associates (1994). Soils Report Grafton Environmental Impact Statement.

(d) Soils

The compartments are included in the Grafton Management Area EIS Study Soils Report carried out by Veness and Associates (published 1994). This study identifies Metasediment Unit soils as occurring in Compartments 386, 387, 388 and 395. Field inspection of the compartments indicate that the Metasediment unit soils do occur in the compartments.

Soil sampling of the area and soil testing has been carried out by J Veness of Veness & Associates Pty Ltd. Soil sample sites are indicated on the map included with the attached Soils Report. The attached letter from Veness & Associates describes the landform elements occurring within this and adjacent compartments, and the sampling for each element. Data from all samples covering landform elements within the compartments are used below.

Soil types

The soil derived from the Metasediments is typed as structured plastic and subplastic clays at times Krasnozems, Xanthozems, Chocolate soils, Structured loams.

Description and profile

The soil is described as bioturbated, strongly structured, stony, silty clay loam topsoil, grading through brownish black to very dark brown, pedal, sandy to silty clay layers to a reddish to bright brown, pedal, stony, light clay subsoil layer.

The topsoil layers are up to 50 cm and more in depth. The surface condition is described as friable, with up to 20% stones and a litter layer up to 1 cm thick.

References Veness & Associates (1994). Soils Report Grafton Environmental Impact Statement.

Erodibility

K values A horizon = 0.021 (site 395/1; simple slope) (Method B3)
K values B horizon = 0.043 (site 386/1; crest) (Method B3)

Texture

A horizon -silty clay loam.
B horizon -fine, sandy clay loam

Dispersibility (Method D1)(site 388/1; crest)

%clay A horizon	25%(inclusive of gravels)
%clay B horizon	32%(inclusive of gravels)
D% A horizon	21%
D% B horizon	35%
%dispersible soil A horizon	25/100x21/100x100 = **5.25**
%dispersible soil B horizon	32/100x35/100x100 = **11.2**

The A horizon is not significantly dispersible.
The B horizon is significantly dispersible.

Reference Veness and Associates. Soils report Number VA1715D of March 4, 1996 and letter of May 19, 1996.

A copy of the above report and letter from J Veness is attached.

Inherent fertility

The soils are relatively fertile compared generally with soils on State forests in the Grafton areas. Much of the original stand would have been very open.

Depth to subsoils and bedrock

Subsoils are from around 30 to 50 cm, bedrock is at about 100 to 150 cm. The harvesting should rarely disturb the subsoil.

Existing erosion

There is very little evidence of existing erosion in the compartments and structures built during previous operations seem to be functioning. There has been slight erosion in compartment 388, caused by the deterioration of a dam wall. The runoff from the eroded dam wall feeds into a drainage line below the dam. This ground is now stable and well vegetated and logging will not disturb the site and no remedial action needs to be taken. The spillway of the dam has caused slight erosion to 388 Road, which will be rectified during the reopening of the road before the commencement of operations. There is also slight existing erosion along 386/1 Road and 386/2 Road, which will be rectified by improving the drainage on the sections where this occurs.

(e) Landform

Slope

Approximately half of compartments 386 and 387 have slopes less than 20°. Approximately one third of compartments 388 and 395 have slopes less than 20°. Absolute and percentage areas of slope classes are given in Tables 1a to 1d below.

Table 1a - Slope Class Areas - cpt 386

Slope Class	0° - ≤5°	>5° - ≤10°	>10° - ≤15°	>15° - ≤20°	>20° - ≤25°	>25° - ≤30°	>30°
Area (ha)	6.1	15.1	26.4	30.3	29.4	21.5	37.6
% Area	3.7	9.1	15.9	18.2	17.7	12.9	22.5

Table 1b - Slope Class Areas - cpt 387

Slope Class	0° - ≤5°	>5° - ≤10°	>10° - ≤15°	>15° - ≤20°	>20° - ≤25°	>25° - ≤30°	>30°
Area (ha)	5.2	9.8	20.5	32.8	44.0	30.4	11.6
% Area	3.4	6.4	13.3	21.3	28.5	19.6	7.5

Table 1c - Slope Class Areas - cpt 388

Slope Class	0° - ≤5°	>5° - ≤10°	>10° - ≤15°	>15° - ≤20°	>20° - ≤25°	>25° - ≤30°	>30°
Area (ha)	2.1	8.6	23.1	36.1	42.7	34.6	38.2
% Area	1.1	4.6	12.5	19.5	23.0	18.7	20.6

Table 1d- Slope Class Areas - cpt 395

Slope Class	0° - ≤5°	>5° - ≤10°	>10° - ≤15°	>15° - ≤20°	>20° - ≤25°	>25° - ≤30°	>30°
Area (ha)	3	9.4	16.3	24.3	37.4	39.5	38.7
% Area	1.8	5.6	9.7	14.4	22.2	23.4	22.9

Terrain

Compartments 386, 387, 388 and 395 are on the main forest ridge line. The compartments consist of minor secondary ridges running from the main ridge.

Drainage line condition

The drainage features of the compartments have been field inspected. The drainage lines are in good condition. They are mostly deeply incised but not often to bedrock. Most drainage lines in the more open stands are well grassed.

The flow in the streams is intermittent. At the time of recent inspections there was water running in some of the drainage lines in compartment 387, also, small pools of water were evident in a drainage line in compartment 386 after an extended period of rain. There was no running water in the drainage lines in compartments 388 and 395.

Aspect

The aspect is generally east to south-easterly in compartments 386 and 395. Compartments 387 and 388 have a westerly aspect.

Rockiness

There is a 19 hectare area of rock in compartment 386, a 9 hectare area of rock in compartment 388 and a 10 hectare area of rock in compartment 395. These are in very steep country and will not be a problem for the harvesting operation. There are no rock areas in Compartment 387.

(f) Hydrology

The compartments are in the Clarence River Catchment. Compartments 386 and 395 drain into Gorge Creek, which forms the eastern boundary of compartment 395. Gorge Creek flows north out of the forest and on about one and a half kilometres to the Clarence River. Compartments 387 and 388 drain into Welshs and Fishers Creeks, which flow west into the Mann River. There are no prescribed streams, swamps or wetlands in the net harvest area.

No major water storages occur adjacent to or downstream from the compartments.

Verification of drainage lines

All drainage features verified during harvesting plan preparation as watercourses or drainage lines are shown on the harvesting plan Operational Map with filter strip protection (unless already protected by other harvesting exclusions). Other smaller drainage features which are not marked on the map must be inspected by the SFO during tree marking and given protection in accordance with the Pollution Control Licence.

Representative water monitoring sites

The representative water monitoring site is Mebbin (Sedimentary soils; 1200+ mm annual rainfall).

Reference Forest Planning Branch *Water quality monitoring program* **SFNSW** 1994

Previous harvesting

Old reports concerning the forest comment on access tracks and Red Cedar, White Beech and Hoop Pine cutting in the Towgon Creek area. It is not known whether these compartments were affected. The original stands were fairly open and readily accessible, regularly burnt and heavily grazed but there are no records of the early loggings in the compartments. The compartments were logged quite heavily in the early 1970s. There is evidence of sleepers and girder cutting on the compartments that pre-date these operations.

Upstream catchment water use

Production forestry - the upstream catchments are within Grange State Forest.

Downstream catchment water use

Gorge, Welshs and Fishers Creeks flow through grazing country downstream of Grange State Forest. There may be limited stock watering downstream of the forest.

Domestic water use

The only domestic water supply drawn from the Mann/Clarence below the junctions with Gorge, Welshs and Fishers Creeks is the Copmanhurst town supply. These creeks would amount to only a fraction of a per cent of the Clarence flow and would have no influence at all on the town supply. Copmanhurst is to transfer to the lower Clarence scheme, which sources its water higher up the Clarence catchment, during the next year or so.

(g) Vegetation and Ground-Cover

Effect on ground-cover during operations

The harvest operations are expected to remove less than 20% of the overall ground cover of the net harvest area.

(h) Proposed Operation System

Use of existing roads

Existing roads have been evaluated for their potential to cause water pollution.

Grange Access Road and Western Boundary Road are long established fully designed roads with concrete relief pipes in side-cuts and drainage lines, mitre drains on the ridge tops and consolidated gravelled pavement. They are regularly maintained.

Winters Road runs for about 3.5 km through the planning area. It is an old, natural surface road, with mitre drains where required, that has been consolidated by use. The batters and drainage outlets are stable and well vegetated.

386, 386/1, 386/2, 388, 394 Roads and Ringbark Road (a total of about 3.2 km) will be reopened for use during the harvesting operation. These are stable roads with litter and grass cover. They are drained by outfall drainage. All batters are stable and well vegetated. They are generally about 1 m high. Maximum batter height is approximately 2.5 to 3 m. Maximum road grade is 14°, for a length of 50 m on 388 Road. Road grade everywhere else is less than 10°.

Reopening will require the removal of fallen timber and some regrowth from the road pavement and edges. These works will be done with logging machinery and will cause minimal disturbance to the road pavement. None of the existing roads are likely to cause significant water pollution.

Use of existing drainage feature crossings

386/1 Road crosses one drainage depression. The crossing is a stable and well grassed open causeway and does not appear to be causing any significant erosion. A drainage structure will be installed on each approach to minimise potential pollution from the road.

Road construction

About 75 metres of road construction is required for harvesting in compartment 387. This will allow logging trucks access to dump 1. The road will be constructed along a flat ridge-top and there will be no need to establish borrow pits or gravel pits.

Construction of drainage feature crossings

There is no drainage feature crossing construction required for this operation.

Harvesting

The harvesting method proposed for the area is based on current accepted operational practices. It comprises:

- Chainsaw felling, using directional felling techniques where required.
- Snigging of logs using an articulated rubber tyred skidder and/or a crawler tractor.
- Debarking and loading of logs at the dump using an excavator or forklift.
- Transport of logs from the site using a jinker and prime mover.

The crawler tractor is used for construction work and snigging from steeper slopes including winching of logs and snigging larger logs. The rubber-tyred skidder is used on the flatter terrain, for snigging smaller logs and logs from steeper areas that have been bunched by the tractor.

Cover factor

The harvesting operations described above result in a cover factor (in accordance with PCL Sch 4, Part A, Table 2) of **C = 0.108**.

Location of log dumps

Log dumps are located on ridge tops to facilitate uphill snigging, as indicated on the Operational Map. There will be limited downhill snigging to dumps 2-6, 8-18 and 21-23 to reduce snigging distances and take advantage of previously constructed log dumps, snig tracks and drainage line crossings. These snig tracks and drainage line crossings are stable. Less than 30% of the snigging activity will be downhill.

Log dumps will be located as indicated on the Operational Map.

Post-harvest burning

In Compartments 386, 387, 388 and 395 bark and logging debris will be progressively spread through the logged area during the harvesting operation and/or accumulated in small heaps on log dumps. Logging debris will be kept approximately 5 metres clear of identified habitat trees. Bark and logging debris will be burnt, and in the longer term fine fuels will be managed as detailed in the Grafton District Fuel Management Plan (1993) and the Nymboida District Fire Plan.

Post-harvest rehabilitation

Natural regeneration and natural re-seeding of overstorey, understorey and ground-cover plants will provide ground cover rehabilitation. Supervision by the SFO and fortnightly check sheets will assess that road surfaces, batters and drainage structures are stable at the completion of operations and prior to the shifting of the contractor.

Description 13 Evaluation of Soil and Water Data

(a) Soil Erosion and Water Pollution Hazard Categories

Soil Erosion and Water Pollution Ratings (SE/WPR) have been assessed using SOILOSS 5.1. The Ratings have then been used to assess Soil Erosion and Water Pollution Categories (SE/WPC) for the net harvest area. The subsoil data from site 386/1 give lower slopes for the categories and have been used in the calculations. Details are in Table 2 below.

SE/WPR = R x K x LS x C (5.1) where:

R = 3000

K = 0.016 **Topsoil (A horizon)** Method B3

K = 0.043 **Subsoil (B horizon)** Method B3

S = As factored in SOILOSS 5.1

L = 20 metres

C = 0.108 Native forest harvesting "B" Table 2

P = 1.0

Table 2: Water Pollution Hazard Categories

Slope Ranges (Degrees)	Water Pollution Category	Indicative % of Net Harvest Area			
		cpt 386	cpt 387	cpt 388	cpt 395
0 - ≤ 3	1	2.5	2.3	1	1
>3 - ≤ 15	2	22.8	19.5	14.7	13.6
>15 - ≤ 30	3	74.7	78.2	84.3	85.4
Roads	3	N/A	N/A	N/A	N/A

The following factors for rainfall erosivity and soil erodibility also apply to road construction:

R = 3000 **K = 0.043**

(b) Dispersibility (site 386/1; crest)

%dispersible soil A horizon = 6/100x11/100x100 = **5.25** (Method D1)

%dispersible soil B horizon = 9/100x54/100x100 = **11.20** (Method D1)

The A horizon is not significantly dispersible.

The B horizon is significantly dispersible.

(c) Other Factors

References

Standard Erosion Mitigation Guidelines for Logging in New South Wales Soil Conservation Service, CaLM, NSW 1993

Rosewall C.J. SOILOSS A program to assist in the selection of management practices to reduce erosion

Soil Conservation Service Technical handbook No. 11 First Edition 1990, 2nd Edition 1993.

2.6 FOREST ZONING AND SPECIAL ATTRIBUTES

Description 14 Forest Zoning and Special Attributes

(a) Research Plots

There are no research plots or long term inventory plots in compartment 387, 388 and 395.

An elite Spotted Gum tree is located in the south-eastern section of compartment 386 as indicated on the Operational Map .

(b) Permanent Growth Plots

Permanent Growth Plot 326 is located in the south-eastern section of compartment 386 as shown on the Operational Map.

(c) Special Attributes of the Area.

Not applicable to these compartments.

Part 3 AUTHORISATION CONDITIONS

3.1 COMPLIANCE

(a) Area Identification

GRAFTON DISTRICT

Grange State Forest No. 771

Compartments 386, 387, 388 and 395

Grafton Management Area

(b) Third Party/Lessee or Other Interest

The compartments are within the area of Occupational Permit 2379 and Crown Leases 34/18 and 15/17 held by NL & SA Winters, NL & FL Winters and Mrs LM MacDougall respectively for the purpose of grazing.

(c) Environmental Compliance Requirements

This Harvesting Plan is prepared by State Forests of New South Wales (State Forests) under the authority of the Forestry Act 1916. This Harvesting Plan is a condition of all Timber, Forest Products, Contractors and Operators Licences issued in connection with the timber harvesting operations described in the Plan.

All operations conducted under the authority of the Timber Licence and other Licences and Agreements issued for the area covered by this Harvesting Plan must comply with:

- Licence conditions issued by State Forests under the Forestry Act 1916.
- the **"Forest Practices Code Part 2 - Timber Harvesting in Native Forests"** - State Forests (1993).
- the **"Standard Erosion Mitigation Guidelines for Logging in New South Wales" (SEMGL 1993)** issued by the Soil Conservation Service of Department of Land & Water Conservation (LaWC).
- the conditions of **Pollution Control Licence No 4017** issued by the Environment Protection Authority under the Pollution Control Act 1970. Those general conditions which affect licensees are set out in Schedule "A" attached to every Timber, Contractors and Operators Licence.
- conditions attached to licences issued by the National Parks and Wildlife Service under the Endangered Fauna (Interim Protection) Act 1992 and the National Parks and Wildlife Act 1974 (NPW Act).
- conditions resulting from the determination of the **Grafton Management Area Environmental Impact Statement**.
- the silvicultural specifications as stated in the **Grafton Management Area Environmental Impact Statement** (as amended by Operational Circular 95/14 of 30/10/95).
- the schedule of specifications for the harvesting and utilisation of timber applicable to this operation, in this case:

- **Grafton/Coffs Harbour Compulsory Sawlog Specification Hardwood Sawlog Flat Rate Royalty Utilisation Standards**
- **Specification for Eucalypt Veneer Logs for Rotary Peeling**
- **Australian Standard AS2209 - 1979 (poles)**

- the Code of Procedure for the measurement of timber and other products applicable to this operation, in this case:
  - **Code of Procedure for the Measurement of Hardwood Logs and other Timber Products - Northern Region.**

Variations, additions or amendments to the above documents may be made by the responsible authorities at any time, and must be implemented immediately by the State Forests Licensee.

