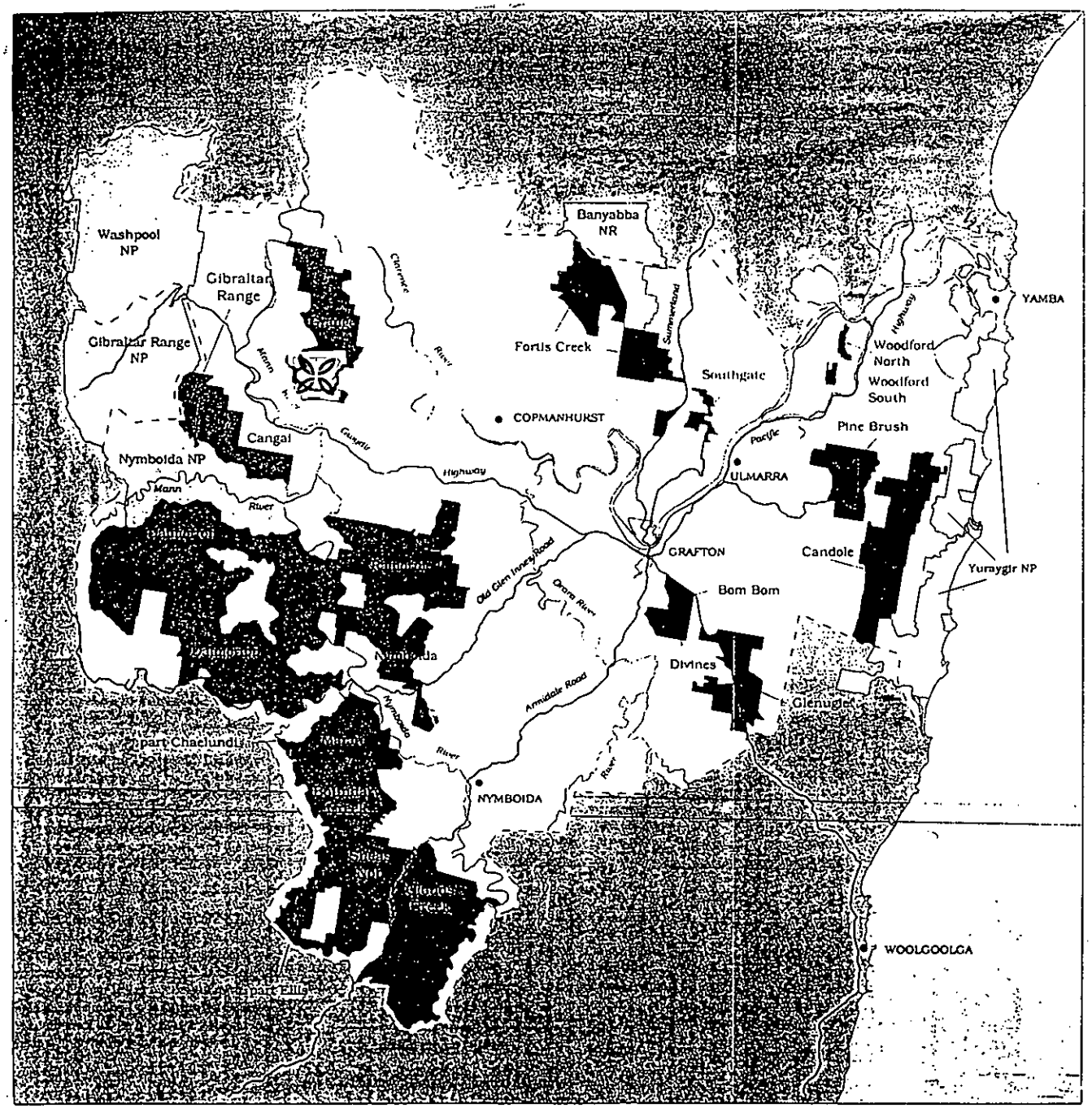
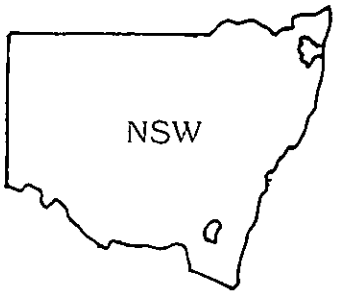
GRANGE
355

Grafton District
Northern Region



GRAFTON MANAGEMENT AREA



STATE FORESTS

NATIONAL PARKS

MANAGEMENT BOUNDARY

TOWNS

ROADS

RIVERS

0 20km N

LOCATION

COMPARTMENT 355

STATE FORESTS OF NSW

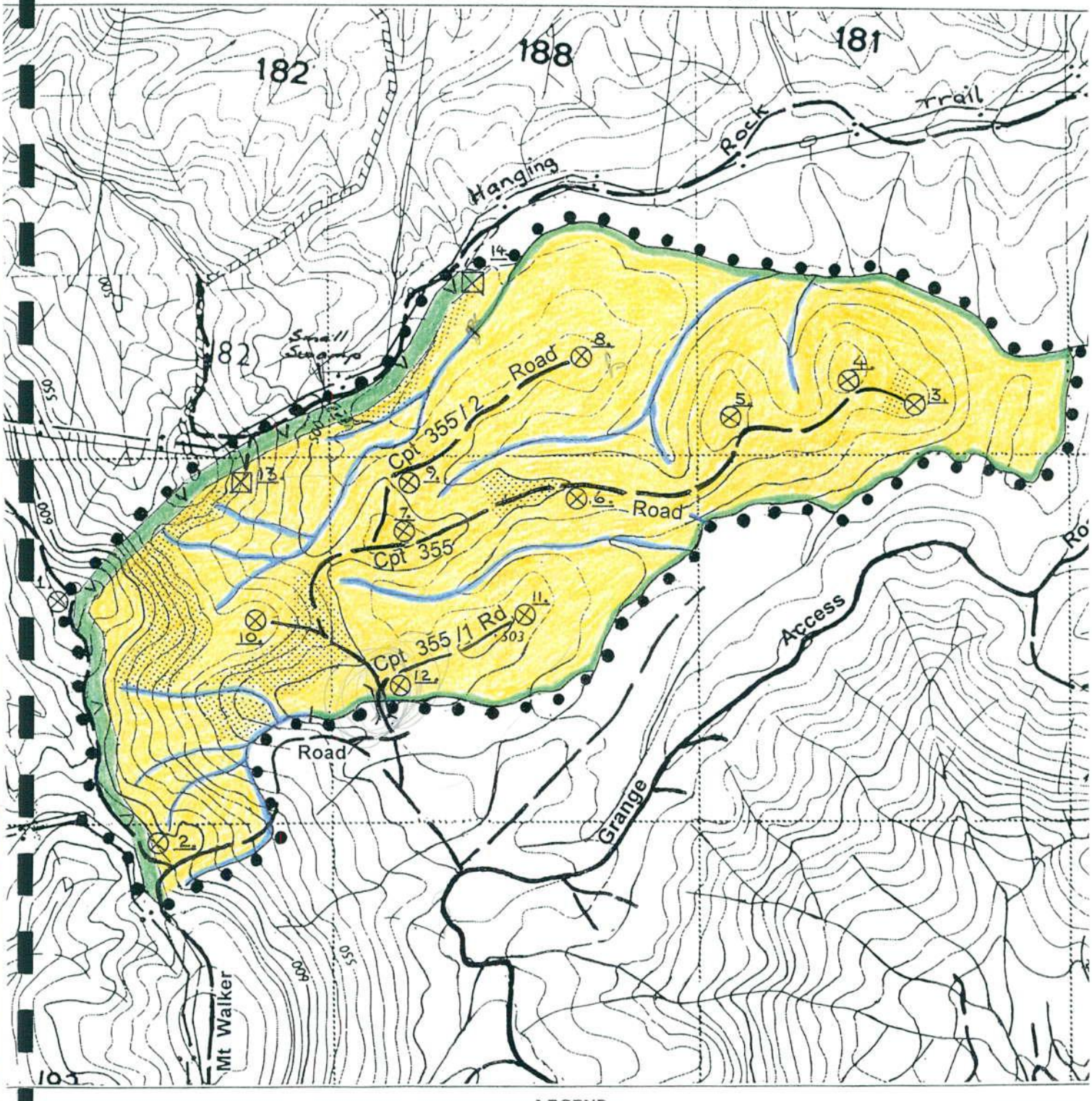
NORTHERN REGION - GRAFTON DISTRICT
HARVESTING PLAN - OPERATIONAL MAP

COMPARTMENT NUMBER ... 355
GRANGE STATE FOREST

GN

SCALE 1 : 15000 CONTOUR INTERVAL 10 m

0 0.5 1 km



LEGEND

BOUNDARIES

State Forest.....

Compartment .....

ROADS.....

Minor Roads.....

HARVEST AREA

Normal Prescriptions .....

Down-hill snigging .....

NON HARVEST AREA

Visual Resource Protection P.M.P.1.1.6.(Modified Harvesting).

Riparian Zone .....

DUMP SITES

Dry Weather .....

Wet Weather .....

DRAINAGE FEATURES

Filter Strip .....

Protection Strip.....

Open Crossing .....

STATE FORESTS OF NSW

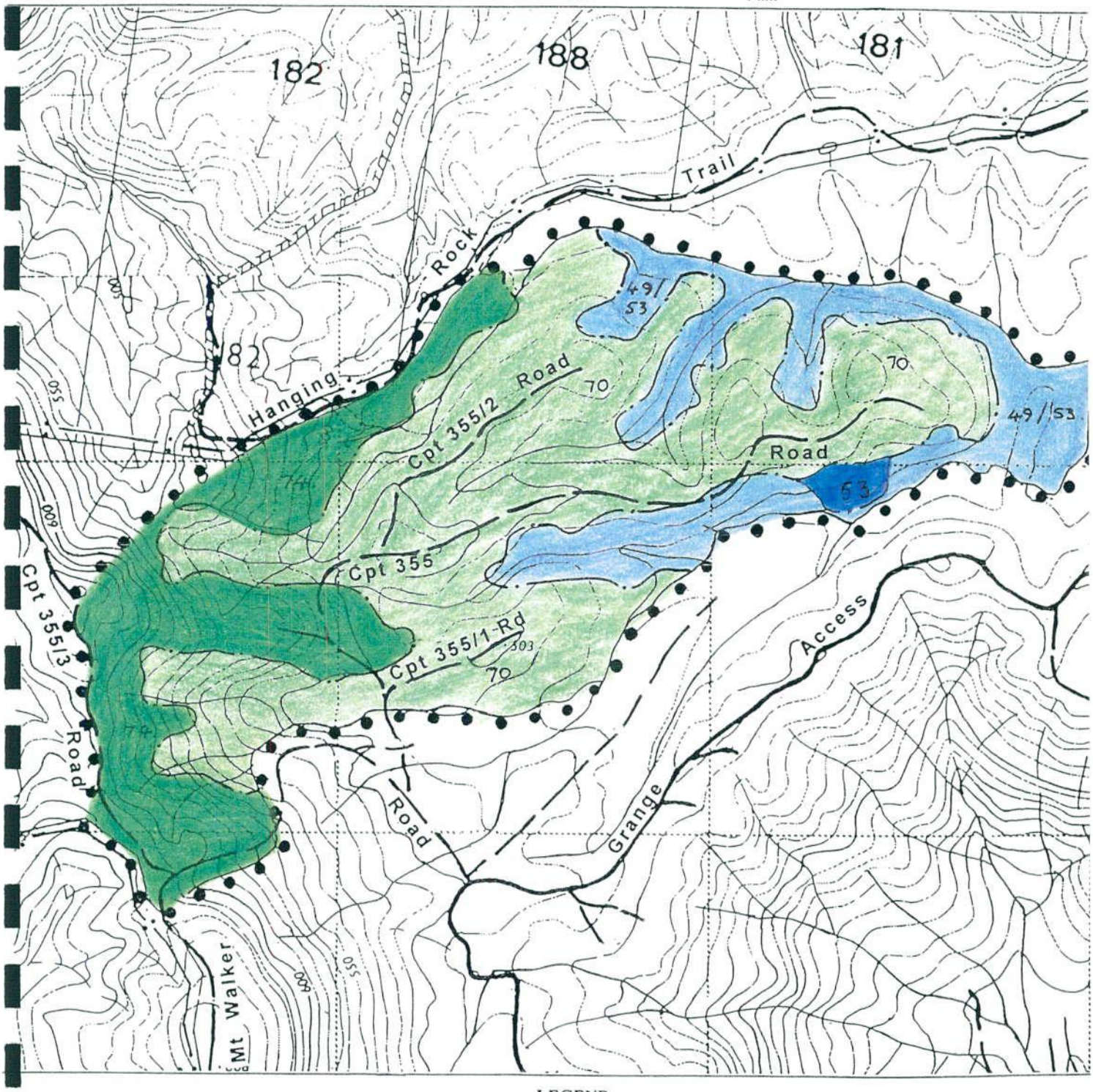
NORTHERN REGION - GRAFTON DISTRICT
HARVESTING PLAN - FOREST TYPE MAP

COMPARTMENT NUMBER ... 355
GRANGE STATE FOREST

SCALE 1 : 15000 CONTOUR INTERVAL 10 m

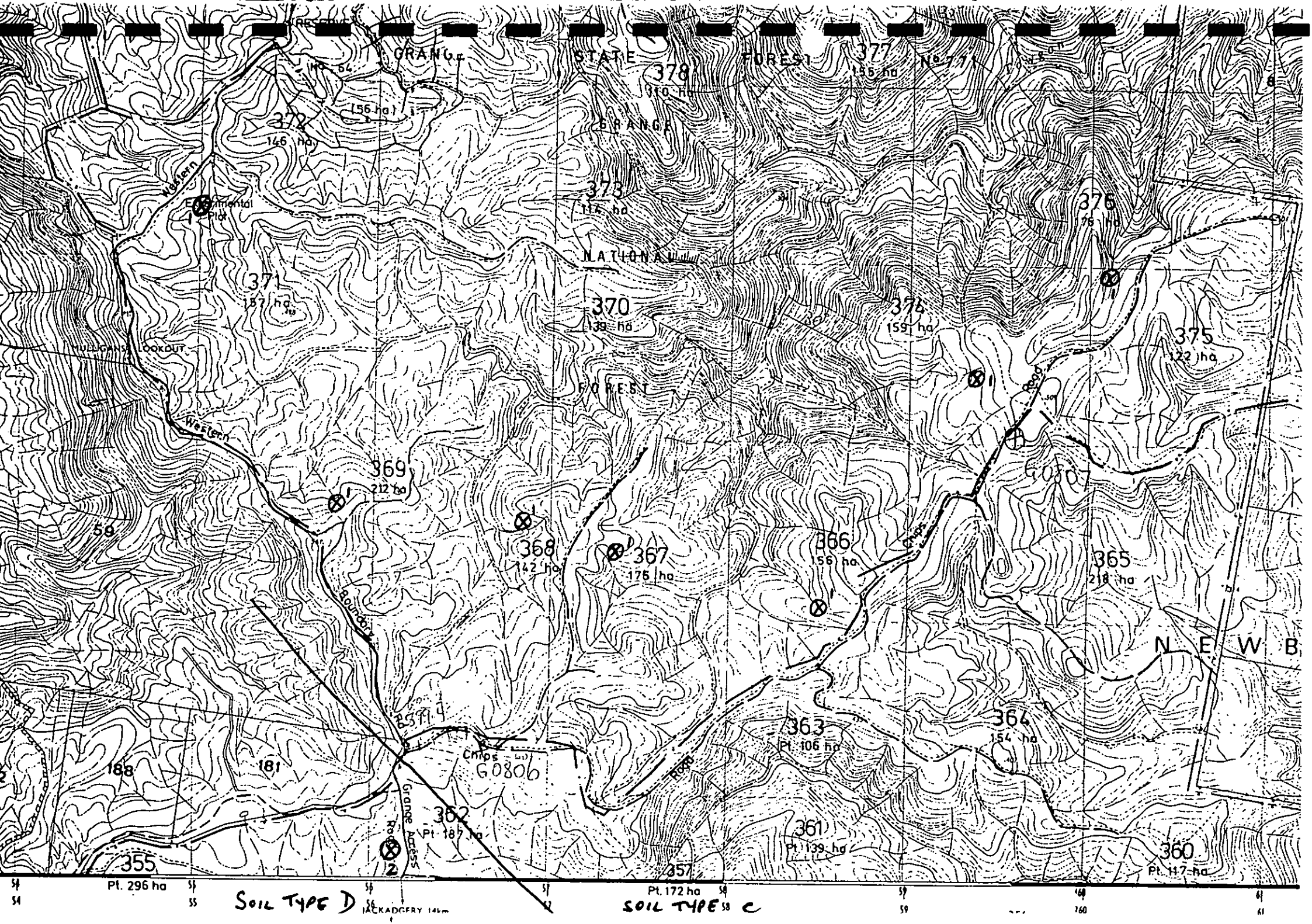
0 0.5 1 km

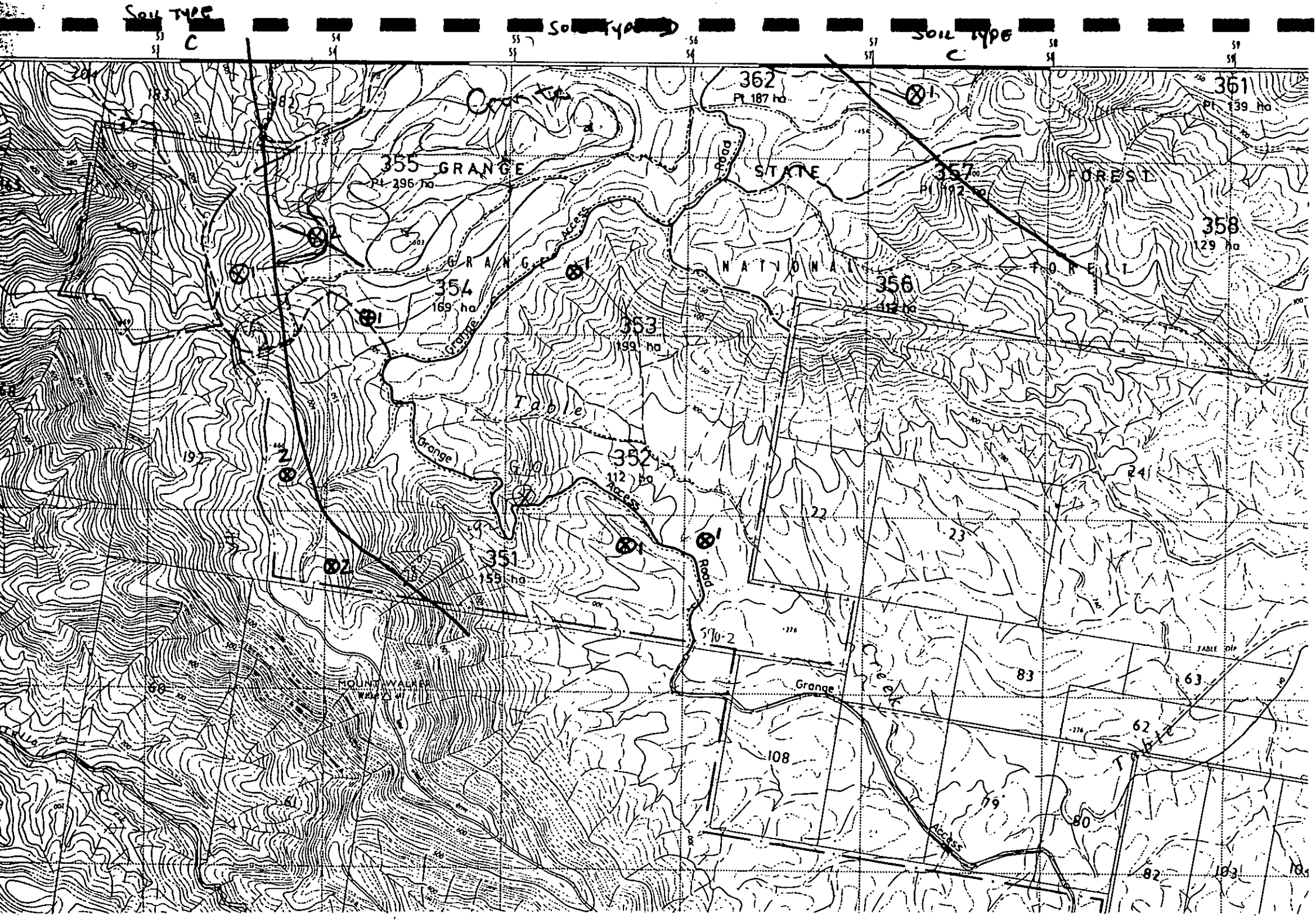
GN



LEGEND

BOUNDARIES	FOREST TYPES
State Forest.....	49/53.....
Compartment.....	53.....
Forest Type.....	70.....
ROADS	74.....