(d) Environmental Planning & Assessment Act Requirements

In preparing this Harvesting Plan, the requirements of Part V of the EPA Act (as amended) and Section 92 of the NPW Act have been considered and Grafton Management Area Environmental Impact Statement (EIS) has been produced.

(e) Breaches and Infringements

Non-compliance with any condition or instruction set out in this Harvesting Plan will be dealt with in accordance with Section 4 of the **"Forest Practices Code Part 2 - Timber Harvesting in Native Forests"**. Serious breaches may lead to the issue of a penalty notice, licensee suspension or prosecution.

(f) Variations and Amendments to this Harvesting Plan

Conditions and requirements relating to the Pollution Control Licence cannot be varied in the field without the prior written approval of the EPA, other than those areas detailed in Condition 5.1 (c) or consistent with variation 24A to the Pollution Control Licence.

Variations and other specified approvals detailed Condition 5.1(c) or consistent with variation 24A to the Pollution Control Licence, may be made by the Supervising Forest Officer to this Harvesting Plan, subject to the District Forester's counter approval.

Other approvals may only be made by the Supervising Forester and are also subject to the District Forester's counter approval. Major variations that relate to the conditions of the Pollution Control Licence, minor variations that would result in an increased risk of water pollution, or any variation relating to drainage feature protection conditions can only be made with the prior written approval of the EPA.

All approvals must be recorded on a variation advice, attached as Part 6 to all operational copies of this Harvesting Plan.

This Plan must not be amended by a licensee or contractor.

(g) Harvesting Plan Availability

Copies of this Harvesting Plan must be held available by the contractor or bush supervisor at the site of timber-harvesting operations at all times that felling, snigging or environmental work is being undertaken within the area covered by this Harvesting Plan.

3.2 CERTIFICATION

(a) Plan Preparation

Prepared by: L. WALSH Signature: .....

Title: MARKETING FORESTER Date: 9 September 1996

(b) District Approval

I approve the issue of this Harvesting Plan subject to any amendments, endorsements or approvals that may be made following submission to the National Parks and Wildlife Service, the Environment Protection Authority and/or the Regulatory and Public Information Committee (constituted under the Timber Industry (Interim Protection) Act, 1993 as amended).

The date that operations will need to commence is: 25 SEPT, 1996

Signature: ..... District Forester Date: 9 Sept, 1996

(c) Receipt of External Authority Approvals

(To be completed by the District Forester or a person nominated by the District Forester who must attach the relevant amendments to the Plan.)

Table 3: External Authority Approvals

Name of Authority	Date Received	Attached to Plan by
NPWS		
EPA		
RaPIC		
Other Authority		

I note approval of this Harvesting Plan from the above-mentioned authorities, together with the amendments they have required to be included in the Plan.

These amendments have been included in the final Plan. This Harvesting Plan comprises pages 1 - 40, attachments and the Operational, Forest Types and Locality maps marked and referenced to this Harvesting Plan. This is Harvesting Plan No. CG 96/07/386.

Date for commencement of operations: .....

Signature: ..... Date: .....

District Forester

3.3 DISTRIBUTION

Recipient	Parts	Minimum Copies
Timber Licensee	1,3,4	1
Contractors	1,3,4	1
Operator(s) (where required)	1,3,4	
Supervising Forest Officer(s) [SFO(s)]	1 ,3-5, (2 optional)	1
Supervising Forester(s)	All	
District Forester	All	
District Office Register	All	
Compartment Historey File	All	1
Regional Office (optional)	All	
Community Groups		
Soil Conservationist (Forestry)	All	

Forest Planning Branch, Head Office, for distribution to:

Regulatory and Public Information Committee	All	3
National Parks And Wildlife Service	All	2
Environment Protection Authority	All	3
Department of Lands and Water Conservation (for harvesting in other Crown-timber lands)	All	1

3.4 INDUSTRY ENDORSEMENT

I endorse the harvesting plan on behalf of industry.

Signature: ..... Licence No.: ..... Date: .....

Position: ..... Company: .....

Signature: ..... Licence No.: ..... Date: .....

Position: ..... Company: .....

Signature: ..... Licence No.: ..... Date: .....

Position: ..... Company: .....

3.5 BUSH SUPERVISORS ACKNOWLEDGMENT

I acknowledge that I have received a copy of Harvesting Plan No CG 96/07/386 and that I understand the conditions of the Plan as explained to me by a State Forests officer.

Signature: ..... Licence No: ..... Date: .....

Position.....

Signature: ..... Licence No: ..... Date: .....

Position.....

Signature: ..... Licence No: ..... Date: .....

Position.....

Part 4 OPERATIONAL CONDITIONS

The Tree-marking Code shown in this Plan will be used to apply other Conditions of this Plan as required. All necessary tree-marking in the field must be carried out before and during the harvesting operation by the SFO. Product marking will generally be for extraction.

4.1 Harvesting Activity Description

The logging will be a selective harvesting operation in maturing and regrowth native hardwood forest. The products that will be harvested are sawlogs, poles and veneer logs.

4.2 Tree-marking Code and Harvest Regulation

Tree Marking Code

(a) Trees to be removed

Trees will be marked with a **dot**. Some trees may also be marked to produce a specific log type; **P** = Pole, **G** = girder, **V** = veneer log.

(b) Trees to be retained

Trees will be marked with a **horizontal line**. Some trees may be marked for a specific purpose; **H** = habitat tree, **R** = recruitment habitat tree.

(c) Trees marked for information

Two horizontal lines indicates that machinery is not permitted past the point but there may be trees to be felled. **Three horizontal lines** indicates that machinery and that felling is not permitted past the point. **F** = wildlife corridor, **Z** = riparian zone, "**5**", "**10**", "**15**", "**20**", or "**25**" = buffer or filter strip width as appropriate. **D** = dump site, **O** = compartment boundary.

Forest boundaries are marked by yellow painted **blazes** and/or **sawn stakes**.

Vertical line indicates location of a minor road or snig track. **Vertical lines with arrowheads** indicates an approved crossing.

X = cancellation mark

Reference: Northern Region Tree Marking Code (1995)

4.3 Order of Working

(a) Wet Weather, Dry Weather and Intermediate Areas.

A total of 23 dump sites have been located and marked in the planning area, as indicated on the Operational Map. Dumps 1, 2, 5, 7-9, 13-16, and 20-23 have been designated as suitable for working when conditions are wet. While allowing for wet conditions and other practical considerations, harvesting will commence on dump 1 and work progressively through to dump 23. The SFO is responsible for determining the order of working in the field.

(b) Wet Weather Controls - Roads

During wet weather, the wet-weather controls set out in Section 7 of the Forest Practices Code Part 2 (Timber Harvesting in Native Forests) must apply. In particular, when it is raining and/or where runoff occurs from a road surface, haulage must not occur unless the road is a gravel or sealed road.

[FPC Pt2 7.2, PCL Sch 4 C 82]

(c) Wet Weather Controls - Snigging

During wet weather, snig tracks must not be used where:

(i) there is runoff from the track surface, or;

(ii) there is a likelihood of significant rutting leading to turbid runoff from the track surface. [FPC Pt2 7.2, PCL Sch 4 C 93]

4.4 Silviculture

(a) General

The aim of the harvest is to promote growth on retained trees and to create conditions that will allow the establishment and growth of regeneration. Selective logging techniques, including the Australian Group Selection system where appropriate, shall be implemented.

(b) Tree Marking

Tree marking shall aim at:

Retaining trees capable of net merchantable timber value increment for cutting in future cutting cycles, except where:

a) the removal would result in more valuable increment on preferred retained trees (redistribution).

b) the tree has been or is likely to be significantly damaged during the course of harvesting operations.

c) the removal of a small group of merchantable trees would create favourable conditions for the establishment and growth of regeneration.

In general tree marking and supervision shall be directed towards:

1. Harvesting for the highest economic end use for which markets are available.

2. Ensuring maximum economic utilisation of all trees felled.

3. Minimising damage to the retained stand and minimising soil disturbance in excess of that required for successful regeneration establishment.

Tree marking for removal must be carried out by the SFO.

Reference Grafton Management Area Environmental Impact Statement
Jacobs (1955) Growth Habits of the Eucalypts. Forestry and Timber Bureau. Commonwealth Government Printer, Canberra.

(c) Harvesting Debris

Debris must be removed from within approximately 5 metres of the butts of retained habitat trees to minimise bark scorch during prescribed burning operations, or any wild fire.

Harvesting debris which is likely to impede the flow of water in road drainage structures must be removed from such structures every 2 days.

Bark and debris produced by the harvesting must be returned to the logging area and dispersed as far as practicable around the net harvest area and/or stacked in small heaps on log dumps.

(d) Directional Felling

Directional felling techniques must be employed to minimise damage to retained trees, to avoid hang ups and to maintain values of the Riparian Habitat Zones, filter strips and buffer strips.

4.5 Flora Protection

(a) Rare or Endangered Species

No occurences of rare or threatened flora are recorded for these compartments and none were encountered during field inspections.

(b) Rainforest Protection

Not applicable to these compartments.

4.6 Fauna Protection

(a) Sightings of Fauna

A pair of Glossy Black Cockatoos were recorded feeding on a Casuarina tree in compartment 387. A Yellow-bellied Glider V-notch tree was also recorded in compartment 387 near dump number 1. No Threatened species were recorded in comparmtents 386, 388 and 395. Threatened species expected to occur in or in the vicinity of the compartment are;

Glossy Black Cockatoo	**Powerful Owl**	**Sooty Owl**
Masked Owl	**Stephen's Banded Snake**	**Pale-headed Snake**
Spotted-tailed Quoll	**Brush-tailed Phascogale**	**Yellow-bellied Glider**
Squirrel Glider	**Rufous Bettong**	**Red-legged Pademelon**
Common Planigale	**Koala**	**Long-nosed Potoroo**
Great Pipistrelle	**Golden-tipped Bat**	**Little Bent-wing Bat**
Common Bent-wing Bat	**Large-footed Mouse-eared Bat**	

Contractors and supervisory staff shall report any sightings of Threatened species to the District Marketing Forester. Such confirmed sightings or findings shall generate the application of the appropriate prescriptions to reduce the impact on the species.

(b) Habitat Trees

Compartments 386, 387, 388 and 395 include Dry Hardwood forest and Moist Hardwood forest with xeromorphic understorey, and limited areas of Moist Hardwood forest with mesic

understorey. Sufficient potential habitat and recruitment habitat trees exist in the net harvest area to allow for the retention of enough trees to meet prescription requirements.

Prescription 1:

Habitat Tree Retention

Habitat tree retention in Dry Hardwood and Moist Hardwood forests with a xeromorphic understorey shall be four trees per hectare. For the purpose of this prescription a xeromorphic understorey is considered to be one composed predominantly of grasses, heath and/or shrubs with sclerophyllous leaves.

Habitat tree retention in Moist Hardwood forests with a mesic understorey shall be six trees per hectare. For the purpose of this prescription a mesic understorey is considered to be one composed predominantly of moist elements such as vines, shrubs with mesophyllous leaves and/or species often found in Rainforest areas.

Habitat trees will be live hollow bearing trees. They are to be well spaced throughout the compartments being harvested, consistent with requirements for adequate regeneration and growth for the species of the forest types. Where the specified density of habitat trees is not present the existing density is to be retained. Sufficient recruitment habitat trees to sustain the retained density of habitat trees into perpetuity are also to be retained. Stags shall not be counted as habitat trees.

Habitat trees shall be marked by the SFO.

All practical precautions must be taken to avoid tree heads landing adjacent to identified habitat trees. Tree heads shall be removed from within approximately 5 metres of identified habitat trees. Tree heads shall be removed with minimum disturbance to understorey vegetation and on-ground logs.

(c) Non Harvest and Modified Harvest Areas

Riparian Habitat Zones

Riparian Habitat Zones exist 20 metres either side of streams (watercourses, drainage lines and drainage depressions) with catchments greater than 40 hectares.

- except to use crossings harvesting machinery must not enter Riparian Habitat Zones.
- felling and snigging must be excluded from Riparian Habitat Zones.
- trees must not be felled into Riparian Habitat Zones.
- trees must not be damaged in Riparian Habitat Zones.

Refugia areas

No areas of critical habitat for Threatened species have been located in the net harvest area and no refugia areas have been set aside.

(d) Species and Mitigation Prescriptions

Mitigation prescriptions to be applied in Grafton Management Area have been determined for Threatened species that might be adversely impacted on by forest management activities. Those relevant to Compartments 386, 387, 388 and 395 are stated below. The appropriate mitigation prescription shall be immediately applied when any of the listed species is sighted or critical habitat is located.

Prescription 2:

Preservation of Critical Weight Range species

In applying the following prescription it should be noted that the *Bush Fires Act* 1949 overrides Section 99 (1) of the *National Parks and Wildlife Act* 1974. That is, it is not an offence to undertake an activity which will take or kill any endangered fauna if that activity is authorised or required by a section 41A plan or authorised or required under the Bush Fires Act.

Given the above, the prescription should only be seen as a guide for managing the habitat of critical weight range (CWR) fauna.

Critical weight range species expected to occur in the compartments are Rufous Bettong, Red-legged Pademelon, Long-nosed Potoroo and Spotted-tailed Quoll.

SFNSW are to ensure, to the fullest extent practicable, that any post-logging burning is to be carried out in such a manner that encroachment into critical habitat for those species listed above is prevented. This can be achieved by carrying out post-logging burning under weather and fuel conditions which minimises the chance of encroachment into critical habitat and minimises the destruction of large fallen logs (ie. those logs with a diameter greater than 40 cm).

For the purpose of this prescription critical habitat for the Spotted-tailed Quoll is defined as moist gullies wet sclerophyll, rainforest and fallen logs with a diameter of greater than 40 cm. Critical habitat for the Red-legged Pademelon is defined as moist gully vegetation and rainforest. Critical habitat for the Rufous Bettong is defined as well grassed open forest and woodland and large fallen logs of greater than 40 cm.

Prescription 3:

Glossy Black Cockatoo

All practical attempts must be made to minimise disturbance to mature feeding forest oaks throughout the logging area. On location of a nest tree the NPWS's Manager Threatened Species, Northern Zone is to be informed and logging in the immediate area (ie within 100 metre radius) is to cease pending delineation of an appropriate buffer by a joint NPWS / SFNSW inspection of the area.

Prescription 4:

Powerful/Masked/Sooty Owls

200 metre radius buffer must be established around each identified roost site. This prescription is to be reviewed when more than 10 confirmed locations of the species have been recorded in the management area.

Prescription 5:

Stephen's Banded Snake and Pale-headed Snake

100 metre radius buffer zone must be established around each identified location site. This prescription is to be reviewed when more than 10 confirmed locations of the species have been recorded in the management area.

Prescription 6:

Brush-tailed Phascogale

200 metre radius buffer zone must be established around each identified nest site. This prescription is to be reviewed when more than 10 confirmed locations of the species have been recorded in the area.

Prescription 7:

Yellow-bellied Glider

All trees with V-notch markings must be retained.

The tree with the most recent V-notch markings or other incisions shall be the centre tree of an area with a 100 metre radius. Within this area the following trees will be retained: a minimum of 30 trees (>10 cm dbh) of the sap feed tree species, and a minimum of 15 bark shedding trees, with their bark shedding in long strips.

Where there is more than one marked feed tree within the 100 metre radius, the additional feed trees may count as those feed trees to be retained.

Prescription 8:

Squirrel Glider

200 metre radius buffer zone must be established around each identified nest site. This prescription is to be reviewed when more than 10 confirmed locations of the species have been recorded.

Prescription 9:

Koala

If a koala is observed during logging, numerous scats (more than twenty below a tree) are found, or less than twenty pellets of different sizes are found, logging will be excluded from within a 100 metre radius of the site and a survey undertaken.

The survey shall be undertaken according to the agreed coastal prescription for koalas. Tree felling will be excluded from within fifty metres of a high use area, or modified within intermediate use areas.

Prescription 10:

Long-nosed Potoroo

100 metre radius buffer zone must be established around each identified location site. This prescription is to be reviewed when more than 10 locations of the species have been recorded in this management area.

Prescription 11:

Golden-tipped Bat/Little Bent-wing Bat/Common Bent-wing Bat/Large-footed Mouse-eared Bat

100 metre radius buffer zone must be established around each identified roost site.This prescription is to be reviewed when more than 10 locations of the species have been recorded.

References Environmental Impact Statement Grafton Management Area.
State Forests' Response to Submissions to the Grafton Environmental Impact Statement.

4.7 Soil Erosion and Water Pollution Control Conditions

(a) Soil Erosion and Water Pollution Categories

The calculated Soil Erosion and Water Pollution Categories for Compartments 386, 387, 388 and 395, based on the subsoil data from site 386/1, are detailed in Table 4 below.

Table 4 - Water Pollution Hazard Categories

Slope Ranges (Degrees)	Water Pollution Category	Indicative % of Net Harvest Area			
		cpt 386	cpt 387	cpt 388	cpt 395
0 - ≤ 3	1	2.5	2.3	1	1
>3 - ≤ 15	2	22.8	19.5	14.7	13.6
>15 - ≤ 30	3	74.7	78.2	84.3	85.4
Roads	3	N/A	N/A	N/A	N/A

(b) Approved Timber Harvesting and Extraction Method

- Chainsaw felling, using directional felling techniques where required.
- Snigging of logs using a crawler tractor and/or a rubber tyred skidder.
- Debarking and loading of logs at the dump using an excavator or forklift.
- Transport of logs from the site using a jinker and prime mover.

(c) Marking and Location of Roads, Log Dumps, and Crossings

The marking and location of roads, log dumps, and crossings in the field must be in accordance with condition 4.2. The location of roads, drainage feature crossings and log dumps are indicated on the Operational Map.

(d) Wet Weather Controls

Harvesting operations may be conducted throughout the year subject to the application of normal wet weather closure procedures as per Section 7 of the Forest Practices Code Part 2 (Timber Harvesting in Native Forests). During wet weather, the wet weather controls for road usage and for snigging set out in section 7 of the Forest Practices Code Part 2 (Timber Harvesting in Native Forests) will apply. In particular, where:

i) runoff occurs from a road surface:

- haulage must cease on natural surface roads.

ii) there is runoff from a snig track surface:

- snig tracks must not be used.

(iii) there is a likelihood of significant rutting leading to turbid runoff from a snig track surface;

- snig tracks must not be used.

(iv) it is raining:

- operations must cease.

In any event, if:

rutting of a snig track is, or is likely to approach a maximum of 200 mm below the natural surface, measured over any 20 metre length of track, snig tracks must not be used.

Dumps 1, 2, 5, 7-9, 13-16, and 20-23 as marked on the Operational Map, are suitable to be worked during wet weather periods.

(e) Existing Roads

Clearing of regrowth

A minimal amount of clearing may be required to open existing roads for use. This will involve lowering of crossbanks and the removal of fallen timber and small regrowth trees from the road pavement and edges. This work must be kept to the minimum required to allow for use of existing roads. The slight erosion on 388 Road caused by the dam spillway must be rectified during reopening of the road.

Road surface drainage

Rollover crossbanks may be required on some sections of the minor roads where outfall drainage has not been established or is inadequate. Where required, rollover crossbanks must be spaced as stated in the Table below. The banks must have a minimum design consolidated vertical height from spillway to bank top of 20 cm. Such banks will convey the peak flow of a 1 in 5 year storm event (see calculations attached as Appendix 2).

Spacing of Rollover Crossbank Drainage
(grade of road - degrees)

Road Grade (degrees)	Spacing
0 - ≤5	100m
>5 - ≤10	60m
>10 - ≤15	40m

Rollover crossbanks must drain onto undisturbed vegetation or logging slash wherever possible. Where it is necessary to convey runoff water over a fill batter greater than 1 m high, that has been disturbed by the operation or on which the soil is exposed, drop down structures constructed of rock or prefabricated fluming must be installed. Dissipaters must be installed at the bottom of drop down structures.

Road drainage must minimise the flow of unchecked water onto extraction tracks, snig tracks or log dumps. Where this cannot be achieved by outfall drainage, a rollover crossbank must be placed as close as possible to the track or dump, consistent with haulage practicalities, to minimise the catchment area above it.

While a road is in use for hauling timber, spoon drains may be used in preference to rollover banks, but must be converted to rollover banks on completion of operations in the area.

Crossing of drainage features

386/1 Road crosses one drainage depression in compartment 386. This crossing is a stable natural surface open causeway and is well grassed. A spoon drain or rollover crossbank must be placed on each approach to the crossing as close as possible to the crossing consistent with haulage practicalities (and at least within the spacings given in the table above). The structure must discharge water onto undisturbed vegetation and there must be at least 5 m of undisturbed vegetation between the outlet and the banks of the drainage depression.

If the road pavement commences to deform during operations, the crossing and approaches must be gravelled.

At the conclusion of harvesting, any disturbed area adjacent to this causeway must be seeded with rye grass (or other suitable species) by the SFO at the rate of 20 kg/ha.

Revegetation and rehabilitation

Revegetation of the minor roads following harvesting will be through natural regeneration. The minor roads in the compartments are to be closed and must be bedded down, all spoon drains converted to rollover crossbanks, and crossfall (outfall) drainage reinstated. A crossbank must be constructed at the entrance to each road to prevent vehicular traffic using the road.

Road surfaces, batters and drainage feature crossings must be left in a stable condition. The slight erosion on 386/1 and 386/2 Roads must be rectified by providing effective drainage where this occurs.

Dispersible soils

If the subsoil is exposed on the road surface, batters or table drains within 20 m of the drainage depression crossing, top soil from the road, or imported gravel, must be spread over the road surface at the site. Where subsoil is exposed on cut and fill batters, the site must be seeded with rye grass (or other suitable species) at the rate of 20 kg/ha.

(f) Road Construction

There is a short length of minor road construction from the edge of Winters Road to dump 1 in compartment 387 required for these logging operations.

Design

The minor road to be constructed is approximately 75 metres in length and the running surface must be no wider than 6 m. The road must be drained by outfall drainage, which must be established before the commencement of operations.

Grade

The road is to be constructed on a flat ridge-top. The road grade must not exceed 2°.

Survey

The road line has been surveyed and marked in the field. Clearing and earthworks must not deviate from the marked lines.

Clearing

The clearing width for construction of the road must not exceed 6 metres.

Batters

A short length of cut batter will be required at the intersection of the new road with Winters Road. Vertical batters are preferred, and be no more than 0.75 m deep. The maximum length of cut batter must be 5 m.

Crossing of drainage features

The road to be constructed does not cross any drainage lines.

(g) Slope limits for the area

Maximum slope for harvesting	30 degrees
Maximum grade of snig track construction	25 degrees
Maximum side slope for snig track construction	30 degrees
Maximum road grade permitted	10 degrees
Maximum side slope for road construction	30 degrees without design

Areas with slopes over 30° are indicatively marked on the Operational Map. The SFO is responsible for identifying areas with slopes over 30° in the field.

(h) Drainage Feature Protection

Riparian Habitat Zones exist 20 metres either side of watercourses, drainage lines and drainage depressions with catchments greater than 40 hectares.

Filter strips must be retained along all watercourses and drainage lines within the net harvest area of Compartments 386, 387, 388 and 395 at minimum widths (measured in the horizontal plane) as stated in Table 5 below. These minimum widths meet or exceed the requirements of the Pollution Control Licence.

Where a filter strip extends beyond the boundary of the catchment of the drainage feature that is the subject of the protection, then the filter strip may be terminated at the catchment boundary.

In addition buffer strips 5 metres wide must be maintained on either side of drainage depressions.

Table 5 - Filter Strip Widths
(distance each side of stream)

Water Pollution Category	CATCHMENT /SLOPE	Riparian Zone	Filter Strip
1	<40 ha		5m
1	>40 ha	20m	
2	<40 ha		10m
2	>40 ha	20m	
3	<40 ha <18° slope		15m
3	<40 ha >18° slope		20m
3	>40 ha <18° slope	20m	
3	>40 ha >18° slope		30m

(i) Tree Marking Rules for Filter Strips and Buffer Strips

The SFO must mark Riparian Habitat Zones and filter strips in the compartment progressively ahead of harvesting operations, except where there is no tree marked for removal within a tree length of the protected area.

Contractors and operators are responsible for identifying drainage depressions encountered in the field and taking appropriate action whilst operating within the buffer strip or crossing the drainage depression. (See also 5.2)

(j) Felling and Extraction from Filter Strips

OPERATIONS WITHIN NATIVE FOREST FILTER STRIPS

Trees located in a filter strip must not be felled, except for the purposes of constructing an approved road, extraction or snig track crossing.

Trees must not be felled into filter strips.

Crowns, logs and substantial debris accidentally felled into filter strips must be removed with minimal disturbance to the groundcover and soil in the filter strip. any disturbance caused must be remedied by reshaping of furrows and replacement of cover, so that concentrated water flow does not occur.

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

(k) Extraction from Drainage Depression Buffer Strips

Machinery must not operate in buffer strips when the soil is saturated.

Soil exposure must be minimised and channelised flow must be prevented by use of the following techniques:

- no snigging along drainage depressions
- operating with the blade up at all times

- preventing skewing of machinery tracks (by approaching logs in reverse gear, and minimal changes in direction while snigging logs out of the buffer strip).

No earthworks can be undertaken within buffer strips except for the construction of road, extraction tracks or snig track crossings.

(l) Snig Tracks

It is preferable that, wherever practicable, walkover extraction techniques be used in preference to snig track construction.

The grades of snig tracks must not exceed 25 degrees.

Snig tracks must not be located where they cannot be drained effectively. Wherever practicable, snig tracks shall be located slightly off ridge-top to ensure free crossfall drainage. Side cut tracks must have crossfall drainage.

Snigging along roads must only occur in order to avoid snig track construction and where approved by the SFO. Effective road drainage must be re-instated by the contractor/operator immediately at the completion of the snigging operation.

Snig tracks must be drained to minimise the flow of water along them and the flow of water directly into watercourses, drainage lines or onto roads and dumps. Drainage must be effected within 2 days of the completion of use, or where operations are to be temporarily suspended in accordance with Table 6.

Table 6 - Drainage of Snig Tracks at Temporary Cessation of Operations

Slope boundaries	WP Category	No. Days
0- ≤3	1	10
>3 - ≤15	2	8
>15 - ≤30	3	5

Where earth banks are required they must be constructed to a minimum unconsolidated effective height of 35 cm, with spacing in accordance with Table 7.

Table 7 - Maximum Earth Bank Spacing

Track Grade (degrees)	WPH Category		
	1 (0° - ≤3°)	2 (>3° - ≤15°)	3 (>15° - ≤30°)
0 - ≤5	200 m	150m	100m
>5 - ≤10	150 m	100m	60m
>10 - ≤15	80 m	60m	40m
>15 - ≤20	60 m	40m	25m
>20 - ≤25	40 m	30 m	20m
>25	30 m	25 m	15m

The above spacings are the maximums and should be varied to utilise the most suitable outlet point. Crossbanks must be discharged into undisturbed vegetation or logging debris.

Crossbank construction, if required, must avoid exposing the dispersible subsoil wherever practicable (see also 4.7(o) below).

(m) Downhill Snigging

Limited downhill snigging will be required to dumps 2-6, 8-17 and 20-22.

The following techniques must be used where downhill snigging is used:

- Crossfall drainage must be used where practicable.
- Where practicable the snigging pattern must be uphill from the stump with the logs being bunched for the downhill portion of the snig onto a centrally located extraction track(s).
- Where possible, tracks must enter the log dump from the side or below. Where this is not possible, a crossbank must be in place immediately before a snig track enters the log dump at the end of each day's operation.

(n) Snig Track Drainage Line Crossings

All snig track watercourse and drainage line crossings must be approved by the SFO before construction and must be open causeways utilising the natural surface at the site. Crossings must be rehabilitated after use, and any harvesting debris inadvertantly deposited during use shall be removed from the channel. As far as practicable the crossing point must be reshaped to its original condition and seeded with rye grass (or other suitable species) at the rate of 20 Kg/ha.

(o) Dispersible Soils

As far as practicable, no more than 30 per cent of the dispersible subsoil (measured over any 20 m length of snig track) may be exposed on snig tracks. This must be achieved by maintaining topsoil cover and/or using logging slash and walkover techniques. Where these methods do not achieve adequate ground-cover, the exposed area must by seeded with rye grass (or other suitable species) at the rate of 20 kg/ha on completion of operations in the area.

(p) Log Dumps

Field location of log dumps must utilise the most level site available, consistent with the location marked in the field and indicated on the Operational Map.

Because of the dispersible subsoil in the area, topsoil must not be stripped and stockpiled.

Dumps must be constructed with outfall drainage and shall be kept drained during use and at the completion of operations.

Upon completion of operations any debris at or near the edge of a dump must be moved away from standing vegetation into the dump area. The log dump surface must be left in a stable condition with at least 70% cover of topsoil and/or logging slash (which may include bark). As far as possible, those dumps on Winters Road must be left substantially free of large timber, to enable subsequent use by apiarists.

Where these techniques are not adequate to ensure stability of the dump surface, it must be seeded with rye grass (or other suitable species) at the rate of 20 kg/ha.

(q) Prescribed Burning

Pre-logging burning

There is no pre-logging burning associated with the harvesting of Compartments 386, 387, 388 and 395.

Post-logging burning

Post-logging burning of Compartments 386, 387, 388 and 395 must be carried out in accordance with provisions and specifications of the Nymboida District Fire Plan and the Grafton District Fuel Management Plan.

Objectives

Post-logging burning objectives for the compartments are:

- to meet State Forests' obligations under the Bush Fires Act.
- to decrease fine fuel loads and logging debris under prescribed conditions to decrease the intensity of any wildfire that might occur in the compartment and hence, decrease associated damage to regeneration and retained stems.
- to reduce the possibility of wildfire burning through the compartment and entering and damaging adjacent forests and private property areas.
- to simplify and increase the efficiency and the safety of any wildfire control activity.
- to promote good seedbed conditions for regeneration.

Ignition

Burning must be undertaken by the lighting of individual heaps of harvesting slash and debris under conditions that will enable the fires to be contained within the compartment.

Post-logging burning must be undertaken under conditions that will prevent fire travelling onto slopes over 30^0.