GRANGE
STATE
FOREST
No 7 7
378
110 ha
377
155 ha
372
146 ha
156 ha
373
116 ha
NATIONAL
376
76 ha
371
187 ha
370
139 ha
374
159 ha
375
122 ha
HULLGANS LOOKOUT
Western
Experimental Plot
FOREST
369
212 ha
368
142 ha
367
175 ha
366
156 ha
365
218 ha
59
Boundary
Chips
G0806
363
Pt. 106 ha
364
154 ha
188
181
362
Pt. 187 ha
Grange Access Road
361
Pt. 139 ha
360
Pt. 117 ha
355
Pt. 296 ha
357
Pt. 172 ha
SOIL TYPE D
SOIL TYPE C
JACKADGERY 14km
N E W B


Soil Type C
Soil Type C
362
Pt 187 ha
361
Pt 139 ha
355
Pt 296 ha
GRANGE
STATE
FOREST
357
Pt 192 ha
358
129 ha
GRANGE
NATIONAL
FOREST
354
169 ha
356
353
199 ha
Table
Grange
352
112 ha
Access
351
159 ha
Road
Grange
Access
MOUNT WALKER

Harvesting Plan No GG 95/07/355

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	**355**
MANAGEMENT AREA	**Grafton**		

Natural Features

General: The compartment contains undulating to moderate slopes with a steeper area located in the western section. It is basically a series of side ridges running north-east off the area's main range system.

Catchment: Clarence River catchment. Chips Creek, a tributary of Table Creek, is the compartment's south-eastern boundary. A tributary of Chips Creek is the eastern part of the northern boundary.

Altitude range: 460 m - 640 m A.S.L.

Aspect: Generally north-easterly.

Topography: The eastern three-quarters of the compartment varies from flat to undulating with slopes up to 10°. The western section, which rises to the main ridge, is steeper with slopes up to 25°.

Artificial Features

Roads: Grange Road, the main access through the forest, runs just to the east of the compartment.

Minor Roads: Two minor roads, Mt Walker Road in the south and Hanging Rock Trail in the north, run to the west off Grange Road and give access to the compartment. There are five minor roads off these roads giving access to side ridges in the compartment. Sections of the northern minor road off Grange Road run through private property.

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

Private property joins parts of the northern and the western boundaries of the compartment. The northern boundary part is fenced.

A Special Emphasis Visual Resource Protection Zone (PMP 1.1.6 Visual Resource Strip, 50 metres wide) exists along the western and part of the northern boundary of the compartment, as indicated on the Operational Map.

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

A small perched swamp is located beside the western section of the northern boundary.

Reference Grafton Management Area Environmental Impact Statement

2.2 FOREST MANAGEMENT AND SILVICULTURE

Description 3 Compartment Subdivision, Forest Types

Areas:

Gross Area of Compartment	219 ha
Visual Resource Strip	11 ha
Riparian Habitat Zones	4 ha
Filter Strips	13 ha
Swamp	1 ha
Proposed for Logging	**190 ha**

Forest Types:

Forest Types		Area (ha)
49/53	Turpentine/Brush Box	40.0
53	Brush Box	2.6
70	Spotted Gum	124.7
74	Spotted Gum - Ironbark/Grey Gum	51.5

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

Description 4 Broad Description of Vegetation

(a) Forest Types

- Type 49/53 a moist type that occurs along the creek areas in the eastern section of the compartment with some very small patches of rainforest (not mappable) embedded in it.
- Type 53 a moist type that occurs in one area beside the main creek in the south-eastern section of the compartment.
- Type 70 occurs over the major part of the compartment, the better quality on somewhat sheltered areas.
- Type 74 a dry type on the more exposed sections of the main ridge and extending down the tops of secondary ridges.

Overstory species

The overstory species are Spotted Gum, Grey Ironbark, Grey Gum, White Mahogany, Red Mahogany, Tallowwood, Bloodwood, Brush Box, Sydney Blue Gum and Turpentine.

(b) Understory

The understory on the more exposed sections is typically dry, being eucalypt regeneration, Forest Oak, Acacias, Cheese Tree, Backhousia, scattered Grass Trees and other xerophytic shrubs; Geebungs, Indigo, Hakeas and Native Cherry. The sheltered moist areas have Native Ginger, Tobacco Bush, Soft Tree Fern, Blechnum sp, Black Wattle, Tree Heath, Bangalow Palms and Forest Oak, with the Oak being prominent on parts of the Types 70 and 49/53 areas. Sections of the Types 70 and 49/53 area have a well developed mesic understory.

(c) Ground-cover

The ground cover is mostly grasses (kangaroo, poa and bladey), bracken and litter on the drier areas. Litter, ferns, vines and herbs, sedges and mosses occur on the moist areas.

(d) Rare or Endangered Species

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

(e) Rainforest

Very small patches of rainforest, (Forest Type 23 - Myrtle) are scattered along Chips Creek in the eastern section of the compartment.

(f) Exotic Weeds

Lantana is scattered through the lower section of the compartment.

(g) Regeneration and Serial Stages

The compartment carries a multi-age forest consisting of a few remnants of the original stand, maturing regrowth seemingly resulting from heavy harvesting during the 1940s, and maybe from the 1968 fire and younger regrowth of varying ages, the result of a number of selective logging operations and some stand improvement treatment.

Description 5 Forest and Crop Condition

Compartment 355 has had a long history of selective logging of varying intensities, seemingly particularly heavy in places during the 1940s. It has been partly silviculturally treated. Areas were intensely burnt in 1968. These events have induced growth response to varying extents on retained stems and allowed some regeneration to become established. Mostly the gaps created have been insufficient in size for widespread regeneration development. The current stand is mainly mature or maturing with groups of younger regrowth. Average growth rates would be low. There is a need to replace a proportion of the stands over the next few cutting cycles to maintain stand vigour and increase growth rates. The areas of younger regrowth shall be taken into consideration when carrying out this group selection activity. The compartment will now yield a range of log types.

The forest has been grazed more or less since European settlement in the 1840s, originally as part of *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 on Compartment 355.

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 Riparian Habitat Zones, the small swamp on the northern boundary and filter strips on the compartment will remain in a relatively undisturbed state. The Visual Resource strip will have limited activity in it. Protection strips will be thinned under specific prescriptions with up to 50% canopy removal.

Clusters of habitat trees will be retained to meet wildlife habitat requirements.

On the balance of the area, while taking groups of young regrowth into consideration, harvesting will provide canopy gaps and ground disturbance to promote seedling regeneration leading to multi-age regrowth forest conditions. A minimum canopy gap size of 0.4 hectares is required in the forest types occurring on the compartment to achieve successful regeneration development. This corresponds to an area approximately 65 metres in diameter.

To sustain regrowth forest development on a cyclic basis, gap creation will aim at treating a maximum of 25% of the net harvesting area this cutting cycle. The balance of the area will be lightly selectively thinned where required, retaining stems that have the potential of putting on positive net increment to the next cutting cycle.

(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 co-ordinated with other fire control agencies through the Nymboida District Fire Plan.

In Compartment 355 bark and logging debris will be progressively spread through the logged area and/or accumulated in small heaps on the dumps 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 listed Rare or Threatened have been detected in this compartment and none are expected to occur.

References 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

Very small patches of Myrtle rainforest (not mappable at 1:25,000) are scattered along Chips Creek in the eastern section of the compartment.

Description 9 Protection of Flora

The very small patches of rainforest scattered along Chips Creek would mostly be within the Riparian Habitat Zone and be protected by that zone. However, where these patches extend beyond the Riparian Habitat Zone they shall be protected by a 10 metre wide buffer strip. The rainforest patches can be recognised by the presence of Kurrajong, Corkwood and Bangalow Palms.

The small Melaleuca swamp on the northern boundary would partly be within the Visual Resource Strip and be protected by that strip. However, where the swamp extends beyond the Visual Resource Strip it shall be protected by a 10 metre wide buffer strip.

must

Filter strip

2.4 FAUNA PROTECTION

Description 10 Endangered and Protected Fauna Occurrence

(a) General

Glossy Black Cockatoos and Powerful Owls are the only Schedule 12 species that have been detected in Compartment 355. Schedule 12 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-tail 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

Compartment 355 includes Dry Hardwood forest and Moist Hardwood forest with xeromorphic understory and Moist Hardwood forest with mesic understory. 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) 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.

(d) Refugia Areas

No areas of critical habitat for Schedule 12 species have been located in the net harvest area and no refugia areas have been set aside. Casuarina trees suitable for Glossy Black Cockatoos exist through the compartment and the Cockatoos have been seen feeding in the compartment. Forest management activities will promote the growth of Casuarina.

Description 11 Species and Habitats Descriptions

Brief habitat descriptions for Schedule 12 species that might be adversely impacted by forest management activities on Compartment 355 are stated below:

(a) Critical Weight Range Species

Critical Weight Range species likely to occur in Compartment 355 are the Rufous Bettong, Red-legged Pademelon, Long-nosed Potoroo and Spotted-tail Quoll. Rufous Bettongs inhabit well-grassed open forests and are commonly associated with Spotted Gum. Long-nosed Potoroos prefer dense understory 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-tail Quolls occur in a variety of forest types favouring moister areas.

(b) Glossy Black-Cockatoo

Glossy Black-Cockatoos require stands containing species of Casuarina for food and large tree hollows for nesting, in a range of hardwood forest types. Suitable Casuarina occur on the compartment and there are large hollow trees on it and nearby.

(c) Powerful/Masked/Sooty Owls

These owls require large tree hollows for nesting, roost sites in large trees and require large home ranges. Suitable moist gully areas occur on and adjacent to the compartment.

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

These snakes require tree hollows and old trunk scares. There is a scattering of suitable older trees through the compartment.

(e) Brush-tailed Phascogale

This species requires tree-hollows for nesting and prefers open forest areas, foraging generally in large rough-barked trees. The compartment does not really have suitable habitat.

(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 of bark-shedding eucalypts. There are V-notch trees on nearby areas.

(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 higher nutrient areas. Such country would be limited on this compartment.