The Grafton District Operations Foreman is responsible for ignition, subject to the requirements of the Grafton District Fuel Management Plan.

Preferred season to burn

February to August.

4.8 Research and Inventory Plots

There are no research or inventory plots in Compartments 387, 388 and 395.

In compartment 386 Permanent Growth Plot 326 exists in the southern part of the compartment.

An elite Spotted Gum tree is located in the southern section of compartment 386 as indicated on the Operational Map.

- this tree must not be damaged by the harvesting activity.
- if necessary, directional felling must be employed to fall trees away from the elite tree.
- logging debris must be removed 5 metres away from the tree.

4.9 Modified Harvest Conditions

(a) Riparian Habitat Zones

Riparian Habitat Zones, 20 metres either side of the stream, exist on all watercourses, drainage lines and drainage depressions with catchments greater than 40 hectares.

- except to use crossings harvesting machinery must not enter Riparian Habitat Zones.
- felling and snigging must be excluded from Riparian Habitat Zones.
- trees must not be felled into Riparian Habitat Zones.
- trees must not be damaged in Riparian Habitat Zones.

(b) Visual Resource Protection Strip

A Visual Resource Protection Strip (PMP 1.1.6) exists along the main ridge running through the centre of the block of compartments. It runs along the western boundary of compartment 386, the eastern boundary of compartments 387 and 388 and on the north-eastern corner of compartment 395 as shown on the Operational Map. The strip is 80 metres wide along the ridge top.

- Harvesting activity in the Visual Resource Strip must be restricted to trees under 40 cm dbhob and 50% of trees greater than 40 cm dbhob.
- Harvesting activity in the Visual Resource Strip must be restricted so as to always maintain the high tree line as seen from a distance.
- Any roads must run at an acute angle through the Visual Resource Strip.
- Dumps located in the Visual Resource Strip must be established in such a way that the high canopy can be maintained.

(d) Other (eg boundary fences)

There is a derelict fence on the north-western boundary of compartment 395. This fence must not be damaged and must be left in the condition found before the commencement of operations. If damaged, it must be repaired before the completion of the operations.

4.10 Specification of Type of Products to be Removed.

Compulsory Sawlogs	See **Grafton/Coffs Harbour Compulsory Sawlog Specification Hardwood Sawlog Flat Rate Royalty Utilisation Standards.**
Salvage Sawlogs	See **Grafton/Coffs Harbour Compulsory Sawlog Specification Hardwood Sawlog Flat Rate Royalty Utilisation Standards.**
Poles	See **Australian Standard AS2209 - 1979 (poles)**
Veneer Logs	See **Specification for Eucalypt Veneer Logs for Rotary Peeling.**

Yield Information for Compartments 386, 387, 388 and 395

Estimated Yields are:

Compulsory Sawlogs 40 cm +	1000 m^3
Compulsory Sawlogs <40 cm	400 m^3
Salvage Sawlogs	100 m^3
Poles	200 m^3
Veneer Logs	50 m^3

Part 5 CONDITIONS FOR SUPERVISING FOREST OFFICERS (SFOs)

Condition 5.1 SFO' Authority to Supervise Harvesting Operations

(a) General

The Supervising Forest Officer responsible for the direct field supervision of this harvesting operation, including tree-marking, log measuring and/or log check measurement, safety, implementation of wet weather controls, and monitoring and reporting generally are:

The appointed Hardwood Marketing Foreman, Grafton District.

(b) Relieving SFOs

Relieving SFOs, if required are:

The Forest Assistant, Marketing, Grafton District.

The Marketing Forester, Grafton District.

(c) SFOs Authority

The SFO has the authority to approve:

- the blading off of natural surface roads provided that damage will be minimal and the removed material is recoverable for respreading.
- downhill snigging routes where provided for in the Harvest Plan.
- use of natural surface roads for snig track crossings or as snig tracks to dumps provided restoration of the road for wheeled traffic is undertaken as necessary and use of the road significantly reduces soil disturbance.
- the exact location and type of watercourse and drainage line crossings for snig tracks - for this plan area all crossings must be open causeways.

All approvals must be noted on the harvesting plan. The location of drainage line crossings must be marked on the Operational Map.

Condition 5.2 Tree Marking and Other Harvesting Control Requirements

(a) Tree Marking for Forest Management and Silviculture

The Northern Region Tree Marking Code will apply to the harvesting operation. All trees to be removed must be marked for extraction. (Also see Part 4.2)

Habitat trees and habitat recruitment trees for fauna protection

Habitat trees and habitat recruitment trees must be marked for retention by the SFO according to Prescription 1 in Part 4.6 (b).

Non-harvest areas and modified harvest areas

The boundaries of the Wildlife Corridor and Riparian Habitat Zones must be marked ahead of harvesting operations except where there is no tree marked for removal within a tree length of the Wildlife Corridor or Riparian Habitat Zone.

(b) Soil Erosion and Water Pollution Control

Marking of filter strips

In most cases, Riparian Habitat Zone prescriptions are equivalent to or greater than filter and buffer strip requirements. There is no need for filter and buffer strips where they would be embedded in Riparian Habitat Zones. Hence filter strips shall only be marked in the field where they are not embedded in Riparian Habitat Zones.

Similarly, where filter strip requirements exceed Riparian Habitat Zones (ie in Water Pollution Hazard Category 3 above 18°), there is no need to mark Riparian Habitat Zones.

All drainage features must be inspected by the SFO during the harvesting operation in conjunction with tree marking and protected in accordance with the Pollution Control Licence. Where practicable, any variation between the actual drainage feature found in the field and that shown on the harvest plan Operational Map should be marked on the SFO's copy of the map for future reference.

Filter strips and drainage line buffer strips must be retained along all drainage features at the minimum widths as specified in Table 5 in Part 4.7 (l).

The SFO is responsible for marking filter strips in the field progressively and prior to the commencement of operations in each section of the harvest area. Riparian Habitat Zones and filter strips need not be marked where there is no tree marked for removal within a tree length of the Riparian Habitat Zone or filter strip.

Drainage depression buffer strips

The SFO is responsible for ensuring that contractors and operators are detecting drainage depressions in the field and taking appropriate protective precautions within the buffer strip area whilst operating in the buffer strip or crossing the drainage depression. (See also Part 4.7 (k)).

Slopes over 30°

Areas with slopes over 30° are indicatively marked on the Operational Map. The SFO is responsible for identifying slopes over 30° in the field.

Road drainage

The SFO must ensure that all drainage structures on existing roads and proposed roads are constructed and maintained in accordance with Parts 4.7 (e and f).

Sowing of watercourse and drainage line crossings

The SFO must ensure that crossing approaches are seeded in accordance with Part 4.7 (e and n).

Sowing of exposed dispersible subsoil

The SFO must ensure that measures are taken to protect dispersible subsoil (including seeding where required) in accordance with Sections 4.7(e and o).

Condition 5.3 Monitoring and Reporting

(a) Daily and Fortnightly Reporting

The standard District procedures for daily and fortnightly reporting on the conduct of operations must be followed.

(b) Fauna Reporting and Mitigation Prescriptions

Sightings of any Threatened fauna must be reported to the District Marketing Forester within 24 hours of the sighting being made, as required in Part 4.6 (a). For any of the animal species listed in Part 4.6 (d) the stated mitigation prescriptions shall be immediately applied.

(c) Soil Erosion and Water Pollution Control Conditions

The SFO must report the following matters and record their location if necessary on the SFO's copy of the Harvesting Plan Operational Map, or the recording map attached to the Plan for that purpose:

- any accidental felling into filter strips and remedial action taken.
- any approval to leave soil from road and track construction in drainage lines or watercourses where attempts at removal would have resulted in excessive damage.
- any approval to defer stabilisation works at a drainage feature crossing beyond five days.
- any approval to leave a snig track drainage feature crossing structure in place and the reason for it to be left in place.
- any instances where effective cross bank drainage of a snig track is not effected within two days of completion of snigging from the area served by the track.

Post Harvest Rehabilitation

Supervision by the SFO and fortnightly check sheets must assess that road surfaces, batters and drainage structures are stable at the completion of operations and prior to the shifting of the contractor.

Condition 5.4 Pre- and Post-logging Burning

(a) Pre-logging Burning

There is no pre-logging burning associated with the harvesting of Compartments 386, 387, 388 and 395.

(b) Post-logging Burning

Post-logging burning of Compartments 386, 387, 388 and 395 must be carried out in accordance with provisions and specifications of the Nymboida District Fire Plan and the Grafton District Fuel Management Plan.

Ignition

The Grafton District Operations Foreman is responsible for ignition, subject to the requirements of the Grafton District Fuel Management Plan.

Condition 5.5 Other Instructions

There are no other instructions concerning the supervision of harvesting Compartments 386, 387, 388 and 395.

Condition 5.6 Supervising Forest Officer's Acknowledgment

I acknowledge that I have received a copy of Harvesting Plan No GG96/07/386;387;388;395 and that I have been briefed on the conditions of the Plan and understand the supervision and operational control requirements as explained to me by the District Marketing Forester.

Signature: ..... Date: .....

Position: .....

Supervising Forest Officer

Signature: ..... Date: .....

Position: .....

Relieving Supervising Forest Officer

ATTACHMENTS
CLEARANCE CERTIFICATE

HARVESTING PLAN No. ..... Compartment:.....

.....STATE FOREST.....DISTRICT

To M.....Supervising Forest Officer

I request approval for me to move my logging crew and all associated machinery from the above mentioned area to the next Compartment in accordance with Section 3.5 of the Code of Logging Practice.

I certify that:

(a) all permanent roads, trails and mitre drains have been cleared of harvesting debris;
(b) butt damage to retained trees has been kept to acceptable limits;
(c) all trees marked for removal have been felled;
(d) utilisation limits have been satisfactorily met;
(e) stump heights conform to requirements;
(f) all hanging trees have been felled and brought down;
(g) all log dump sites have been satisfactorily restored as required;
(h) harvesting debris is not accumulated around retained trees;
(I) all accumulated litter has been disposed of properly;
(j) all filter, protection and buffer strip requirements have been complied with;
(k) all snig track, extraction track and temporary logging road drainage has been installed satisfactorily and other required rehabilitation work has been completed;
(l) all necessary repairs to damaged roads, signs, fences and other structures have been carried out.

I believe that I have met all my obligations under the conditions of the Timber Licence, the Pollution Control Licence, and/or any licence issued under Section 120 of the National Parks and Wildlife Act, which apply to the Compartment just completed, as stated in this Harvesting Plan.

Signature.....Licence No.....Date .....
Contractor/licensee

As a result of inspections of the logging operations made in accordance with this Harvesting Plan, I am satisfied that, to the best of my knowledge, the licensee/contractor responsible for this harvesting operation has satisfactorily completed all work and approval is given for her/him to remove her/his machinery and equipment and leave the area/commence operations in another Compartment. (Compartment .....).

This clearance does not release the licensee/contractor from any obligation to undertake any remedial work if subsequent deficiencies are shown to result from inadequate practices during the harvesting operation, which are found during any inspections of the area made within 12 months of the date of this post-harvesting inspection.

Last inspection was made on .....(Date)

Signed: .....(Date).....
Supervising Forest Officer

Notes

Appendix 1: Erosion Hazard Assessment - Soil Type "C" Metasediments Formation

(a) Soil Erosion Hazard Classes

Soil Erosion Hazard Ratings (SEHR) have been assessed using SOILOSS High. The rating has then been used to assess Soil Erosion Hazard (SEH) classes for the net harvest area.

SEHR = R x K x LS x C x P where

R = 3000 Derived from $R = 89.31 \times {}^{2}I_{12}{}^{1.74}$

K = 0.043 subsoil (B Horizon; from site 386/1)

Derived from Laboratory Analysis of the B Horizon

B Horizon has been adopted as it gives lower slopes for the erosion classes.

S As factored in SOILOSS High

L = 10 metres

C = 0.45

Derived from 0.45 SEMGL standard

P = 1.0

Slope Ranges (Degrees)	Erosion Hazard Class	Where SEHR is	Indicative % of Net Harvest Area			
			cpt 386	cpt 387	cpt 388	cpt 395
0<=5	Low	less than 40	3.7	3.4	1.1	1.8
5> to <=21	Moderate	40 - 400	45.2	46	39.6	32.7
21> to <=30	High	400 - 800	51.1	50.6	59.3	65.5
N/A	Extreme	greater than 800	N/A	N/A	N/A	N/A

(b) Special Conditions

No special conditions, other than the following, are required as the conditions for use with Harvesting Plans, Schedule 4, of the EPA Pollution Control Licence (PCL) for 1995/96, are adequate to address the erosion and pollution risk.

(c) In areas of high erosion hazard, the grades of snig tracks and extraction tracks must not exceed 25°.

(Conditions derived above are to be inserted into the Harvest Plan at Condition 4.7 Soil Erosion and Water Pollution Control, (d) Wet Weather Controls - Seasonal Operations and Safeguards and (k) Extraction Tracks and Snig Tracks, when necessary.)

Preparation (by Forester, Forest Assistant)

Prepared by LEONIE WALSH ..... Signature .....

Title MARKETING FORESTER Date 9/9/96

District Approval (by District Forester)

Signature .....

District Forester

Date 9/9/96

POLLUTION CONTROL LICENCE CONDITIONS CHECKLIST

PLAN PREPARATION - PCL Sch 2, Div 3

Condition Number	Condition Title/Enquiry	Entry Needed?	Plan Ref.
C18	Representative water monitoring site	Yes	2.5 12 (f)
	Have Water Pollution Categories and proportion of Dispersible soil been calculated for the area?	Yes	2.5 13(a) 2.5 12(d)
	Method of soil sampling for K factor	Yes	2.5 12(d)
	Field sampling - sites? - lab analysis? - field analysis?	Yes Yes Yes	2.5 12(d) Soil report
1b)	Site specific conditions	Yes	2.5 13(c) 4.7 (e) & (f)
4	Are areas >30° within the net harvest area	Yes	4.7(g)
5	Are areas of WPC 4 within the net harvest area	No	
	SFO to mark areas over 30° or WPC 4	Yes	4.7(g)
5B	Areas over 30° and WPC 4 marked on map	Yes	Map
6	Drainage feature protection, prescribed streams	Yes	4.7 (h) Map
7	Any major water storage?	No	
8, 22A, 23	Drainage depression buffer strips conditions	Yes	4.7 (h)
9.1 (c)	Filter strips on map?	Yes	Map
9.2	Protection strips on map?	No	
10	Prescriptions for marking/identifying in the field -filter strips -protection strips -buffer strips	 Yes Yes Yes	 5.2 (b) 5.2 (b) 5.2 (b)
13	Reporting accidental felling into filter strips	Yes	5.3 (c)
14, 20, 22	See 10		
24	Specify techniques in buffer strips	Yes	4.7 (k)
47A,B 48B	Stabilisation of roads	Yes	
48A	Are roads shown on map	Yes	Map
49	Road traverses area over 30°	No	
50 (a), (b)	Maximum road grade 10°	Yes	4.7(f)