(l) Long-nosed Potoroo

This species prefers dense understory areas, will forage in open areas and builds a vegetation nest on the ground. There are broad flatter areas in the compartment with associated dense riparian areas.

(j) Golden-tipped Bat

This bat roosts in moist forests, seemingly preferring dense vegetation. There are suitable moist gully areas in the compartment.

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

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

(m) 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

Compartment 355 is located in the south-western section of Grange SF which in turn is located some 60 kilometres 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 1200 mm
The average 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 monthly rainfall erosivity details are:

J	F	M	A	M	J	J	A	S	O	N	D
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.

Temperature

Mean maximum temperatures range from over 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

There are two rock types on Compartment 355. The major part of the area is on Granite of Carboniferous age that has intruded into Ordovician-Silurian Metasediments (argillites, phyllites, slates and intermediate volcanics, all with abundant quartz veins). The Ordovician-Silurian Metasediments are located in the elevated western section of the compartment. The geological boundary is shown on the maps in the attached Soil Sampling Report.

Bedding planes

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

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

(d) Soils

Soil sampling of the area and soil testing have been carried out by J Veness of Veness & Associates Pty Ltd. Soil sample sites are indicated on the maps included with the Veness Soils Report.

Soil types

The two rock types in the compartment give rise to two different soil types. The soil derived from the granite is typed as red podsolic. The soil derived from the metasediments is typed as structured plastic and subplactic clays, at times krasnozems, xanthozems, chocolate soils, structured loams.

Description and profile

The Granite soil is described as brownish black to dark reddish brown, weakly to moderate pedal, sometimes stony sandy loam, to sandy clay loam top soil, grading through sandy and stony clay loams layers to a reddish brown, to light brown pedal, very stony sandy light clay subsoil layer.

The top-soil layers are up to about 70 cm in depth. The surface condition is described as loose with abundant stones and plant litter. Stones are rounded or angular and their size range is 2-200 mm.

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

The top soil 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.

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

Erodibility

Granite Soils	Metasediment Soils
K values A horizon = 0.016	K values A horizon = 0.011
K values B horizon = 0.036	K values B horizon = 0.053

Texture

Granite Soils

A horizon	-sandy clay loam, normal plastic.
B horizon	-sandy clay, normal plastic.

Metasediment Soils

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

Dispersibility

Granite Soils

%clay A horizon	22% (inclusive of gravels)
%clay B horizon	17% (inclusive of gravels)
D% A horizon	15%
D% B horizon	71%
%dispersible soil A horizon	22/100x15/100x100 = **3.30**
%dispersible soil B horizon	17/100x71/100x100 = **12.07**

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

Metasediment Soils

%clay A horizon	9% (inclusive of gravels)
%clay B horizon	9% (inclusive of gravels)
D% A horizon	22%
D% B horizon	48%
%dispersible soil A horizon	9/100x22/100x100 = **1.98**
%dispersible soil B horizon	9/100x48/100x100 = **4.32**

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

Reference Vessess and Associates. Soils Report Number VA1595B/01.

A copy of Report Number VA1595B/01 from J Veness is attached.

Inherent fertility

The soils are relatively fertile compared generally with soils on State forests in the Grafton area, as is evident by the wide spread occurrence of the moist high site quality White Mahogany Type on the compartment.

Depth to subsoils and bedrock

Granite Soils

Subsoils are from around 35 cm up to 70 cm, bedrock is at about 100 cm and possibly deeper on the flatter areas. The harvesting should rarely disturb the subsoil.

Metasediment Soils

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

Existing erosion

There is very little evidence of erosion within the compartment. All structures built during the recent logging seem to be functioning. There is limited deposition of sand and fine gravel in some drainage lines and minor riling has occurred on the steeper sections of the roads giving access off Grange Road to the compartment. These will be rectified by routine maintenance grading.

(e) Landform

Slope

Slopes are generally convex from the ridge tops down to the creeks lines though there are concave slopes in the western area of the compartment where the side ridges joins the main ridge. About three quarters of the compartment has slopes less than 10°. The balance of the compartment, the western section, is steeper with slopes up to around 25°. Approximate areas of slope classes are given in Table 1 below.

Table 1 - Slope Class Areas
(hectares)

0 - ≤5	>5 - ≤10	>10 - ≤15	>15 - ≤20	>20 - ≤25	>25 - ≤30
87	81	43	5	3	0

Terrain

The elevated western section of the compartment is on the main ridge running through the forest. This main ridge falls evenly to the north-east to long flat side ridges, with the balance of the compartment being on these side ridges.

Drainage line condition

The drainage lines are in good condition. They are deeply incised on the steeper areas of the compartment but not often down to bedrock. On the flatter eastern section the lines are mostly wide, some being grassy, others carry dense moist forest. The major portion of Chips Creek and its main tributary are protected by riparian habitat zones.

The flow in the streams is intermittent and the drainage lines were dry at the time of recent inspections, with the only water being in a few large water holes in the main creeks.

Aspect

The aspect is north-east.

Rockiness

There are no rock areas on the compartment and rockiness is not a consideration. The surface condition on the granite is described as loose with abundant stones and plant litter, and on the metasediments as friable with variable amounts of stones up to 20% and plant litter.

(f) Hydrology

The compartment is in the Clarence River catchment. Table Creeks runs south-east out of Grange State Forest and then north-east for about 12 kilometres to the Clarence River, being the forest boundary for part of that length. Chips Creek joins Table Creek along this eastern forest boundary. There are no prescribed streams, swamps or wetlands within the net harvest area.

No major water storages occur adjacent to or down stream from the compartment.

Representative water monitoring sites

The representative water monitoring site is Middle Brother (Granite, Rainfall 1200 mm +).

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

Previous harvesting

Apparently one of the original access routes into Grange SF entered the forest east of Compartment 355, crossed Chips creek and run through the compartment to the north. That road/trail would have given access (bullocks and horses) into the compartment many years ago for sleepers, girders, poles and other locally used timber. Old sleeper off-cuts are commonly seen on the compartment. The compartment has been extensively harvested on a number of occasions, apparently heavily during the 1940s following the construction of the first surveyed road through the forest and again during the 1960s following the resurveying and upgrading of the road. It was treated during the 1940s. Poles, girders and veneer logs were cut in a light selective logging during 1993/4. Erosion mitigation structures were constructed on snig tracks and minor roads during the 1993/94 logging.

Upstream catchment water use

Production forestry - the upstream catchment is within Grange SF.

Downstream catchment water use

Table Creek flows through steep grazing country before joining the Clarence River. There would be limited stock watering along its length.

Domestic water use

The only domestic water supply drawn from the Clarence below the Table Creek junction is the Copmanhurst town supply. Table Creek would amount to only a fraction of a percent 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.

Recovery time

Recovery will be relatively rapid with 100% live ground-cover being attained with 12 months. The tracks and minor roads utilised during the 1993/94 logging have revegetated except in places where soil has been scraped off to form erosion mitigation banks.

(h) Proposed Operation System

Use of existing roads

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

Grange Road, which runs just to the east of the compartment, is a fully designed road with concrete relief pipes in the side-cuts and drainage lines, and mitre drains on the ridge-tops. The minor roads that give access from Grange Road to the compartment have cross-fall and roll-over drainage in the side-cuts and mitre drains on the ridge-tops. Minor surface riling on section of these roads will be rectified by routine grading. Mt Walker Road crosses a number of dry drainage lines on long established stable, open, natural surface causeways. The

pavements of these roads are well consolidated and the roads are maintained by periodic grading and manual cleaning of drainage structures. The batters and outlets of the drainage structures are stable and well vegetated. Grange Road has been gravelled over much of its length.

5 km of minor roads, located on side ridges in the compartment, will be reopened for use during this harvesting operation. The reopening of these minor roads will simply require the lowering of some cross fall banks constructed during the 1993/94 logging and the removal of fallen timber and shrub regrowth from road edges. This will be done with the logging machinery and will cause minimal disturbance to the road pavement. These roads are stable, with litter and grass cover. Drainage is confined to cross-fall and roll-overs. The road into the compartment from the south crosses a drainage line on a long established stable, open, natural surface causeway. None of the existing roads are likely to cause significant water pollution.

Road construction

A 30 metre long minor road (access track) will need to be constructed to dump 13. There will be no need to establish borrow pits or gravel pits.

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 a crawler tractor and/or an articulated 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.

The crawler tractor is used for snigging from steeper slopes, including winching of 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 3, 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 3, 6, 10, 12, 13 and 14 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. The drainage line crossings are long established and utilise natural gravel, rock or flat grassy sites. Less than 10% of the snigging activity will be downhill.

Post-harvest burning

In Compartment 355 bark and logging debris will be progressively spread through the logged area during the harvesting operation and/or accumulated in small heaps on the 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 overstory, understory and ground-cover plants will provide ground cover rehabilitation. Roads, log dumps and major snig tracks, associated

batters, and drainage structures normally stabilise within twelve months provided crossfall and cross bank drainage is properly installed. The extent of re-vegetation will be assessed during post-logging regeneration surveys.

Description 13 Evaluation of Soil and Water Data

(a) Soil Erosion and Water Pollution 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. Details are in Tables 2a and 2b below, the subsoil data having given lower slopes for the categories for both the granite and the metasediment soils.

Granite Soils

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

R = 3000
K = 0.016 **Topsoil (A horizon)** Method B3
K = 0.036 **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 2a: Water Pollution Hazard Categories
Granite Soils

Slope Ranges (Degrees)	Water Pollution Category	Indicative % of Net Harvest Area
0 - ≤4	1	20
over 4 - ≤18	2	65
over 18 - ≤30	3	5
Roads	3	N/A

The following factors for rainfall erosivity and soil erodibility also apply to road construction:
R = 3000 **K = 0.036**

Metasediment Soils

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

R = 3000
K = 0.011 **Topsoil (A horizon)** Method B3
K = 0.053 **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 2b: Water Pollution Hazard Categories
Metasediment Soils

Slope Ranges (Degrees)	Water Pollution Category	Indicative % of Net Harvest Area
0 - ≤3	1	1
over 3 - ≤12	2	3
Over 12 - ≤30	3	6
Roads	3	N/A

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

R = 3000 **K = 0.053**

(b) Dispersibility

Granite Soils	Metasediment Soils
%dispersible soil A horizon = **3.30**	% dispersible soil A horizon = **1.98**
%dispersible soil B horizon = **12.07**	% dispersible soil B horizon = **4.32**
The A horizon is not significantly dispersible.	The A horizon is not significantly dispersible.
The B horizon is significantly dispersible.	The B horizon is not significantly dispersible.