POLLUTION CONTROL LICENCE CONDITIONS CHECKLIST

PLAN PREPARATION - PCL Sch 2, Div 3

Condition Number	Condition Title/Enquiry	Entry Needed?	Plan Ref.
51	Marking of roads to be constructed in field	Yes	4.7(f)
52	Minimising clearing widths for construction	Yes	4.7(f)
53	Road side clearing conditions	Yes	4.7(f)
57	Borrow or gravel pits conditions	No	
60	Batter stabilisation measures	Yes	4.7(f)
63	Road drainage techniques	Yes	4.7 (e)
64	Road drainage spacing	Yes	4.7 (e)
65	Roadside windrows	No	
66	Removal of harvesting debris from structures	Yes	4.4 (c)
67	Blading-off of roads	Yes	5.1 (c)
71	Location of drainage feature crossings on roads	Yes	4.7 (e)
74	Condition to cover non-removal of spoil from drainage features	Yes	5.3 (c)
76	Condition to cover non-completion of crossing stabilisation within 5 days - roads	Yes	5.3 (c)
77	Techniques to leave road crossing sites stable	Yes	4.7 (e)
78	Techniques for stabilisation of roads that are no longer required	Yes	4.7 (e)
79	Evaluation of old roads	Yes	2.5 12(h)
80	Road construction in dispersible soils	No	
81	Protection techniques for roads traversing dispersible soils	No	
82	Wet weather restrictions for roads	Yes	4.3 (b)
83	Condition to cover non-completion of snig track crossing stabilisation within 5 days - snig tracks	Yes	5.3 (c)
84	Techniques to leave snig track crossing sites stable	Yes	4.7 (n)
85	Condition to cover non-removal of temporary crossing structures on snig tracks	Yes	5.3 (c)

POLLUTION CONTROL LICENCE CONDITIONS CHECKLIST

PLAN PREPARATION - PCL Sch 2, Div 3

Condition Number	Condition Title/Enquiry	Entry Needed?	Plan Ref.
86	Crossing of drainage features other than drainage depressions by snig tracks	Yes	4.7 (n) 5.1 (c)
	Specification of snig track crossing locations, types and capacity	Yes	4.7 (n)
	Condition for SFO approvals for crossings	Yes	5.1 (c)
	Conditions for non-removal of soil from drainage features	Yes	5.3 (c)
89	Location and effective drainage of snig tracks	Yes	4.7 (l)
92	Condition for snigging along roads	Yes	4.7 (l)
93	Conditions for wet weather restrictions for use of snig tracks	Yes	4.3 (c)
99	Specifications for drainage of snig tracks include:		
	-capacity for peak flow in a 1:2 year storm event	Yes	4.7 (l)
	-diversion into stable surfaces	Yes	4.7 (l)
	-minimise unchecked flow into drainage features	Yes	4.7 (l)
	-divert water with minimum damage to structure	Yes	4.7 (l)
103	Minimum specification for bank height	Yes	4.7 (l)
105	Condition for non-drainage of snig tracks 2 days after use has ceased	Yes	5.3 (c)
107	Condition for drainage at temporary cessation of use	Yes	4.7 (l)
109	Specifications for preventing concentrated water flow where downhill snigging is specified	Yes	4.7 (m)
112	Protection techniques for snig tracks on dispersible soils	No	
119	Specifications for log dump location and drainage	Yes	4.7 (p)
120	Use of traxcavators and wheeled loaders in relation to wet weather	No	
125	Post-logging burning conditions	Yes	4.7 (q)
	Other conditions listed in Sch 2 Div 3 that need to be included as alert conditions in this plan	None	
	Are any appendices required	Yes	app

HARVESTING PROTOCOL ATTACHMENT

Cpt 386, Grange State Forest

API

Photography: Coaldale
Run 11 Print 117 and Run 12 Print 126

Interpreter: Peter Fisher Date completed: 13 February. 1996.

Results summary (ocular estimate)

Candidate OGF	Whole Compartment (as per photos)
Polygons >25 ha	Yes
Contiguous areas >25ha	Yes

Mapping required? Yes

Photo overlay signed and stored with harvesting plan? Yes

Comments:
Within compartment 386, API identifies a polygon >25 ha which contains <10% CCP of regrowth forest and is contiguous with part compartments 385, 387, 388, 389, 391 and 395.

MAPPING

Mapper: Leonie Walsh Date completed: 23 May 1996

Candidate OGF	Net loggable area	
	No.	Area
Polygons >25 ha	1	115

Number of plots to be sampled: 12

STUMP COUNT

- 19 plots were measured in the field.
- *Disturbance history:* The compartment was logged in the early to mid-70s, followed by a post log burn. The whole compartment was burnt by wildfire in 1994/95.
- *Field inspection:* The area was walked to determine the extent of previous logging. Parts of the area consist of very steep and inaccessible areas that are difficult to access. All accessible areas within the compartment have been logged at least once. It should be noted that there were a number of holes recorded that are most probably burnt out stumps. These were not included in the calculations.

Assessors: Les Casson Date completed 31 May, 1996. Paul Robb

Plot no.	Av largest tree diam	Number of stumps per half hectare plot		
		Pre 1960	Post 1960s	Total
Dry Forest				
1	80.3	0	9	9
2	122.4	0	8	8
3	78.7	0	16	16
4	103.8	0	9	9
5	121	0	5	5
6	77.5	0	12	12
7	99	0	8	8
8	57.8	0	14	14
9	56.3	0	14	14
10	57.8	0	11	11
11	69.2	0	8	8
12	103.8	0	8	8
13	107.7	0	1	1
14	72.2	0	5	5
15	80.2	0	7	7
16	74.7	0	5	5
17	71	0	5	5
18	85.3	0	5	5
19	92.7	0	7	7
	TOTAL:	0	160	160

NB: The figures presented in the table above relate to number of stumps per half-hectare plot. The figures presented below refer to average number of stumps per hectare.

Average number pre-1960 stumps per hectare:
Dry forest = 0 (disturbance threshold ≤ 9)

Average number post-1960 stumps per hectare
Dry forest = 16.8 (disturbance threshold ≤ 5)

Average number stumps per hectare
Dry forest = 16.8

Candidate OGF net loggable area
polygons >25 ha no

No Candidate OGF Exclusion Areas

Cpt 387, Grange State Forest

API

Photography: Coaldale
Run 12 Print 123

Interpreter: Peter Fisher Date completed: 13 February. 1996.

Results summary (ocular estimate)

Candidate OGF	Whole Compartment (as per photos)
Polygons >25 ha	Yes
Contiguous areas >25 ha	Yes

Mapping required? Yes

Photo overlay signed and stored with harvesting plan? Yes

Comments:
Within compartment 387, API identifies a polygon >25 ha which contains <10% CCP of regrowth forest and is contiguous with part compartments 388, 386, 385, 380.

MAPPING

Mapper: Leonie Walsh Date completed: 29 July 1996

Candidate OGF	Net loggable area	
	No.	Area
Polygons >25 ha	1	66 ha

Number of plots to be sampled: 7

STUMP COUNT

- 9 plots were measured in the field.
- *Disturbance history:* The area has been logged in the last 30 years, however dates and intensities are not recorded in the compartment history. The whole compartment was burnt 1993/94 and again in 1994/95.
- *Field inspection:* Field inspection revealed evidence of very heavy logging in parts of the area. There is evidence of burnt stumps but these are not included in the tally.

Assessors: Wayne Davis
Les Casson

Date completed 1 August 1996.

Plot no.	Av largest tree diam	Number of stumps per half hectare plot		
		Pre 1960	Post 1960s	Total
Dry Forest				
1	80.4		7	7
2	70.6		3	3
3	91.2		12	12
4	92.2		13	13
5	104.7		5	5
6	88.6		5	5
7	65.7		6	6
8	76.8		3	3
9	88.1		5	5
	TOTAL:		59	59

NB: The figures presented in the table above relate to number of stumps per half-hectare plot. The figures presented below refer to average number of stumps per hectare.

Average number pre-1960 stumps per hectare:
Dry forest = 0 (disturbance threshold ≤ 9)

Average number post-1960 stumps per hectare
Dry forest = 13.1 (disturbance threshold ≤ 5)

Average number stumps per hectare
Dry forest = 13.1

Candidate OGF	net loggable area
polygons >25 ha	no

No Candidate OGF Exclusion Areas

Cpt 386, Grange State Forest

API

Photography: Coaldale
Run 11 Print 118, Run 12 Print 125

Interpreter: Peter Fisher Date completed: 13 February. 1996.

Results summary (ocular estimate)

Candidate OGF	Whole Compartment (as per photos)
Polygons >25 ha	Yes
Contiguous areas >25ha	Yes

Mapping required? Yes

Photo overlay signed and stored with harvesting plan? Yes

Comments:
Within compartment 388, API identifies a polygon >25 ha which contains <10% CCP of regrowth forest and is contiguous with part compartments 387, 386, 389, 395, 391.

MAPPING

Mapper: Leonie Walsh Date completed: 29 July 1996

Candidate OGF	Net loggable area	
	No.	Area
Polygons >25 ha	1	40

Number of plots to be sampled: 4

STUMP COUNT

- 5 plots were measured in the field.
- *Disturbance history:* The area has been logged in the last 30 years, however dates and intensities are not recorded in the compartment history. The whole compartment was burnt 1993/94 and again in 1994/95.
- *Field inspection:* Field inspection revealed the area has been extensively logged and silviculturally treated.

Assessors: Les Casson
Mark Casson

Date completed 31 July 1996.

Plot no.	Av largest tree diam	Number of stumps per half hectare plot		
		Pre 1960	Post 1960s	Total
Dry Forest				
1	71.7		8	8
2	97.9		6	6
3	86.8		4	4
4	68.6		8	8
5		0	0	0
	TOTAL:	0	26	26

NB: The figures presented in the table above relate to number of stumps per half-hectare plot. The figures presented below refer to average number of stumps per hectare.

Average number pre-1960 stumps per hectare:
Dry forest = 0 (disturbance threshold ≤ 9)

Average number post-1960 stumps per hectare
Dry forest = 10.4 (disturbance threshold ≤ 5)

Average number stumps per hectare
Dry forest = 10.4

Candidate OGF	net loggable area
polygons >25 ha	no

No Candidate OGF Exclusion Areas

Cpt 395, Grange State Forest

API

Photography: Coaldale
Run 11 Print 117, Run 12 Print 126

Interpreter: Peter Fisher Date completed: 13 February. 1996.

Results summary (ocular estimate)

Candidate OGF	Whole Compartment (as per photos)
Polygons >25 ha	Yes
Contiguous areas >25ha	Yes

Mapping required? Yes

Photo overlay signed and stored with harvesting plan? Yes

Comments:
Within compartment 395, API identifies a polygon >25 ha which contains <10% CCP of regrowth forest and is contiguous with part compartments 394, 392, 391, 390, 389, 386, 385.

MAPPING

Mapper: Leonie Walsh Date completed: 29 July 1995

Candidate OGF	Net loggable area	
	No.	Area
Polygons >25 ha	1	34

Number of plots to be sampled: 4

STUMP COUNT

- 6 plots were measured in the field.
- *Disturbance history:* The area has been logged in the last 30 years, however dates and intensities are not recorded in the compartment history. Part of the compartment was burnt in 1993/94 and the whole compartment was burnt in 1994/95.
- *Field inspection:* Extensive evidence of logging was found.

Assessors: Wayne Davis
Les Casson
Mark Ross

Date completed 31 July 1996.

Plot no.	Av largest tree diam	Number of stumps per half hectare plot		
		Pre 1960	Post 1960s	Total
Dry Forest				
1	76.0		4	4
2	99.6		6	6
3	59.7		10	10
4	61.7		4	4
5	67.7		19	19
6	83.5		10	10
	TOTAL:		53	53

NB: The figures presented in the table above relate to number of stumps per half-hectare plot. The figures presented below refer to average number of stumps per hectare.

Average number pre-1960 stumps per hectare:
Dry forest = 0 (disturbance threshold ≤ 9)

Average number post-1960 stumps per hectare
Dry forest = 17.7 (disturbance threshold ≤ 5)

Average number stumps per hectare
Dry forest = 17.7

Candidate OGF	net loggable area
polygons >25 ha	no

No Candidate OGF Exclusion Areas

Assessors: Wayne Davis
Les Casson
Mark Ross

Date completed 31 July 1996.

Plot no.	Av largest tree diam	Number of stumps per half hectare plot		
		Pre 1960	Post 1960s	Total
Dry Forest				
1	76.0		4	4
2	99.6		6	6
3	59.7		10	10
4	61.7		4	4
5	67.7		19	19
6	83.5		10	10
	TOTAL:		53	53

NB: The figures presented in the table above relate to number of stumps per half-hectare plot. The figures presented below refer to average number of stumps per hectare.

Average number pre-1960 stumps per hectare:
Dry forest = 0 (disturbance threshold ≤ 9)

Average number post-1960 stumps per hectare
Dry forest = 17.7 (disturbance threshold ≤ 5)

Average number stumps per hectare
Dry forest = 17.7

Candidate OGF	net loggable area
polygons >25 ha	no

No Candidate OGF Exclusion Areas

Prepared by:

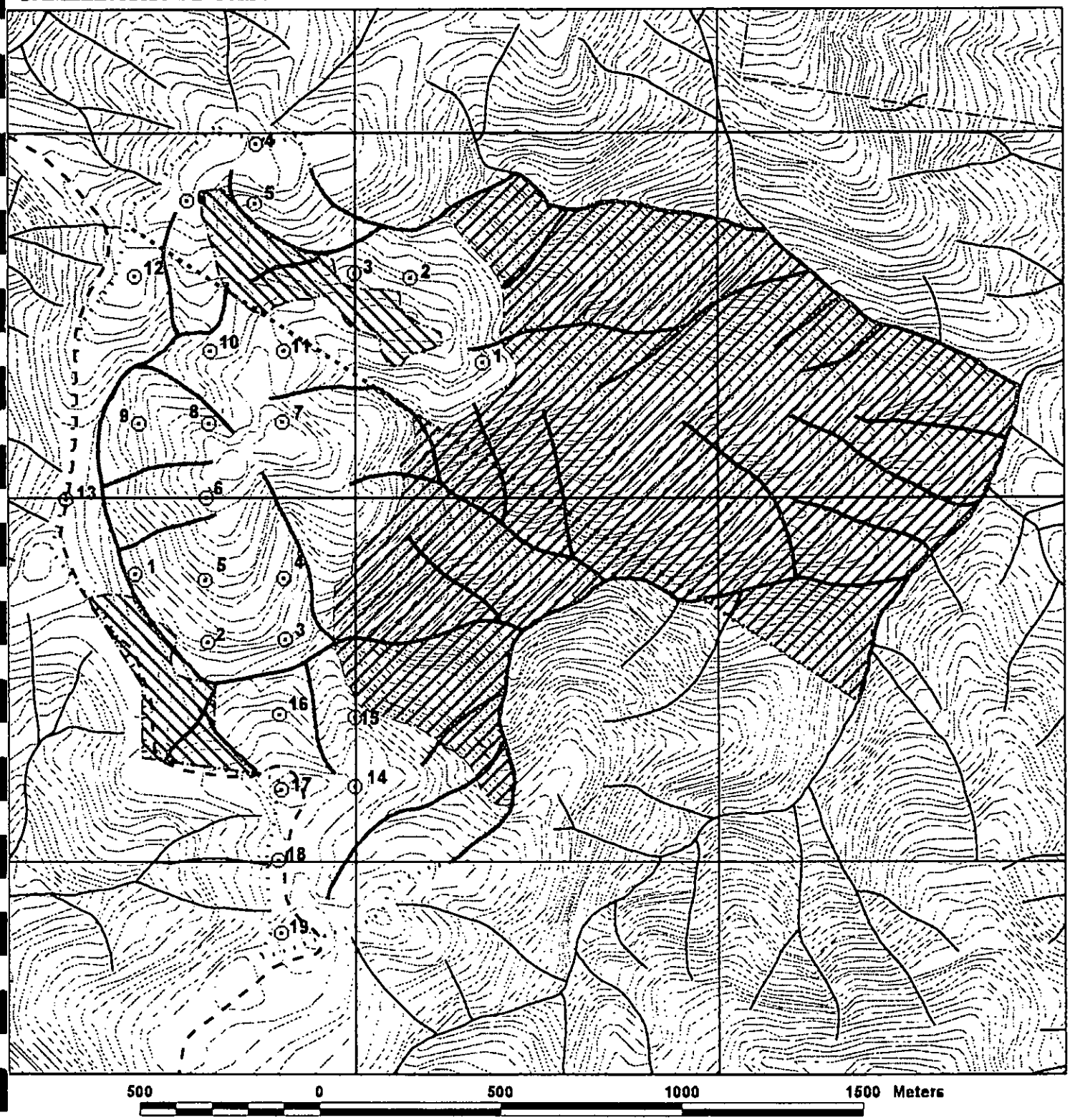
Marketing Forester
GRAFTON DISTRICT
9 September 1996