(c) Other Factors

There are no other soil erosion or water pollution factors which need to be considered in relation to the planned harvesting of Compartment 355.

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 in the net harvest area.

(b) Permanent Growth Plots

There are no permanent growth plots in the net harvest area.

(c) Special Attributes of the Area.

No special attributes occur in the net harvest area.

Part 3 AUTHORISATION

3.1 COMPLIANCE

(a) Area Identification

GRAFTON DISTRICT
Grange State Forest No. 771
Compartment 355
Grafton Management Area

(b) Third Party/Lessee or Other Interest

The compartment is within the area of Occupation Permit No 13556 held by Albarine Pty Ltd 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 **"Code of Logging Practice Native Forests - State Forests and Other Crown Timber Lands"** - State Forests (1993).
- the **"Standard Erosion Mitigation Guidelines for Logging in New South Wales" (SEMGL 1993)** issued by the Soil Conservation Service of the Department of Land and Water Conservation (LaWC).
- the conditions of **Pollution 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 1967 (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**.
- 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 prepared.

(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 "Code of Logging Practice Native Forests - State Forests and Other Crown -Timber Lands"**. 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 from EPA, other than those areas detailed in condition 5.1(c).

Variations and other specified approvals detailed in Condition 5.1(c), 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, and where relevant to the Pollution Control Licence, with prior approval from 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, extraction or environmental work is being undertaken within the area covered by this Harvesting Plan.

3.2 CERTIFICATION

(a) Plan Preparation

Prepared by: D.G. Ryan Signature: .....D.G. Ryan.....

Title: Consulting Forester Date: 14 November 1995

(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: 18th December 1995

Signature: ..... District Forester Date: 15 November 1995

(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 - 37, attachments and the Operational, Forest Type and Location maps marked and referenced to this Harvesting Plan. This is Harvesting Plan No. GG 95/07/355.

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 History 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 GG 95/07/355 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 will 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.

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. Two horizontal lines also indicates a **protection strip**. **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, protection 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.

Reference: Northern Region Tree Marking Code (1995)

4.3 Order of Working

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

Fourteen dump sites have been located and marked in the compartment as indicated on the Operation Map. Dumps 13 and 14 have been designated as suitable for working when conditions are wet. Apart from meeting wet weather requirements, harvesting will commence on dump 1 and work through to dump 14.

(b) Wet Weather Controls - Roads

During wet weather, the wet-weather controls set out in Section 7 of the Code of Logging Practice will apply. In particular, where runoff occurs from a road surface, haulage may not occur unless the road is a gravel or sealed road.
[COLP 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. [COLP 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.

(b) Canopy Gaps

Tree marking for removal shall be carried out by the SFO. Tree marking shall aim at creating **gaps** with a maximum diameter of 70 metres over about 25% of the net harvest area. The location of these gaps shall be determined by the SFO in the field.

- Gaps shall not be located on slopes greater than 25 degrees.
- Gaps shall not intrude into protection or buffer strips.
- Logging debris shall be moved away from the edges of gaps, approximately 5 metres into the gap area.
- Some follow up felling of unmerchantable trees within gaps, using chainsaws, may be required.

No additional ground disturbance to that achieved by the logging is required to stimulate regeneration and promote its development in the compartment's forest types. No additional soil erosion or water pollution control measures, to those specified for the logging operations, are required in the gaps. Adequate wildlife habitat shall be retained in the **clusters** of undisturbed forest and in the selectively logged forest surrounding the gaps.

(c) Tree Marking

Tree marking within the gaps and clusters shall aim at:

Gaps

Removing all merchantable products with the intention of maximising the practical yield of log products with the highest economic end use.

Interstitial Areas

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.

Clusters

Retaining trees for wildlife habitat purposes.

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.

Reference Grafton Management Area Environmental Impact Statement

(d) Harvesting Debris

Harvesting debris within a gap shall be moved approximately 5 metres away from the edge of the gap.

Debris from the selective harvesting between canopy gaps shall be removed from within approximately 5 metres of the butts of retained habitat trees in forests with a xeromorphic understory and forests with a mesic understory if a ground burn would be carried, 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 shall be returned to the logging area and dispersed as far as is practicable around the net harvest area or stacked in small heaps on log dumps.

(e) Directional Felling

Directional felling techniques are to be employed to minimise damage to retained trees, to avoid hang ups and to maintain values of Riparian Habitat Zones, the very small scattered patches of rainforest, filter strips, protection strips and buffer strips.

4.5 Flora Protection

(a) Rare or Endangered Species

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

(b) Rainforest Protection

The very small scattered patches of rainforest in the eastern section of the compartment shall be inspected ahead of logging. Seemingly, they are all located in the Riparian Habitat Zone along Chips Creek. Any that might extend outside the Zone shall be protected with a 10 metre wide no activity buffer strip.

(c) Melaleuca Swamp

The small swamp near the western part of the northern boundary of the compartment shall be protected with a 10 metre wide no activity buffer strip.

4.6 Fauna Protection

(a) Sightings of Fauna

Glossy Black Cockatoos and Powerful Owls are the only Schedule 12 species that have been detected in Compartment 355. Schedule 12 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-tail 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 Schedule 12 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

Compartment 355 includes Dry Hardwood forest and Moist Hardwood forest with xeromorphic understory and Moist Hardwood forest with mesic understory. 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 understory shall be four trees per hectare. For the purpose of this prescription a xeromorphic understory 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 understory shall be six trees per hectare. For the purpose of this prescription a mesic understory 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 compartment being harvested, consistent with the size of canopy gaps required 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. In forests with a xeromorphic understorey tree heads shall be removed from within approximately 5 metres of identified habitat trees. Tree heads shall be removed with minimum disturbance to understory vegetation and on-ground logs. In forests with a mesic understorey logging slash within a radius of 10 metres of identified habitat trees is not to be spot burnt. Alternatively, if a ground burn can be carried in this forest type then burn conditions shall follow those agreed upon for xeromorphic understorey.

In gapping operations, logging debris shall be moved approximately 5 metres away from the edge of the gap.

(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 no harvesting machinery may enter Riparian Habitat Zones.
- felling and snigging shall be excluded from Riparian Habitat Zones.
- trees shall not be felled into Riparian Habitat Zones.
- trees shall not be damaged in Riparian Habitat Zones.

Visual Resource Strip

A designated visual resource strip exists along the western boundary of the compartment as shown on the Operational Map. The strip is 50 metres wide.

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

Refugia areas

No areas of critical habitat for Schedule 12 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 Schedule 12 species that might be adversely impacted on by forest management activities. Those relevant to Compartment 355 are stated below. The appropriate mitigation prescription shall be immediately applied when any of the listed animal 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. Given this, the prescription should only be seen as a guide for managing the habitat of CWR species.

Critical Weight Range species likely to occur in Compartment 355 are the Rufous Bettong, Red-legged Pademelon, Long-nose Potoroo and Spotted-tail 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 minimise 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-tail Quoll is defined as moist gullies, wet sclerophyll, rainforest and fallen logs with a diameter of greater than 40 cm. Critical habitat for 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 diameter.

Prescription 3:

Glossy Black-Cockatoo

Harvesting operations shall avoid damage to Casuarina stands.

Prescription 4:

Powerful/Masked/Sooty Owls

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

Prescription 6:

Brush-tailed Phascogale

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

Prescription 7:

Yellow-bellied Glider

Within 100 metres of identified V-notch scarred trees the following trees will be retained: known scarred trees, an additional 30 trees (>10 cm dbh) of the sap feed tree species and a minimum of 15 bark shedding trees. Additionally within a 50 ha area surrounding a scarred tree or a sighting location of a yellow-bellied glider, an average of 10 trees (>10 cm dbh) of feed tree species and 5 mature bark shedding trees per hectare shall be retained. These trees may be located within unlogged remnants, but retained sap feed trees may not count as retained bark shedding trees.

Prescription 8:

Squirrel Glider

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

Prescription 9:

Koala

Trees with identifiable use by Koalas at the time of harvesting shall be retained. If no further Koala evidence is found within 100 metres of the use tree a minimum of 5 Koala food trees shall be retained within the 100 metres. If regular activity is detected but less than 20% of the trees within 100 metres have faecal pellets underneath and no Koalas are observed, trees with evidence of regular Koala activity shall be retained; a minimum of 15 trees are to be retained within the 100 metres radius. If regular Koala activity is detected and more than one Koala is observed or more than 20% of trees within 100 metres radius have faecal pellets underneath, forestry operations, except low intensity prescribed burning, shall be excluded from the 100 metres radius and the Manager, Northern Zone, NPWS shall be informed.

Prescription 10:

Long-nosed Potoroo

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

Prescription 11:

Golden-tipped Bat

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

Prescription 12:

Little Bent-wing Bat/Common Bent-wing Bat

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

Prescription 13

Large-footed Mouse-eared Bat

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

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 Compartment 355, based on subsoil data for both the granite and metasediment soils, are detailed in Tables 4a and 4b below.

Granite Soils

Table 4a - Water Pollution Hazard Categories
Granite Soils

Slope Ranges (Degrees)	Water Pollution Category
0 - ≤4	1
over 4 - ≤18	2
over 18 - ≤30	3
Roads	3

Metasediment Soils

Table 4b - Water Pollution Hazard Categories
Metasediment Soils

Slope Ranges (Degrees)	Water Pollution Category
0 - ≤3	1
over 5-≤12	2
over 12 - ≤30	3
Roads	3

(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 jinker and prime mover.

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

The marking of roads, log dumps, snig tracks and crossings in the field will be in accordance with condition 4.2. Locations of roads and 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 Code of Logging Practice. During wet weather, the wet weather controls for road usage and for snigging set out in section 7 of the Code of Logging Practice will apply. In particular, where:

i) runoff occurs from a road surface:

- haulage must cease on natural surface roads.

ii) runoff occurs 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.

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 located along the northern boundary of the compartment, as marked on the Operational Map, are suitable to be worked during wet weather periods.

(e) Road Construction

A 30 metre minor road (access track) will be constructed to dump 13.

Grade

Not applicable for this logging operation, the access to dump 13 is flat.

Survey

The centre line of the minor road to dump 13 has been marked in the field. Clearing and earthworks must not deviate from the marked line.

Clearing

Clearing width of the minor road to dump 13 must be minimal to fit the road formation.

Batters

Not applicable for this logging operation.

Road surface drainage

Rollover crossbanks may be required on some sections of the minor roads where outfall drainage has not been established. Where required, rollover crossbanks will be spaced as stated in the Table below. The banks must have a minimum design unconsolidated vertical height from spillway to bank top of 35 cm. Such banks should readily cater for 1 in 5 year storm events.

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

0 -≤5	>5 - ≤10	over 10
100m	60m	40m

Rollover crossbanks must drain at natural surface level, or by way of installed plastic sheeting, onto undisturbed vegetation. Where undisturbed vegetation is not immediately accessible to the outfall, sediment trap fences must be installed across the outlet.

Rollover banks shall be retained in situ after the roads have been closed.

Crossing of drainage features

The drainage lines in the compartment are intermittent, in fact rarely run water, and were dry at the time of recent inspections.

Mount Walker Road crosses a number of drainage lines and the road off it into the compartment crosses one drainage line. Open natural surface causeways, that are in a stable condition with consolidated pavements and well vegetated batters, exist at these sites. The approaches to these causeways will be gravelled if pavements commence to deform. Any disturbed areas adjacent to these causeways shall be seeded with rye grass at the rate of 20 Kg/ha immediately following the logging, where considered necessary by the SFO.

These causeways will remain in situ after the logging has been completed.

Revegetation and rehabilitation

Revegetation of the minor roads following harvesting will be through natural regeneration. All crossbank rollover drains shall be left in working condition and crossfall (outfall) drainage reinstated.

Dispersible soils

It is not anticipated that the Granite sub-soil will be exposed on the roads during the harvesting. If small sections of the sub-soil are exposed, top soil from the road or imported gravel shall be spread over the road surface at the site and the cut and fill batters shall be seeded with rye grass at the rate of 20 Kg/ha.

(f) Slope Limits for the Area

Maximum slope for harvesting	30 degrees
Maximum slope for snig track construction	30 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

(g) Drainage Feature Protection

Riparian Habitat Zones exist 20 metres either side of watercourses, drainage lines and drainage depressions with catchments greater than 40 hectares. These zones have the same harvesting exclusion specifications as wildlife corridors.

Filter strips and protection strips shall be retained along all watercourses and drainage lines within the net harvest area of Compartment 355 at minimum widths as stated in Table 5 below.

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

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

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

(h) Tree Marking Rules for Filter Strips, Protection Strips and Buffer Strips

The SFO shall mark the Visual Resource Strip, the Swamp area, Riparian Habitat Zones, small rainforest areas where required and filter strips in the compartment progressively ahead of harvesting operations. The licensee or contractor shall be responsible for measuring off-sets to a protection strip from a filter strip as indicated by the SFO to determine the boundary of the protection strip adjacent to the filter strip. (See also 4.2, 5.2)

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

(I) Felling and Extraction from Filter Strips and Protection Strips

There shall be no felling in filter strips. Directional felling must be used to avoid felling of trees into filter strips.

Trees located in protection strips may be felled provided a minimum of 50% canopy cover is retained within the strip.

Trees which are marked for removal inside protection strips must only be felled if they can be directed out of the strip. Crowns of trees may be felled into protection strips.

Machinery must not enter filter or protection strips except to construct or use crossings.

Where trees are felled out of a protection strip or felled into a protection strip, logs must be extracted in the line of the log so as to minimise damage to vegetation and ground-cover.

Any furrows resulting from log removal from protection strips must be diverted at the edge of the strip by harvesting debris or earth.

(j) Extraction from Drainage Depression Buffer Strips

Soil disturbance in drainage depression buffer strips must be minimised by use of the following techniques:

- no snigging along drainage depressions.
- minimal use of blade.
- logs shall be approached in reverse gear.
- minimal change in direction while snigging logs out of drainage depressions.

(k) Snig Tracks

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

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 licensee/contractor 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 temporally suspended in accordance with Tables 6a or 6b.

Table 6a - Drainage of Snig Tracks at Temporary Cessation of Operations
Granite Soils

Slope boundaries	WP Category	No. Days
0° - ≤4°	1	10
>4° - ≤18°	2	8
over 18° - ≤30°	3	5

Table 6b - Drainage of Snig Tracks at Temporary Cessation of Operations
Metasediment Soils

Slope boundaries	WP Category	No. Days
0° - ≤3°	1	10
over 5°-≤12°	2	8
over 12° - ≤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 Tables 7a or 7b.

The spacings are the maximums and should be varied to utilise the most suitable outlet point. Crossbank construction, if required, must avoid exposing the dispersible sub-soil horizon wherever practicable. Crossbanks must be discharged into undisturbed vegetation or logging debris.

Table 7a - Maximum Earth Bank Spacing
Granite Soils

Track Grade (degrees)	WPH Category		
	1 (0° - ≤4°)	2 (>4° - ≤18°)	3 (>18° - ≤30°)
0 - ≤5	200m	150m	100m
>5 - ≤10		100m	60m
>10 - ≤15		60m	40m
>15 - ≤20		40m	25m
>20 - ≤25			20m
>25			15m

Table 7b - Maximum Earth Bank Spacing
Metasediment Soils

Track Grade (degrees)	WP Category		
	1 (0° - ≤3°)	2 (>3°-≤12°)	3 (>12° - ≤30°)
0 - ≤5	200m	150m	100m
>5 - ≤10		100m	60m
>10 - ≤15		60m	40m
>15 - ≤20			25m
>20 - ≤25			20m
>25			15m

(l) Downhill Snigging

Limited downhill snigging will be required to dumps 3, 6, 10, 12, 13 and 14.

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

- Crossfall drainage must be used where practicable.
- Where practicable the snigging pattern shall be uphill from the stump with the logs being bunched for the downhill portion of the snig onto a centrally located extraction track(s).

- Tracks approaching log dumps shall be located so as to direct water away from the dump immediately before reaching the dump.

(M) Snig Track Drainage Line Crossings

The drainage lines in the compartment only flow intermittently and were dry at the time of recent inspections. All snig track drainage line crossings shall be approved by the SFO before construction and shall be open causeways utilising the natural surface at the site. There should be little need to cross drainage lines, and little need to modify the channel or banks of the drainage lines that are crossed. Crossings must be rehabilitated after use, all loose material shall be removed from the channel, as far as practicable the crossing point shall be reshaped to its original condition and seeded with rye grass at the rate of 20 Kg/ha.

(n) Dispersible Soils

It is not anticipated that snigging will expose significantly dispersible Granite sub-soil. To minimise the possibility walkover extraction techniques will be utilised wherever practicable. If small lengths of sub-soil are exposed, top soil from the track construction shall be spread over the track surface at the site, and at the completion of the use of the track, cut batters shall be seeded with rye grass at the rate of 20 Kg/ha.

(o) Log Dumps

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

Before use, topsoil must be stripped and stockpiled for subsequent respreading at the completion of operations.

Dumps shall be constructed with outfall drainage.

At the completion of operations any debris at or near the edge of the dump shall be moved away from standing vegetation into the dump area. The topsoil shall be spread uniformly over the dump area which shall be left in a neat stable condition.

(p) Prescribed Burning

Pre-logging burning

The will be no pre-logging burning associated with the harvesting of Compartment 355.

Post-logging burning

Post-logging burning of Compartment 355 will 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 compartment 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 will 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.

Where logging slash has not been removed from within about 5 metres of identified habitat trees in forest with a mesic understorey (see Section 4.6, Prescription 1), logging slash within a radius of 10 m of identified habitat trees is not to be spot burnt.

The Grafton District Operations Foreman will be 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 located in Compartment 355.

4.9 Modified Harvest Conditions

(a) Special Emphasis Visual Resource

Preferred Management Priority Classification; Special Emphasis Visual Resource Protection Zone 1.1.6 Visual Resource Strip, 50 metres wide, exists along the western boundary of the compartment, as indicated on the Operational Map.

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

(b) 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 no harvesting machinery may enter Riparian Habitat Zones.
- felling and snigging shall be excluded from Riparian Habitat Zones.
- trees shall not be felled into Riparian Habitat Zones.
- trees shall not be damaged in Riparian Habitat Zones.

(c) Boundary Fences

Private property joins western part of the northern boundary of the compartment. The boundary is fenced.

- Damage to this fence is to be avoided. Any damage caused shall be immediately repaired

(d) Small Rainforest Areas and the Swamp Area

The small rainforest areas and the swamp area shall be protected by 10 metre no activity buffers.

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 Compartment 355

Estimated Yields are:

Compulsory Sawlogs 40 cm + ... 1500m³
Compulsory Sawlogs <40 cm 500m³
Salvage Sawlogs 400m³
Poles 40m³
Veneer Logs 40m³

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 will be:

The appointed Hardwood Marketing Foreman, Grafton District.

(b) Relieving SFOs

Relieving SFOs , if required will be:

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 drainage line crossing for snig tracks - for this plan area all crossings will be open causeways.

All approvals shall be noted on the harvesting plan.

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 shall be marked for extraction. (Also see Part 4.2)

Canopy gaps for regeneration

Canopy gaps for regeneration will be approximately 65 metres in diameter. Gaps shall not intrude into protection or buffer strips. Tree marking should aim at creating sufficient gaps to occupy approximately 25% of the net harvest area. (Also see Part 4.4 (b))

Habitat trees and habitat recruitment trees for fauna protection

Habitat trees and habitat recruitment trees will 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 Visual Resource Strip, the small Melaleuca Swamp, any small Rainforest areas and Riparian Habitat Zones shall be marked ahead of harvesting operations.

(b) Soil Erosion and Water Pollution Control

Marking of filter strips and protection strips

Riparian Habitat Zone prescriptions are equivalent to or greater than filter/protection strips and drainage line buffer strip requirements. There is no need for filter/protection strips and drainage line buffer strips where they would be embedded in riparian habitat zones. Hence, filter/protection strips shall only be marked in the field where they are not embedded in riparian habitat zones.

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

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.

The SFO is responsible for ensuring that the licensee or contractor is correctly measuring off-sets to a protection strip (See also Part 4.7 (h)).

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 (h)).

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 shall be followed.

(b) Fauna Reporting and Mitigation Prescriptions

Reports of sightings of any Schedule 12 fauna as required in Part 4.6 (a) must be made to the District Marketing Forester within 24 hours of the sighting being made. 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 situ.

- 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.