District Approval:

District Forester
GRAFTON DISTRICT
9 September 1996

NORTHERN REGION - GRAFTON DISTRICT
STUMP COUNT PLOT LOCATION
COMPARTMENTS 386 AND 395
GRANGE STATE FOREST

SCALE 1:15000
CAMELBACK MAP SHEET



BOUNDARIES
State Forest Boundary
Compartment Boundaries

ROADS (Proposed in Red)
Natural Surface
Sealed or Gravelled

Not candidate old growth
Not available for harvest

Filter strip or Riparian Habitat Zone

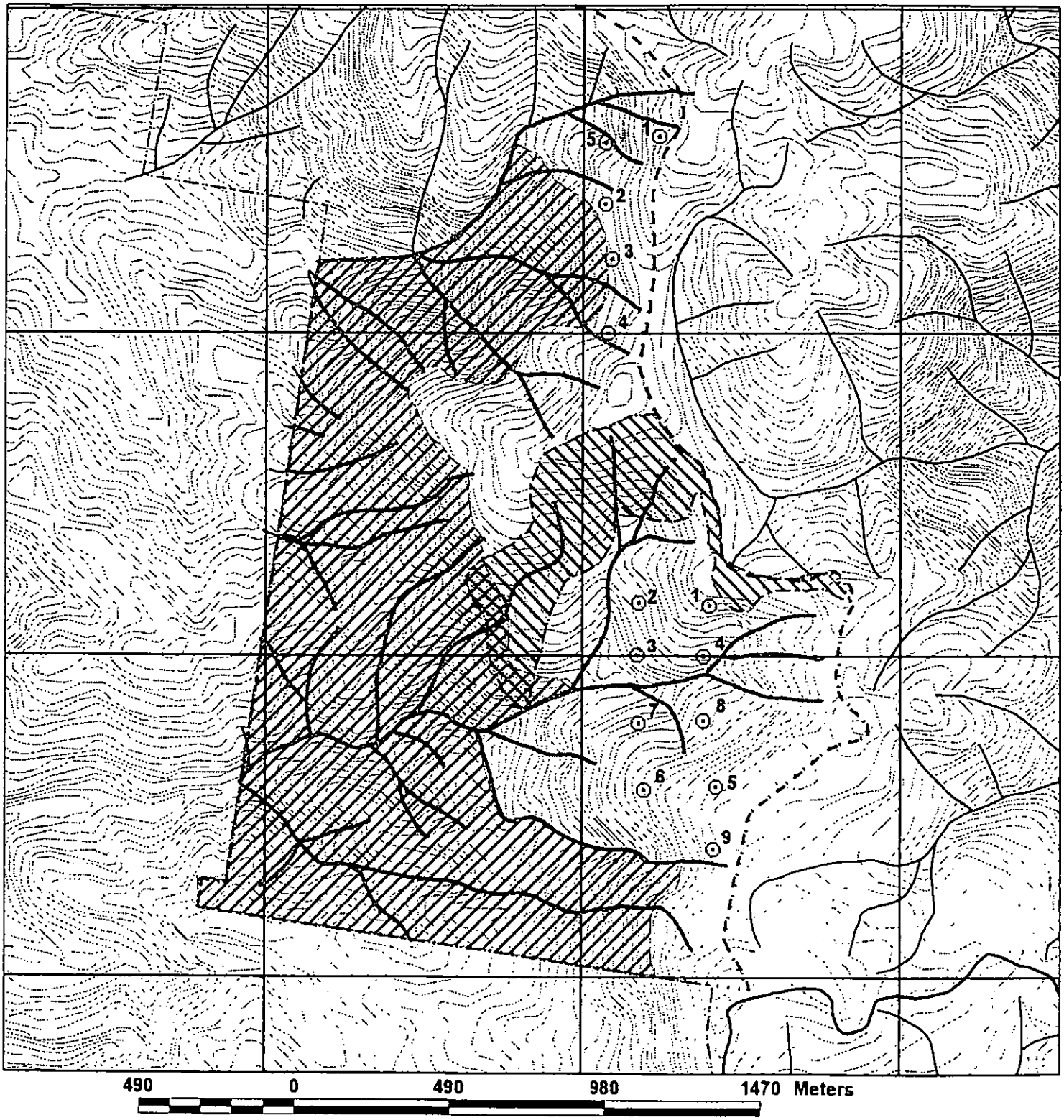
Stump count plot

MN

NORTHERN REGION - GRAFTON DISTRICT
STUMP COUNT PLOT LOCATION
COMPARTMENTS 387 AND 388
GRANGE STATE FOREST

FORESTS

SCALE 1:17000
CAMELBACK MAP SHEET



BOUNDARIES
State Forest Boundary
Compartment Boundaries

ROADS (Proposed in Red)
Natural Surface
Sealed or Gravelled

Not candidate old growth
Not available for harvest
Filter strip or Riparian Habitat Zone

Stump count plot

MN

VENESS & ASSOCIATES

ACN 003 419 958 Pty Limited

10 Dutton Crescent
COFFS HARBOUR NSW 2450
Telephone: (066) 52 7692
Facsimile: (066) 52 8232

Attn: Leonie Walsh
State Forests of NSW
P.O. Box 366
GRAFTON NSW 2460

Dear Leonie,

Re: Soil sampling for Harvesting Plans for compartments 383 - 397, Grange SF

In respect of the soil sampling and analyses program for soils from the above compartments, please be advised of the following points.

- Initially, Veness & Associates examined in detail one site from each compartment, sampling both the A and B horizons. The results of the analyses undertaken on these samples have been previously presented to you in report number VA1715D.

The soils occurring in these compartments were found to belong to soil mapping unit C, as described in the EIS soil study document. It should be appreciated that while samples were taken from each compartment, specific soil data was examined and recorded in the field. This, together with numerous observations throughout the two compartments, allowed Veness & Associates to conclude that these soil materials were consistent with the EIS descriptions.

Specific soils data has been recorded and presented to you. This includes depth of the A and B horizons. The geology underlying all of these compartments consists of Ordovician and Silurian sediments comprising of argillites, phyllites, slates and intermediate volcanics, all with abundant quartz veins.

The Grafton EIS soils mapping, undertaken by Veness & Associates, was carried out at a scale of 1:125 000. In respect of these harvesting plan samples handled by Veness & Associates, the following procedure to determine 'K' has been used:

- each soil sample was textured (after Northcote, 1979)
- each soil sample was analysed in the laboratory to determine both Particle Size Analysis and Dispersion Percentage
- the organic matter of each soil sample was determined

[the above analyses were undertaken using the methods required by EPA]

- for each soil sample, structure and permeability are determined
- the value of 'K' was determined using SOILOSS version 5.1 for each soil sample. As required by the SOILOSS program, the values for clay, silt, fine sand, coarse sand, gravel, organic matter, soil structure and soil permeability were taken as those being determined above.

Consequently, the K factor for each soil sample was determined through laboratory derived values. This methodology exceeds, and is more valid than, the determination of K

sing either Method B2 or B3.

The PDS value, determined for each of the soil samples handled by Veness & Associates, was calculated using laboratory derived dispersion percentage and per cent clay values.

Yours faithfully,

Jim Veness

District: Grafton **Compartment(s):** 383, 384, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397 **REPORT NUMBER:** VA1715D **Pag** **of 2**

Sample Number	Sample Type	Sample Depth (cm)	Soil Unit	Particle Size Analysis (%) clay	silt	fine sand	coarse sand	gravel	D%	Texture+	Structure*	Permeability*	Organic Matter (%)	'K'#	D% x clay%
383/1/A	Topsoil	2- 8	C	15(17)	31(34)	29(32)	15(17)	10	15	L,fsy	1	1	1.03	0.036	2.25
383/1/B	Subsoil	15-25	C	27(29)	33(35)	20(22)	13(14)	7	22	LC	1	4	0.34	0.035	5.94
384/1/A	Topsoil	2-10	C	8(17)	12(27)	13(28)	13(28)	54	19	FSCL	1	2	8.26	0.012	1.52
384/1/B	Subsoil	40-50	C	30(47)	11(17)	8(13)	15(23)	36	18	LC	2	4	1.20	0.018	5.40
386/1/A	Topsoil	5-10	C	6(10)	14(22)	25(40)	18(28)	37	11	FSCL	2	3	8.77	0.016	2.22
386/1/B	Subsoil	40-50	C	9(14)	15(24)	18(29)	21(33)	37	54	LC	2	5	2.24	0.043	4.86
387/1/A	Topsoil	5-15	C	13(20)	22(35)	18(28)	11(17)	36	8	CL	1	2	8.26	0.010	1.04
387/1/B	Subsoil	45-55	C	48(51)	21(23)	14(15)	10(11)	7	11	LC	1	4	1.72	0.012	5.28
388/1/A	Topsoil	2-10	C	25(27)	28(30)	33(35)	8 (8)	6	21	CL	1	2	7.57	0.008	5.25
388/1/B	Subsoil	55-65	C	32(41)	16(21)	15(19)	15(19)	22	35	LC	1	4	1.72	0.019	11.20
389/1/A	Topsoil	10-15	C	7(12)	26(44)	21(36)	5 (8)	41	18	FSCL	1	2	7.91	0.022	1.26
389/1/B	Subsoil	55-65	C	48(55)	14(16)	23(26)	2 (3)	13	11	LC	1	4	1.89	0.011	5.28
390/1/A	Topsoil	3-10	C	12(15)	16(20)	31(40)	20(25)	21	4	CL	1	2	6.71	0.015	0.48
390/1/B	Subsoil	20-30	C	18(29)	19(31)	14(23)	11(17)	38	17	LC	1	4	2.92	0.029	3.06

NOTES: PSA values are calculated inclusive of gravels. The values in brackets have been recalculated after excluding gravels
+ textures determined after Northcote (1979);
* structure & permeability classes are those used in SOILOSS;
# 'K' value has been determined using SOILOSS version 5.1

(Report VA1715D continued on page 2)

These data have been determined on soil samples collected by Veness & Associates.
The laboratory methods used are those required by EPA in its documentation relating to Harvesting Plans.
The data presented on this page have been calculated and determined by me.

Jim Veness
(Managing Director)
VENESS & ASSOCIATES Pty Limited
4th March, 1996

Sample Number	Sample Type	Sample Depth (cm)	Soil Unit	Particle Size Analysis (%) clay	silt	fine sand	coarse sand	gravel	D%	Texture+	Structure*	Permeability*	Organic Matter (%)	'K'#	D% x clay%
391/1/A	Topsoil	5-10	C	12(19)	20(32)	18(29)	13(20)	37	14	SiCL	1	2	8.26	0.010	1.68
391/1/B	Subsoil	45-55	C	23(34)	17(26)	12(18)	15(22)	33	34	LMC	1	4	2.06	0.023	7.82
392/1/A	Topsoil	5-15	C	11(17)	20(31)	22(34)	12(18)	35	14	L,fsy	1	1	9.12	0.004	1.54
392/1/B	Subsoil	65-75	C	9(24)	7(18)	7(18)	15(40)	62	38	FSCL	2	3	1.38	0.030	3.42
393/1/A	Topsoil	5-10	C	12(19)	15(24)	20(32)	16(25)	37	9	SiCL	1	2	7.74	0.010	1.08
393/1/B	Subsoil	35-45	C	43(50)	16(19)	17(20)	10(11)	14	17	LC	1	4	1.72	0.012	7.31
394/1/A	Topsoil	2- 8	C	9(17)	11(21)	13(25)	19(37)	48	17	SiCL	1	2	5.68	0.016	1.53
394/1/B	Subsoil	30-40	C	18(44)	6(15)	5(12)	12(29)	59	14	LC	1	4	1.72	0.016	2.52
395/1/A	Topsoil	2- 8	C	9(14)	19(29)	21(31)	17(26)	34	17	SiCL	1	2	5.50	0.021	1.53
395/1/B	Subsoil	50-60	C	30(36)	20(24)	19(22)	15(18)	16	17	LC	1	4	1.55	0.021	5.10
396/1/A	Topsoil	5-10	C	12(16)	20(27)	22(30)	20(27)	26	25	CL	2	3	5.50	0.026	3.00
396/1/B	Subsoil	20-30	C	26(27)	29(30)	23(24)	19(19)	3	33	LC	1	5	1.89	0.032	8.58
397/1/A	Topsoil	5-10	C	14(18)	14(18)	44(56)	6 (8)	22	4	SiCL	2	3	12.56	0.012	0.56
397/1/B	Subsoil	40-50	C	37(40)	26(28)	25(27)	5 (5)	7	8	LC	1	4	4.30	0.017	2.96

NOTES: PSA values are calculated inclusive of gravels. The values in brackets have been recalculated after excluding gravels
+ textures determined after Northcote (1979);
* structure & permeability classes are those used in SOILOSS;
# 'K' value has been determined using SOILOSS version 5.1

These data have been determined on soil samples collected by Veness & Associates.
The laboratory methods used are those required by EPA in its documentation relating to Harvesting Plans.
The data presented on this page have been calculated and determined by me.

Jim Veness
(Managing Director)
VENESS & ASSOCIATES Pty Limited
4th March, 1996

VENESS & ASSOCIATES

ACN 003 419 958 Pty Limited

10 Dutton Crescent
COFFS HARBOUR NSW 2450
Telephone: (066) 52 7692
Facsimile: (066) 52 8232

19th May, 1996

Attn: Bob Williams
State Forests of NSW
P.O. Box 366
GRAFTON NSW 2460

Dear Bob,

Re: Further information on compartments 386, 387, 388 & 395, Grange SF

Following recent discussions with Leonie Walsh and the requirement to have more information regarding the soil materials within compartments 386, 387, 388 and 389, Grange SF, you are advised of the following.

Jim Veness of Veness & Associates, examined these compartments, together with several other compartments in the 380's and 390's in February, 1996. Soil samples were collected for laboratory testing. The results of the soil sample analyses were presented in report VA1715D.

Prior to the field visits, the landforms were examined from the 1:15,000 topographic maps. Because of the consistency of soil materials found to occur within individual soil mapping units from the EIS study, it was decided that one soil sampling site would be examined within each compartment. This approach was consistent with the EPA soil sampling protocol existing at that time. In order to assess any variation that might be attributed to different landform elements, it was decided to locate the sampling sites within each of the compartments in a different landform element when one compartment was compared with another.

Within compartments 386, 387, 388 and 395, there are two distinct landform elements occurring. These are:

- Crest — this landform element commonly occurs as a smoothly convex upwards feature above the surrounding terrain between the various catchments throughout these compartments

- Simple Slope — this very common landform element occurs extensively throughout these compartments as a uniform slope feature adjacent below crest elements

Because of the terrain no depressions or flats occur within these compartments whereby any limits of curvature pertaining to these features are observable.