(d) Sowing of Constructed Crossings

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

(e) Dispersible Soils Exposed During Road/Snig Track Construction

If small sections of granite subsoil are exposed during road/snig track construction/use the SFO shall ensure that topsoil from the earthworks or imported gravel is spread over the road/track surface at the site and the cut and fill batters are seeded with rye grass at the rate of 20 Kg/ha immediately following construction/completion of use in accordance with Part 4.7 (e) and (n).

Condition 5.4 Pre- and Post-logging Burning

(a) Pre-logging Burning

The will be no pre-logging burning associated with the harvesting of Compartment 355.

(b) Post-logging Burning

Post-logging burning of Compartment 355 will 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 will be 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 Compartment 355.

Condition 5.6 Supervising Forest Officer's Acknowledgment

I acknowledge that I have received a copy of Harvesting Plan No GG 95/07/355 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

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 "D" Granite

(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 = 0.036 Subsoil (B Horizon)

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 Rangers (Degrees)	Erosion Hazard Class	Where SEHR is	Indicative % of Net Harvest Area
<=6	Low	less than 40	40
>6 to <=24	Moderate	40 - 400	42
>24 to <=30	High	400 - 800	0
N/A	Extreme	greater than 800	

(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.

(a) 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 D. G. RYAN Signature .....

Title Consulting Forester Date 14.11.95

District Approval (by District Forester)

Signature .....
Date 17th November 1995.
District Forester

Appendix 2: Erosion Hazard Assessment - Soil Type "C" Metasediments

(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 = 0.053 Subsoil (B Horizon)

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 Rangers (Degrees)	Erosion Hazard Class	Where SEHR is	Indicative % of Net Harvest Area
<=4	Low	less than 40	4
>4 to <=19	Moderate	40 - 400	13
>19 to <=28	High	400 - 800	1
>28 to <=30	Extreme	greater than 800	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.

(a) 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 D. G. Ryan Signature D G Ryan

Title Consulting Forester Date 14.11.95

District Approval (by District Forester)

Signature

Date 17th November 1995

District Forester

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 the Water Pollution Categories and proportion of Dispersible Soil been calculated for the area?	Yes	2.5 13 (a) 2.5 12 (d)
	Method for soil sampling for K factor	yes	2.5 12 (d)
	Field sampling - sites?	yes	
	- lab analysis?	yes	
	- field analysis?	yes	
1b)	Site specific conditions	No	
4	Are areas >30° within the net harvest area	No	2.5 12 (e) Map
5	Are areas of WPC 4 within the net harvest area	No	2.5 13 (a)
6	Drainage feature protection, prescribe stream	Yes	4.7 (g) Map
7	Any major water storage?	No	2.5 12 (f)
8	Drainage depression buffer strips conditions	Yes	4.7 (g)
9.1 (c)	Filter strips on map?	Yes	Map
9.2	Protection strips on map?	Yes	Map
10	Prescriptions for marketing/identifying in the field		
	-filter strips	Yes	5.2 (b)
	-protection strips	Yes	5.2 (b)
	-buffer strips	Yes	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 (j)
47	Stabilisation of roads within 12 months	Yes	2.5 12 (h)
48	Are roads shown on map	Yes	Map
49	Road traverses area over 30°	No	2.5 12 (h)
50 (a), (b)	Maximum road grade 10°	Yes	4.7 (e)
51	Marking of roads in field	Yes	4.7 (e)
52	Minimising road clearing widths	Yes	4.7 (e)
53	Road side clearing	No	2.5 12 (h)

POLLUTION CONTROL LICENCE CONDITIONS CHECKLIST
PLAN PREPARATION - PCL Sch 2, Div 3

Condition Number	Condition Title/Enquiry	Entry Needed?	Plan Ref.
57	Borrow or gravel pits	No	2.5 12 (h)
60	Batter stabilisation measures	Yes	4.7 (e)
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	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 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	Yes	4.7 (e)
81	Protection techniques for roads traversing dispersible soils	Yes	4.7 (e)
82	Wet weather restrictions for roads	Yes	4.3 (b)
83	Condition to cover non-completion of crossing stabilisation within 5 days - snig tracks	Yes	5.3 (c)
84	Techniques to leave crossing sites stable	Yes	4.7 (e)
85	Condition to cover non-removal of temporary crossing structures	Yes	5.3 (c)
86	Crossing of drainage features other than drainage depressions by snig tracks	Yes	4.7 (m) 5.1 (c)
	Specification of snig track crossing locations, types and capacity	Yes	4.7 (m)
	Condition for SFO approvals for crossings	Yes	5.1 (c)
	Conditions for non-removal of soil from drainage features	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.
89	Location and effective drainage of snig tracks	Yes	4.7 (k)
92	Condition for snigging along roads	Yes	4.7 (k)
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 (k)
	-diversion into stable surfaces	Yes	4.7 (k)
	-minimise unchecked flow into drainage features	Yes	4.7 (k)
	-divert water at minimum damage to structure	Yes	4.7 (k)
103	Minimum specification for bank height	Yes	4.7 (k)
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 (k)
109	Specifications for preventing concentrated water flow where downhill snigging is specified	Yes	4.7 (l)
112	Protection techniques for snig tracks on dispersible soils	Yes	4.7 (n)
119	Specifications for log dump location and drainage	Yes	4.7 (o)
120	Use of traxcavators and wheeled loaders in relation to wet weather	No	
125	Post-logging burning conditions	Yes	4.7 (p)
	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	???

STATE FORESTS OF NSW

NORTHERN REGION - GRAFTON DISTRICT

HARVESTING PROTOCOL ATTACHMENT

COMPARTMENT 355
GRANGE STATE FOREST

API

Photography: Grafton 1:25 000 colour NSW 4231 13/8/94
Run 1 Print 93

Interpreter: Peter Fisher Date completed: 13 Oct 1995

Results summary (ocular estimate):

Candidate OGF	Net loggable area
Polygons >25 ha	Yes
Contiguous areas >25 ha	Yes

Mapping required? Yes
Photo overlay(s) signed and stored with harvesting plan? Yes

MAPPING

Mapper: Leonie Walsh Date completed: 28 Oct 1995

Candidate OGF	Net loggable area (as per H/Plan) No	Area
Polygons >25 ha	1	34 ha

Polygon less than minimum width of 125 m, therefore stump counting is not required.

UNLOGGED AREA

Assessor: Leonie Walsh Date completed 31 October 1995
Sources: Logging records
Field inspection

Unlogged areas >25 ha NLA present? No

Prepared by LEONIE WALSH
Title MARKETING FORESTER

Signature
Date 17 NOVEMBER 1995

District Approval

Date 17th November 1995.

District Forester
GRAFTON DISTRICT

STATE FORESTS OF NSW

NORTHERN REGION - GRAFTON DISTRICT

AMENDMENT TO PLAN

COMPARTMENT 355
GRANGE STATE FOREST

GAPS AND CLUSTERS

The Minister for Land and Water Conservation has announced a moratorium on the silvicultural technique of "gaps and clusters" (see Description 6, part (a)), pending a review by a Committee of scientists.

Accordingly, for the duration of the moratorium, this plan is amended to substitute selective logging techniques for the creation of canopy gaps. All references to canopy gaps should be disregarded. Harvesting will be consistent with SFNSW Operational Circular 95/14, as amended, and the 1987 Grafton Management Area Management Plan.

Prepared by..LEONIE WALSH.....
Title.....MARKETING FORESTER.....

Signature.....
Date.....17 NOVEMBER 1995.....

District Approval

Date.....14 November 1995.

District Forester
GRAFTON DISTRICT

District: Grafton **Compartment(s):** 355, 362, 366, 367, 368, 369, 371, 374, 376 **REPORT NUMBER:** VA1595B/01 **Page** 1 **of** 1

Sample Number	Sample Type	Soil Type	Depth (cm)	Particle Size Analysis (%) clay	silt	fine sand	coarse sand	gravel	D%	Texture+	Structure*	Permeability*	'K'#	per cent dispersible soil (D% x clay%)
355/1/A	Topsoil	C	2–10	9(10)	30(34)	42(49)	6 (7)	13	22	SiCL	1	3	0.011	1.98
355/1/B	Subsoil	C	25–35	9(11)	37(43)	27(32)	12(14)	15	48	FSCL	2	3	(0.053)	4.32
355/2/A	Topsoil	D	2– 6	22(22)	11(11)	35(36)	31(31)	1	15	SCL	2	3	0.016	3.30
355/2/B	Subsoil	D	55–60	17(19)	9(10)	30(33)	35(38)	9	(71)	SC	3	5	0.036	12.07
362/1/A	Topsoil	C	0–10	21(22)	16(16)	32(33)	28(29)	3	16	SiCL	1	3	0.020	3.36
362/1/B	Subsoil	C	25–30	32(33)	16(16)	24(24)	26(27)	2	34	LC	1	4	0.017	10.88
362/2/A	Topsoil	D	0–10	10(10)	12(13)	30(32)	43(45)	5	29	SCL	3	3	0.022	2.90
362/2/B	Subsoil	D	40–50	41(45)	6 (7)	20(22)	24(26)	9	23	LC	3	3	0.015	9.43
366/1/A	Topsoil	C	1–10	11(16)	15(22)	31(46)	11(16)	32	12	SiCL	1	3	0.010	1.32
366/1/B	Subsoil	C	35–40	24(28)	26(30)	21(25)	15(17)	14	19	SiC	1	4	0.028	4.56
367/1/A	Topsoil	C	2– 8	12(16)	24(33)	19(26)	18(25)	27	13	SiCL	1	3	0.009	1.56
367/1/B	Subsoil	C	35–40	11(23)	16(33)	9(19)	12(25)	52	25	LC	2	5	0.040	2.75
368/1/A	Topsoil	C	1– 8	11(17)	15(22)	22(33)	19(28)	33	19	SiCL	1	3	0.008	2.09
368/1/B	Subsoil	C	50–60	26(31)	23(27)	17(20)	19(22)	15	(40)	LC	1	4	0.022	10.40
369/1/A	Topsoil	C	2– 8	14(15)	48(51)	27(29)	5 (5)	6	34	SiCL	1	3	0.034^	4.76
369/1/B	Subsoil	C	25–30	23(24)	47(48)	22(23)	5 (5)	3	33	LC	2	4	0.047	7.59
371/1/A	Topsoil	C	2–10	21(25)	23(28)	31(37)	8(10)	17	19	SiCL	1	3	0.005	3.99
371/1/B	Subsoil	C	25–35	34(41)	18(22)	22(26)	9(11)	17	23	LMC	2	4	0.008	7.82
374/1/A	Topsoil	C	1–10	16(17)	34(37)	37(41)	5 (5)	8	14	SiCL	1	3	0.009	2.24
374/1/B	Subsoil	C	30–40	26(31)	35(42)	19(23)	4 (4)	16	23	SiC	2	4	0.038	5.98
376/1/A	Topsoil	C	2–10	7(10)	21(30)	30(43)	12(17)	30	17	SiCL	1	3	0.012	1.19
376/1/B	Subsoil	C	40–45	21(24)	26(30)	29(33)	12(13)	12	30	SiC	1	4	0.034	6.30