The crest and simple slope landform elements have been sampled within compartments 386, 387, 388 and 395. The sampling sites located within 386 and 388 were situated on a

crest while the sampling sites in 387 and 395 were sampled from the commonly occurring simple slope landform element.

Each of these sampling sites, and all of compartments 386, 387, 388 and 395 are within the EIS Soil Mapping Unit C, with soils forming on Ordovician-Silurian metasediments consisting of argillites, phyllites, slates and intermediate volcanics, all with abundant quartz veins.

The soil materials from each of the relevant sites are compared in the following table.

Site	Landform Element	A Horizon Depth (cm)	Texture	'K'	B Horizon Depth (cm)	Texture	'K'
386/1	crest	0-15	FSCL	0.016	15-60+	LC	0.043
387/1	simple slope	0-21	CL	0.010	21-80+	LC	0.012
388/1	crest	0-11	CL	0.008	11-75+	LC	0.019
395/1	simple slope	0-10	SiCL	0.021	10-70+	LC	0.021

As a result of this comparison, it is evident that, despite the variation in landform and location, the soil materials from each of the sampling sites contain a reasonably high degree of consistency with one another. This is also very evident when examining these soils in the field. Consequently, given that both of the landform elements have been sampled within the area covered by these compartments 386, 387, 388 and 395, the uniformity of these soils permits the conclusion that these landform elements have been adequately sampled.

Yours faithfully,

Jim Veness

CERTIFIED MAIL

RB450485556

FORESTRY COMMISSION OF NSW
LOCKED BAG 23 P.O.
PENNANT HILLS NSW 2120

Environment
Protection
Authority
New South Wales

Civic Tower
Cnr of Jacobs Street
and Rickard Road
Locked Bag 1502
Bankstown
NSW 2200

Telephone .02. 9795 5000
Facsimile .02. 9795 5002

Our Reference: 600000/D61/Not. Nos. 003439

Your Reference:

23 October, 1996

NOTICE UNDER SECTION 17D(3)
OF THE POLLUTION CONTROL ACT 1970

WHEREAS -

(a) FORESTRY COMMISSION OF NSW is the holder of licence number 004017 in respect of premises situated at LAND IN THE NORTHERN REGION, - which expires on 7 August, 1997.

TAKE NOTICE THAT -

In accordance with the powers vested in the Environment Protection Authority (EPA) under Section 17D(3) of the Pollution Control Act 1970, the EPA with respect to licence number 004017 from the date of this Notice hereby:-

1. Varies this licence by inserting the following compartment descriptions, corresponding water pollution hazard categories, special conditions, representative water quality monitoring site, and date of licence variation into Schedule 1:

"Compartment Descriptions

Compartments 386, 387, 388 and 395
Grange State Forest No. 771


CAMELBACK
GRANGE
390
205 ha
390/1
391/1
391
265 ha
Cn.L 49/157
Cn.L 52/13
392
207 ha
393
102 ha
Cn.L 23/15
389/1
389
255 ha
392/1
393/1
394/1
394
116 ha
Cn.L 16/17
395/1
395
168 ha
386/1
388/1
386
166 ha
388
185 ha
Cn.L 34/18
396/1
396
134 ha
397
129 ha
397/1
CAMELBACK
MOUNTAIN
385
54 ha
384
182 ha
387
157 ha
387/1
384/1
383/1
383
167 ha
380
149 ha
381
178 ha
Winter's
Road
Western
Boundary
Road
Winters Dip
Cattle Crossing
Gordon Valley
10
25
27
28
29
38
185
33
32
16
21
15
22
25
6
19
26
2
7
13
14
15
43
59
58
61
47
68
65
148
44
77
79
76
38
31
39
109
30
108
37

Water Pollution Hazard Categories

Water Pollution Hazard Category	Slope Ranges (degrees)
1	Less than or equal to 3.
2	Greater than 3 or less than or equal to 15.
3	Greater than 15 or less than or equal to 30.
4	Not applicable.

Proportion of dispersible soils: less than 10% (A horizon)
greater than 10% (B horizon)

Special Conditions

Special conditions are those conditions contained in the harvesting plan for Compartments 386, 387, 388 and 395, Grange State Forest No. 771, prepared by State Forests of NSW, received by the EPA on 9 October 1996, and as amended by:

1. addendum 1 received by the EPA on 21 October 1996; and

Waters Quality Monitoring Site

To be determined

Date of Licence Variation

23 October 1996.*

2. Varies this licence by inserting the following compartment descriptions, corresponding water pollution hazard categories, special conditions, representative water quality monitoring site, and date of licence variation into Schedule 1:

***Compartment Descriptions**

Compartments 190, 191, 192, 193 and 194
Whiporie State Forest No. 928

Water Pollution Hazard Categories

FILE COPY

Water Pollution Hazard Category	Slope Ranges (degrees)
1	Less than or equal to 5.
2	Not applicable.
3	Not applicable.
4	Not applicable.

Proportion of dispersible soils: less than 10% (A horizon)
not applicable (B horizon)

Special Conditions

Special conditions are those conditions contained in the harvesting plan for Compartments 190, 191, 192, 193 and 194, Whiporie State Forest No. 928, prepared by State Forests of NSW, received by the EPA on 10 September 1996, and as amended by:

1. addendum 1 received by the EPA on 18 October 1996; and

Waters Quality Monitoring Site

To be determined

Date of Licence Variation

23 October 1996."

NEIL SHEPHERD
Director-General

Per .....
Geoff Noonan
Manager - Waters &
Catchments Policy
WATERS AND CATCHMENTS
(by Authorisation)

FOR ACTION OR NOTING BY		
ORIGINATOR	SB	23/10/96
1. MWCP		23/10/96
2.		
3.		
4.		

Forest Planning and Fire Management Branch

Phone No. (02) 97955386

To	District Forester - Grafton / Marketing Forester
From	Forestry Liaison Officer - Environment Protection Authority
Date	18 October 1996
Subject	HARVESTING PLAN GRANGE 386-388, 395

The harvesting plan for Grange 386-388, 395 has been examined by the Environment Protection Authority (EPA). Although comprehensive, the harvesting plan will fail to satisfy the EPA without some alteration to the text. Please implement any possible alterations requested so that an amended harvesting plan can be submitted to the EPA. The amended pages must be forwarded to State Forests Forest Regulation Unit for consideration with the original harvesting plan.

Amendments requested are:-

1. *page 3. Part 2.1, description 2, special warning of critical boundaries or non harvest areas.*

   In the third last stanza the EPA request that we replace 'will not' with 'must not'.

   In the second last stanza, last sentence the EPA request that we replace 'will not' with 'must not'.

2. *page 12. Part 2.5, description 12(f), representative water monitoring sites.*

   Unfortunately the EPA are revising their identification of appropriate water monitoring sites and request that we nominate the site as 'yet to be determined'.

3. *page 13, 28. Part 2.5, description 12(h), use of existing roads.*

   Although we have provided comment on most of the road issues, the EPA insist that the harvesting plan must provide all site specific details on roads to be used, in the planning unit, in accordance with schedule 2 of the licence. The EPA specifically requires that we provide the following site specific information:

   a) **maximum width of running surface**;
   b) **maximum width of allowed clearing either side**; pt4
   c) **horizontal length of largest batters.**

(pt4: Note that this parameter is probably best covered in part 4 as information and prescription to the contractor.)

4. *page 22. Part 4.3(b), wet weather controls - roads.*

   Edit the PCL condition number to '85'.

5. *page 22. Part 4.3(c), wet weather controls - snigging.*

   Edit the PCL condition number to '96'.

6. *page 28. Part 4.7(e), existing roads, clearing.*

   The EPA have requested any contractor prescriptions that can be included in this section on the removal of vegetation (eg a particular place it cannot be pushed, if clumped, away from drainage depression). Note that we should only document our existing local practices.

7. *page 29. Part 4.7(e), existing roads, crossing of drainage features.*

   The EPA have chosen to apply the same conditions to existing crossings in dispersible soils as constructed crossings and hence are requesting a non-dispersible surface 20 metres either side were disturbed. Recently the EPA have considered that sowing is not a non-dispersible surface. Both these issues are being argued against by State Forests for general application. Regardless, the EPA has requested that for this operation that any disturbed areas are covered by a non-dispersible surface prior to sowing. This may simply be met by clarifying this section with the later section on dispersible soils. If you are unable to comply with the EPA request please include an argument in your response to this request and I can take the issue further with more senior State Forests staff.

8. *page 30. Part 4.7(f), road construction, clearing.*

   The EPA request that we clearly address the issue of estimated clearing width either side of the running surface as sought in schedule 2. The EPA note that the maximum running surface is 6 metres. The EPA are being difficult in their interpretation of our current clearing width and suggest that it could be applied outside the running surface by the contractor (ie 6 metres either side of the maximum 6 metre running surface. They also question if it could be our practice to have a 6 metre running surface with no edges and hence no clearing beyond the pavement. Please clarify.

9. *page 31. Part 4.7(h), drainage feature protection, table 5.*

   The EPA request that we insert a final column that totals the full reservation width.

10. *page 33. Part 4.7(n), snig track drainage line crossings.*

In the fourth line replace 'shall' with 'must'.

Depending on the outcome of your inspection with EPA officers at the dam on 388 Road, you should insert any additional description or prescriptions agreed with those officers. You can otherwise expect the EPA to include a licence condition that the site must be evaluated by the Department of Land and Water Conservation and we must undertake any work as advised.

In preparing the amendments the Marketing Forester should discuss issues with the Liaison Officer before final amendments are dispatched to EPA.

Compliance with this request does not constitute satisfaction by the EPA with harvesting plan CG 96/07/386.

Russell Cowgill
for
Tony Howe
Branch Manager
Forest Planning and Fire Management

cc
Operations Manager
Northern Region

Grange 386-388+395

1005 NORTH 23/10/96

Previous Register #993

FACSIMILE TRANSMISSION

To	Forest Regulations Coordinator		
Attention	KRIS GOUNDER	Date	21/10/96
Your Ref		Our Ref	286
From	Leonie Walsh	Phone	(066) 432022
No of Pages	10 (including this cover page)		

STATE FORESTS NORTHERN REGION

State Forests of New South Wales
Grafton District
PO Box 366
Grafton NSW 2460
Phone (066) 432 022

Message

Harvesting Plan for cpts 386, 387, 388 and 395, Grange SF

Following are amended pages for the above harvesting plan, in response to a request (dated 18/10/96) from the Forestry Liaison Officer. The following points relate to the points raised in that request:

1. The first change has been made. The second does not make sense. This sentence is not an instruction, it is a statement of fact. The subject of the sentence is not where we will or won't log, it is the fact that the forest boundary need not be marked.
2. Amended as requested.
3. Amended as requested.
4. Amended as requested.
5. Amended as requested.
6. Amended as requested.
7. I do not understand this request. We have already specified conditions for the protection of dispersible subsoil within 20 m of the crossing. In an attempt to make this more clear, I have shifted the relevant paragraph (headed dispersible subsoil) so that it appears under the section on crossings. The suggestion appears to be that seeding of batters is inadequate. Gravelling is obviously not an option, and to spread topsoil over the batters would be so difficult in practice that we are likely to end up disturbing far more soil than necessary. It is considered that the conditions already specified in the plan are the most appropriate.

8. This amendment has been made as requested. The EPA should note, however, that the plan is now less specific than previously. They do not now know what the maximum clearing width will be.

9. I do not understand this request. The table is quite clear and unambiguous in its present format. This is an operational plan. The whole purpose of having only one figure in each row is to ensure that there is no potential for confusion. It is considered that the addition of an extra column, which provides no more information than is already there, would only defeat this purpose.

10. Amended as requested.

The dam in compartment 388 was inspected by State Forests and EPA officers last Friday. There were no additional descriptions or prescriptions requested to be included in the plan. Because of the recent identification of an Aboriginal archaeological site, the area in the vicinity of the dam will not be logged. (Note - a local variation will be made to the plan to include the archaeological sites we have found since the plan was submitted).

Please contact me if there are any further questions.

for RJ Williams
District Forester
GRAFTON DISTRICT

Riparian Habitat Zones exist 20m either side of streams (watercourses, drainage lines and drainage depressions) with catchments greater than 40 hectares.

A Special Emphasis Visual Resource Protection Zone (PMP 1.1.6) exists along the main central ridge as shown on the Operational Maps.

Permanent Growth Plot 328 is located in the southern section of compartment 386.

As shown on the Operational Maps, the eastern sections of compartments 386 and 395, and the western sections of compartments 387 and 388, are very steep and must not be accessed during this operation.

Private Property adjoins the southern and western boundaries of compartment 387 and the western boundary of compartment 388. The southern boundary of compartment 387 is marked by a fence along the top of the ridge. Below the ridge the boundary has been surveyed and blazed with yellow paint. The western boundary of compartments 387 and 388 do not need to be marked as they occur in steep and inaccessible areas and logging operations will not take place in these areas.

A derelict fence exists on the north-eastern boundary of compartment 395 has not recently been maintained. This fence must not be damaged and must be left in the state that it is at the commencement of operations. Any damage caused to the fence must be rectified before the completion of the operations.

Reference Grafton Management Area Environmental Impact Statement

2.0 FOREST MANAGEMENT AREA DESCRIPTION

Description - Compartment Subdivision; Forest Types

Areas:	**Cpt 386**	**Cpt 387**	**Cpt 388**	**Cpt 395**
Gross Area of Compartment	166 ha	153 ha	185 ha	168 ha
Wildlife Corridor	0 ha	0 ha	0 ha	0 ha
Riparian Habitat Zones	3.2 ha	0 ha	0 ha	0 ha
Filter Strips	8.5 ha	9.3 ha	7.8 ha	2.8 ha
Steep/Inaccessible	46.5 ha	70.6 ha	92.4 ha	121.7 ha
Proposed for Logging	**107.8 ha**	**73.1 ha**	**84.8 ha**	**43.5 ha**

Logging History:

Although records of logging only exist for operations in compartment 386 in the early and mid-1970s, field inspection has revealed extensive evidence of logging in each of the other compartments around the same period.

Drainage line condition

The drainage features of the compartments have been field inspected. The drainage lines are in good condition. They are mostly deeply incised but not often to bedrock. Most drainage lines in the more open stands are well grassed.

The flow in the streams is intermittent. At the time of recent inspections there was water running in some of the drainage lines in compartment 387, also, small pools of water were evident in a drainage line in compartment 386 after an extended period of rain. There was no running water in the drainage lines in compartments 388 and 395.

Aspect

The aspect is generally east to south-easterly in compartments 386 and 395. Compartments 387 and 388 have a westerly aspect.

Rockiness

There is a 19 hectare area of rock in compartment 386, a 9 hectare area of rock in compartment 388 and a 10 hectare area of rock in compartment 395. These are in very steep country and will not be a problem for the harvesting operation. There are no rock areas in Compartment 387.

(f) Hydrology

The compartments are in the Clarence River Catchment. Compartments 386 and 395 drain into Gorge Creek, which forms the eastern boundary of compartment 395. Gorge Creek flows north out of the forest and on about one and a half kilometres to the Clarence River. Compartments 387 and 388 drain into Welshs and Fishers Creeks, which flow west into the Mann River. There are no prescribed streams, swamps or wetlands in the net harvest area.

No major water storages occur adjacent to or downstream from the compartments.

Verification of drainage lines

All drainage features verified during harvesting plan preparation as watercourses or drainage lines are shown on the harvesting plan Operational Map with filter strip protection (unless already protected by other harvesting exclusions). Other smaller drainage features which are not marked on the map must be inspected by the SFO during tree marking and given protection in accordance with the Pollution Control Licence.

Representative water monitoring sites

The representative water monitoring site is yet to be determined.

Reference Forest Planning Branch *Water quality monitoring program* SFNSW 1994

Previous harvesting

Old reports concerning the forest comment on access tracks and Red Cedar, White Beech and Hoop Pine cutting in the Towgon Creek area. It is not known whether these compartments were affected. The original stands were fairly open and readily accessible, regularly burnt and heavily grazed but there are no records of the early loggings in the compartments. The compartments were logged quite heavily in the early 1970s. There is evidence of sleepers and girder cutting on the compartments that pre-date these operations.

Upstream catchment water use

Production forestry - the upstream catchments are within Grange State Forest.

Downstream catchment water use

Gorge, Welshs and Fishers Creeks flow through grazing country downstream of Grange State Forest. There may be limited stock watering downstream of the forest.

Domestic water use

The only domestic water supply drawn from the Mann/Clarence below the junctions with Gorge, Welshs and Fishers Creeks is the Copmanhurst town supply. These creeks would amount to only a fraction of a per cent of the Clarence flow and would have no influence at all on the town supply. Copmanhurst is to transfer to the lower Clarence scheme, which sources its water higher up the Clarence catchment, during the next year or so.

(g) Vegetation and Ground-Cover

Effect on ground-cover during operations

The harvest operations are expected to remove less than 20% of the overall ground cover of the net harvest area.

(h) Proposed Operation System

Use of existing roads

Existing roads have been evaluated for their potential to cause water pollution.

Grange Access Road and Western Boundary Road are long established fully designed roads with concrete relief pipes in side-cuts and drainage lines, mitre drains on the ridge tops and consolidated gravelled pavement. They are regularly maintained.

Winters Road runs for about 3.5 km through the planning area. It is an old, natural surface road, with mitre drains where required, that has been consolidated by use. The batters and drainage outlets are stable and well vegetated.

386, 386/1, 386/2, 388, 394 Roads and Ringbark Road (a total of about 3.2 km) will be reopened for use during the harvesting operation. These are stable roads with litter and grass cover. They are drained by outfall drainage.

All batters are stable and well vegetated. They are generally about 1 m high. Maximum batter height is approximately 2.5 to 3 m, for a length of 100 m. This maximum batter height occurs on Winters Road north of dump 16, and this section of road will not be used by trucks during the operation. Maximum road grade is 14°, for a length of 50 m on 388 Road. Road grade everywhere else is less than 10°.

The maximum width of the running pavement on roads within the compartment is 4 m.

Reopening will require the removal of fallen timber and some regrowth from the road pavement and edges. These works will be done with logging machinery and will cause minimal disturbance to the road pavement. None of the existing roads are likely to cause significant water pollution.

(b) Wet Weather Controls - Roads

During wet weather, the wet-weather controls set out in Section 7 of the Forest Practices Code Part 2 (Timber Harvesting in Native Forests) must apply. In particular, when it is raining and/or where runoff occurs from a road surface, haulage must not occur unless the road is a gravel or sealed road.

[FPC Pt2 7.2, PCL Sch 4 C 85]

(c) Wet Weather Controls - Snigging

During wet weather, snig tracks must not be used where:

(i) there is runoff from the track surface, or;

(ii) there is a likelihood of significant rutting leading to turbid runoff from the track surface.
[FPC Pt2 7.2, PCL Sch 4 C 96]

(a) General

The aim of the harvest is to promote growth on retained trees and to create conditions that will allow the establishment and growth of regeneration. Selective logging techniques, including the Australian Group Selection system where appropriate, shall be implemented.

(b) Tree Marking

Tree marking shall aim at:

Retaining trees capable of net merchantable timber value increment for cutting in future cutting cycles, except where:

a) the removal would result in more valuable increment on preferred retained trees (redistribution).

b) the tree has been or is likely to be significantly damaged during the course of harvesting operations.

c) the removal of a small group of merchantable trees would create favourable conditions for the establishment and growth of regeneration.

In general tree marking and supervision shall be directed towards:

1. Harvesting for the highest economic end use for which markets are available.
2. Ensuring maximum economic utilisation of all trees felled.
3. Minimising damage to the retained stand and minimising soil disturbance in excess of that required for successful regeneration establishment.

Tree marking for removal must be carried out by the SFO.

Reference

Grafton Management Area Environmental Impact Statement
Jacobs (1955) Growth Habits of the Eucalypts. Forestry and Timber Bureau. Commonwealth Government Printer, Canberra.

(iii) there is a likelihood of significant rutting leading to turbid runoff from a snig track surface;

- snig tracks must not be used.

(iv) it is raining:

- operations must cease.

In any event, if:

rutting of a snig track is, or is likely to approach a maximum of 200 mm below the natural surface, measured over any 20 metre length of track, snig tracks must not be used.

Dumps 1, 2, 5, 7-9, 13-16, and 20-23 as marked on the Operational Map, are suitable to be worked during wet weather periods.

(e) Existing Roads

Clearing of regrowth

A minimal amount of clearing may be required to open existing roads for use. This will involve lowering of crossbanks and the removal of fallen timber and small regrowth trees from the road pavement and edges. The maximum width of clearing on either side of the road running surface is 2 m. On all road sections, clearing must be kept to the minimum required to allow use by logging trucks, and soil disturbance must be minimised. Debris from clearing must not be deposited in the outlets of drainage structures or within the drainage depression buffer strip on 386/1 The slight erosion on 388 Road caused by the dam spillway must be rectified during reopening of the road.

Road surface drainage

Rollover crossbanks may be required on some sections of the minor roads where outfall drainage has not been established or is inadequate. Where required, rollover crossbanks must be spaced as stated in the Table below. The banks must have a minimum design consolidated vertical height from spillway to bank top of 20 cm. Such banks will convey the peak flow of a 1 in 5 year storm event (see calculations attached as Appendix 2).

Spacing of Rollover Crossbank Drainage
(grade of road - degrees)

Road Grade (degrees)	Spacing
0 - ≤5	100m
>5 - ≤10	60m
>10 - ≤15	40m

Rollover crossbanks must drain onto undisturbed vegetation or logging slash wherever possible. Where it is necessary to convey runoff water over a fill batter greater than 1 m high, that has been disturbed by the operation or on which the soil is exposed, drop down structures constructed of rock or prefabricated fluming must be installed. Dissipaters must be installed at the bottom of drop down structures.

Road drainage must minimise the flow of unchecked water onto extraction tracks, snig tracks or log dumps. Where this cannot be achieved by outfall drainage, a rollover crossbank must

be placed as close as possible to the track or dump, consistent with haulage practicalities, to minimise the catchment area above it.

While a road is in use for hauling timber, spoon drains may be used in preference to rollover banks, but must be converted to rollover banks on completion of operations in the area.

Crossing of drainage features

386/1 Road crosses one drainage depression in compartment 386. This crossing is a stable natural surface open causeway and is well grassed. A spoon drain or rollover crossbank must be placed on each approach to the crossing as close as possible to the crossing consistent with haulage practicalities (and at least within the spacings given in the table above). The structure must discharge water onto undisturbed vegetation and there must be at least 5 m of undisturbed vegetation between the outlet and the banks of the drainage depression.

If the road pavement commences to deform during operations, the crossing and approaches must be gravelled.

At the conclusion of harvesting, any disturbed area adjacent to this causeway must be seeded with rye grass (or other suitable species) by the SFO at the rate of 20 kg/ha.

Dispersible soils

If the subsoil is exposed on the road surface, batters or table drains within 20 m of the drainage depression crossing, top soil from the road, or imported gravel, must be spread over the road surface at the site. Where subsoil is exposed on cut and fill batters, the site must be seeded with rye grass (or other suitable species) at the rate of 20 kg/ha.

Revegetation and rehabilitation

Revegetation of the minor roads following harvesting will be through natural regeneration. The minor roads in the compartments are to be closed and must be bedded down, all spoon drains converted to rollover crossbanks, and crossfall (outfall) drainage reinstated. A crossbank must be constructed at the entrance to each road to prevent vehicular traffic using the road.

Road surfaces, batters and drainage feature crossings must be left in a stable condition. The slight erosion on 386/1 and 386/2 Roads must be rectified by providing effective drainage where this occurs.

(f) Road Construction

There is a short length of minor road construction from the edge of Winters Road to dump 1 in compartment 387 required for these logging operations.

Design

The minor road to be constructed is approximately 75 metres in length and the running surface must be no wider than 6 m. The road must be drained by outfall drainage, which must be established before the commencement of operations.

Grade

The road is to be constructed on a flat ridge-top. The road grade must not exceed 2°.

Survey

The road line has been surveyed and marked in the field. Clearing and earthworks must not deviate from the marked lines.

Clearing

The clearing width for construction of the road must not exceed 2 metres either side of the raod pavement.

Batters

A short length of cut batter will be required at the intersection of the new road with Winters Road. Vertical batters are preferred, and be no more than 0.75 m deep. The maximum length of cut batter must be 5 m.

Crossing of drainage features

The road to be constructed does not cross any drainage lines.

(g) Slope limits for the area

Maximum slope for harvesting	30 degrees
Maximum grade of snig track construction	25 degrees
Maximum side slope for snig track construction	30 degrees
Maximum road grade permitted	10 degrees
Maximum side slope for road construction	30 degrees without design

Areas with slopes over 30° are indicatively marked on the Operational Map. The SFO is responsible for identifying areas with slopes over 30° in the field.

(h) Drainage Feature Protection

Riparian Habitat Zones exist 20 metres either side of watercourses, drainage lines and drainage depressions with catchments greater than 40 hectares.

Filter strips must be retained along all watercourses and drainage lines within the net harvest area of Compartments 386, 387, 388 and 395 at minimum widths (measured in the horizontal plane) as stated in Table 5 below. These minimum widths meet or exceed the requirements of the Pollution Control Licence.

Where a filter strip extends beyond the boundary of the catchment of the drainage feature that is the subject of the protection, then the filter strip may be terminated at the catchment boundary.

In addition buffer strips 5 metres wide must be maintained on either side of drainage depressions.

The following techniques must be used where downhill snigging is used:

- Crossfall drainage must be used where practicable.
- Where practicable the snigging pattern must be uphill from the stump with the logs being bunched for the downhill portion of the snig onto a centrally located extraction track(s).
- Where possible, tracks must enter the log dump from the side or below. Where this is not possible, a crossbank must be in place immediately before a snig track enters the log dump at the end of each day's operation.

(n) Snig Track Drainage Line Crossings

All snig track watercourse and drainage line crossings must be approved by the SFO before construction and must be open causeways utilising the natural surface at the site. Crossings must be rehabilitated after use, and any harvesting debris inadvertantly deposited during use must be removed from the channel. As far as practicable the crossing point must be reshaped to its original condition and seeded with rye grass (or other suitable species) at the rate of 20 Kg/ha.

(o) Dispersible Soils

As far as practicable, no more than 30 per cent of the dispersible subsoil (measured over any 20 m length of snig track) may be exposed on snig tracks. This must be achieved by maintaining topsoil cover and/or using logging slash and walkover techniques. Where these methods do not achieve adequate ground-cover, the exposed area must by seeded with rye grass (or other suitable species) at the rate of 20 kg/ha on completion of operations in the area.

(p) Log Dumps

Field location of log dumps must utilise the most level site available, consistent with the location marked in the field and indicated on the Operational Map.

Because of the dispersible subsoil in the area, topsoil must not be stripped and stockpiled.

Dumps must be constructed with outfall drainage and shall be kept drained during use and at the completion of operations.

Upon completion of operations any debris at or near the edge of a dump must be moved away from standing vegetation into the dump area. The log dump surface must be left in a stable condition with at least 70% cover of topsoil and/or logging slash (which may include bark). As far as possible, those dumps on Winters Road must be left substantially free of large timber, to enable subsequent use by apiarists.

Where these techniques are not adequate to ensure stability of the dump surface, it must be seeded with rye grass (or other suitable species) at the rate of 20 kg/ha.

(q) Prescribed Burning

Pre-logging burning

There is no pre-logging burning associated with the harvesting of Compartments 388, 387, 388 and 395.

SUBM0441-7868-XG Sstep18

FACSIMILE TRANSMISSION

To	Director, Waters & Catchments, Environment Protection Authority		
Attention	Ms Tammy Otto	Date	27/9/1996
Your Fax	(02) 9795 5004	Our Fax	(02) 9980 7042
From	Nicholas Evans	Phone	(02) 9980 4108
No of Pages	3 (including this cover page)		

Confidentiality Notice for Recipients

Message

Please include the attached letter to the Harvesting Plan for Cpts 386, 387, 388 ... Gronge S.F. Grafton District.

VENESS & ASSOCIATES
Pty Limited
N 003 419 958

10 Dun...
COFFS HARBOUR
Telephone: (06...
Facsimile: (06...

20/6
23/6

19th May, 1996

Attn: Bob Williams
State Forests of NSW
P.O. Box 366
GRAFTON NSW 2460

Dear Bob,

Re: Further information on compartments 386, 387, 388 & 395, Grange SF

Following recent discussions with Leonie Walsh and the requirement to have n... information regarding the soil materials within compartments 386, 387, 388 and ... Grange SF, you are advised of the following.

Jim Veness of Veness & Associates, examined these compartments, together with ... other compartments in the 380's and 390's in February, 1996. Soil samples were co... for laboratory testing. The results of the soil sample analyses were presented in ... VA1715D.

Prior to the field visits, the landforms were examined from the 1:15,000 topographic m... Because of the consistency of soil materials found to occur within individual soil map units from the EIS study, it was decided that one soil sampling site would be exam... within each compartment. This approach was consistent with the EPA soil sam... protocol existing at that time. In order to assess any variation that might be attribute... different landform elements, it was decided to locate the sampling sites within each ... compartments in a different landform element when one compartment was compar... another.

Within compartments 386, 387, 388 and 395, there are two distinct landform elem... occurring. These are:

- Crest — this landform element commonly occurs as a smoothly ... upwards feature above the surrounding terrain between the ... catchments throughout these compartments
- Simple Slope — this very common landform element occurs extensively throu... these compartments as a uniform slope feature adjacent below ... elements

Because of the terrain no depressions or flats occur within these compartments whe... any limits of curvature pertaining to these features are observable.

The crest and simple slope landform elements have been sampled within compar... 386, 387, 388 and 395. The sampling sites located within 386 and 388 were situated ...

crest while the sampling sites in 387 and 395 were sampled from the commonly occurr simple slope landform element.

Each of these sampling sites, and all of compartments 386, 387, 388 and 395 are with the EIS Soil Mapping Unit C, with soils forming on Ordovician-Silurian metasedim consisting of argillites, phyllites, slates and intermediate volcanics, all with abund quartz veins.

The soil materials from each of the relevant sites are compared in the following table.

Site	Landform Element	A Horizon Depth (cm)	Texture	'K'	B Horizon Depth (cm)	Texture	'K'
386/1	crest	0-15	FSCL	0.016	15-60+	LC	0.0
387/1	simple slope	0-21	CL	0.010	21 80+	LC	0.01
388/1	crest	0-11	CL	0.008	11-75+	LC	0.01
395/1	simple slope	0-10	SiCL	0.021	10-70+	LC	0.02

As a result of this comparison, it is evident that, despite the variation in landform and location, the soil materials from each of the sampling sites contain a reasonably high degree of consistency with one another. This is also very evident when examining these soils in the field. Consequently, given that both of the landform elements have been sampled within the area covered by these compartments 386, 387, 388 and 395, the uniformity of these soils permits the conclusion that these landform elements have been adequately sampled.

Yours faithfully,

Jim Veness