NOTES: PSA values are calculated inclusive of gravels. The values in brackets have been recalculated after excluding gravels
+ textures determined after Northcote (1979); * structure and permeability classes are those to be used in SOILOSS;
# 'K' value has been determined using SOILOSS version 5.1; ^ As directed by the SOILOSS program, 'K' for 369/1/A was determined using the nomograph, due to the high proportion of fine sand. It is worth noting that this nomograph only permits the use of organic matter to a maximum of 4% while this layer's value is really 9.4%

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
22nd June, 1995

CERTIFIED MAIL
K 956536

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. 795 5000
Facsimile .02. 795 5002

Our Reference: 600000/D13/Not. Nos. 002571

Your Reference:

23 February, 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, 1996.

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 the licence by further amending the harvesting plan for Compartment 74W, Mt Mitchell State Forest No. 308, (prepared by State Forests of NSW, and received by the EPA on 18 April 1995, as amended by Notice under section 17D(3) of the Pollution Control Act 1970 issued by the EPA on 21 September 1995) by:

a) inserting the attached additional conditions received by the EPA on 20 February 1996, and certified by Mr Geoff Noonan; and

b) omitting the harvest plan map and inserting in its place the harvest plan map received by the EPA on 20 February 1996, and certified by Geoff Noonan; and

c) inserting the attached additional conditions and harvest plan map received by the EPA on 22 February 1996.

2. Varies the licence by further amending the harvesting plan for Compartments 273, 274, 275, 276, 277, 279, 282, Newry State Forest No. 487, (prepared by State Forests of NSW, and received by the EPA on 18 January 1996, as amended by Notice under section 17D(3) of the Pollution Control Act 1970 issued by the EPA on 1 February 1996) by:

a) inserting the attached additional conditions and harvesting plan operational map received by the EPA on 20 February and certified by Mr Geoff Noonan.

3. Varies the licence by further amending the harvesting plan for Compartment 355, Grange State Forest No. 771, (prepared by State Forests of NSW, and received by the EPA on 27 November 1995, as amended by Notice under section 17D(3) of the Pollution Control Act 1970 issued by the EPA on 28 December 1995) by:

a) inserting the attached additional conditions and harvesting plan operational map received by the EPA on 21 February 1996, and certified by Mr Geoff Noonan.

NEIL SHEPHERD
Director-General

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

FOR ACTION OR NOTING BY		
ORIGINATOR	H.L.	23.2.96
1. A/MPIU		23/2/96
2. MWCP		23/2/96
3.		
4.		

********** F I L E C O P Y **********

SUBMM11-7868-KG

FACSIMILE TRANSMISSION

To	Dr. Neil Shepherd, Environment Protection Authority P O Box 1135 CHATSWOOD NSW 2057		
Attention	Mr Geoff Noonan Catchments Branch	**Date**	23 February 1996
Your Fax		**Our Fax**	(02) 980 7042
From	Kris Gounder Forest Planning Branch	**Phone**	(02) 980 4217 (015) 271 625
No of Pages	1 (including this cover page)		

STATE FORESTS

State Forests of New South Wales
Building 7
423 Pennant Hills Road
Pennant Hills NSW 2120
Phone (02) 980 4100

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

In terms of Clause 13(b) of the Pollution Control Regulations, State Forests of New South Wales hereby notifies you that no appeal will be made against EPA's decision to vary amendment to Licence No. 4017 on 23 February 1996 to include the following areas:

Compartment No.	State Forest	Management Area
74 West	Mt Mitchell	Glen Innes
273, 274, 275, 276, 277, 279 & 282	Newry	Urunga
355	Grange	Grafton

J.A. HOWE
Manager
Forest Planning Branch

For State Forests Use Only (Page 1 of 3)

District Forester Glen Innes, Urunga & Grafton

As required under the above legislation we advised EPA about our intention not to appeal against this Licence amendment **on 23 February 1996.** Accordingly you may start logging these compartments **on 25 February 1996.**

Manager, Forest Planning Branch

File: AMEND70.DOC
location: N:\STEVEB\AMENDMEN\

EPA

Environment Protection Authority
New South Wales

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

Telephone .02. 795 5000
Facsimile .02. 795 5002

Dr H Drielsma
Managing Director
State Forests of NSW
Locked Bag 23
Pennant Hills NSW 2120

Our Reference: 600000D1

Your Reference: FPB 70846

28 December 1995

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

WHEREAS -

(a) FORESTRY COMMISSION OF NSW trading as STATE FORESTS OF NSW is the holder of licence number 004017 in respect of premises situated on LAND IN THE NORTHERN REGION - which expires on 7 August 1996

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 varies the licence as set out below.

1. Insert the following compartment description, corresponding water pollution hazard categories, special conditions, representative water quality monitoring site, and date of licence variation into Schedule 1:

Compartment Description

Compartment 355
Grange State Forest No. 771

Water Pollution Hazard Categories

1. Granite Soils

Water Pollution Hazard Category	Slope Ranges (degrees)
1	Less than or equal to 4.
2	Greater than 4 and less than or equal to 18.
3	Greater than 18 and less than or equal to 30
4	Not applicable.

Proportion of dispersible soils: 3.3% (A Horizon) and 12.07% (B Horizon);

2. Metasediment Soils

Water Pollution Hazard Category	Slope Ranges (degrees)
1	Less than or equal to 3.
2	Greater than 3 and less than or equal to 12.
3	Greater than 12 and less than or equal to 30
4	Not applicable.

Proportion of dispersible soils: 1.98% (A Horizon) and 4.32% (B Horizon);

Special Conditions

Special conditions are those conditions contained in the harvesting plan for Compartment 355, Grange State Forest No. 771, prepared by State Forests of NSW, and received by the EPA on 27 November 1995 and as amended by addendum 1 received by the EPA on 21 December 1995.

Water quality monitoring site

Mebbin State Forest

Date of licence variation

28 December 1995."

2. Insert the following compartment description, corresponding water pollution hazard categories, special conditions, representative water quality monitoring site, and date of licence variation into Schedule 1:

"Compartment Description

Compartment 355 West
Grange State Forest No. 771

Water Pollution Hazard Categories

Water Pollution Hazard Category	Slope Ranges (degrees)
1	Less than or equal to 3.
2	Greater than 3 and less than or equal to 12.
3	Greater than 12 and less than or equal to 30
4	Not applicable.

Proportion of dispersible soils: 1.98% (A Horizon) and 4.32% (B Horizon);

Special Conditions

Special conditions are those conditions contained in the harvesting plan for Compartment 355 West, Grange State Forest No. 771, prepared by State Forests of NSW, and received by the EPA on 27 November 1995 and as amended by addendum 1 received by the EPA on 21 December 1995.

Water quality monitoring site

Mebbin State Forest

Date of licence variation

28 December 1995."

NEIL SHEPHERD
Director-General

Per.....
D.R LEECE
Director, Waters and Catchments
(by Authorisation)

FOR ACTION OR NOTING BY		
ORIGINATOR	SB	28/12/95
1. A/HWCP1P		
2. DWC		
3.		
4.		

SUBMM41-7868-KG

FACSIMILE TRANSMISSION

To	Dr. Neil Shepherd, Environment Protection Authority P O Box 1135 CHATSWOOD NSW 2057		
Attention	Mr Geoff Noonan Catchments Branch	**Date**	29 December 1995
Your Fax		**Our Fax**	(02) 980 7042
From	Kris Gounder Forest Planning Branch	**Phone**	(02) 980 4217 (015) 271 625
No of Pages	1 (including this cover page)		

STATE FORESTS

State Forests of New South Wales
Building 2
423 Pennant Hills Road
Pennant Hills NSW 2120
Phone (02) 980 4100

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

In terms of Clause 13(b) of the Pollution Control Regulations, State Forests of New South Wales hereby notifies you that no appeal will be made against EPA's decision to vary amendment to Licence No. 4017 on 29 December 1995 to include the following areas:

Compartment No.	State Forest	Management Area
355, 355 west	Grange	Grafton

A. HOWE
Manager
Forest Planning Branch

For State Forests Use Only (Page 1 of 5)

District Forester Grafton

As required under the above legislation we advised EPA about our intention not to appeal against this Licence amendment **on 29 December 1995**. Accordingly you may start logging these compartment **on 31 December 1995**.

Manager, Forest Planning Branch

RECEIVED
22 FEB 1996

STATE FORESTS
NORTHERN REGION

Grafton District

DO: 286
HO: ?
L Walsh:LW

Request for EPA approval for Harvesting Plan Amendment Cpt 355, Grange State Forest

The approved Harvesting Plan for this compartment makes use of an existing road constructed during a previous pole harvesting operation. A section of this road (approximately 90 m - see attached map) has a grade of 13°, and has proven too steep for loaded log trucks. Currently, loaded trucks are being winched up the hill by the skidder, resulting in significant productivity losses, strain on machinery and soil disturbance.

It is proposed to construct a side-cut below the existing road to reduce the grade of the road to a maximum of 9°. Maximum side-slope is 21°. No drainage features are to be crossed. Total length of the proposed side-cut is 220 m. The maximum height of the cut batter is 1.2-1.5 m, for a length of 70 m. The batter height along the remainder of the proposed cut is 0-0.9 m. The batters will be constructed to a stable 1:1 slope.

Construction of the proposed side-cut will be in accordance with the conditions of the Pollution Control Licence. The new section will have outfall drainage, and batters will be stabilised by spreading of grass seed immediately following construction.

The existing road section to be replaced will be bedded down by constructing cross-banks that disperse water onto undisturbed vegetation. The replacement of this section will reduce the risk of water pollution.

for R J Williams
District Forester
GRAFTON DISTRICT
20 February 1996

Manager
FOREST PLANNING BRANCH
ATTN: Kris Gounder

23-2-96

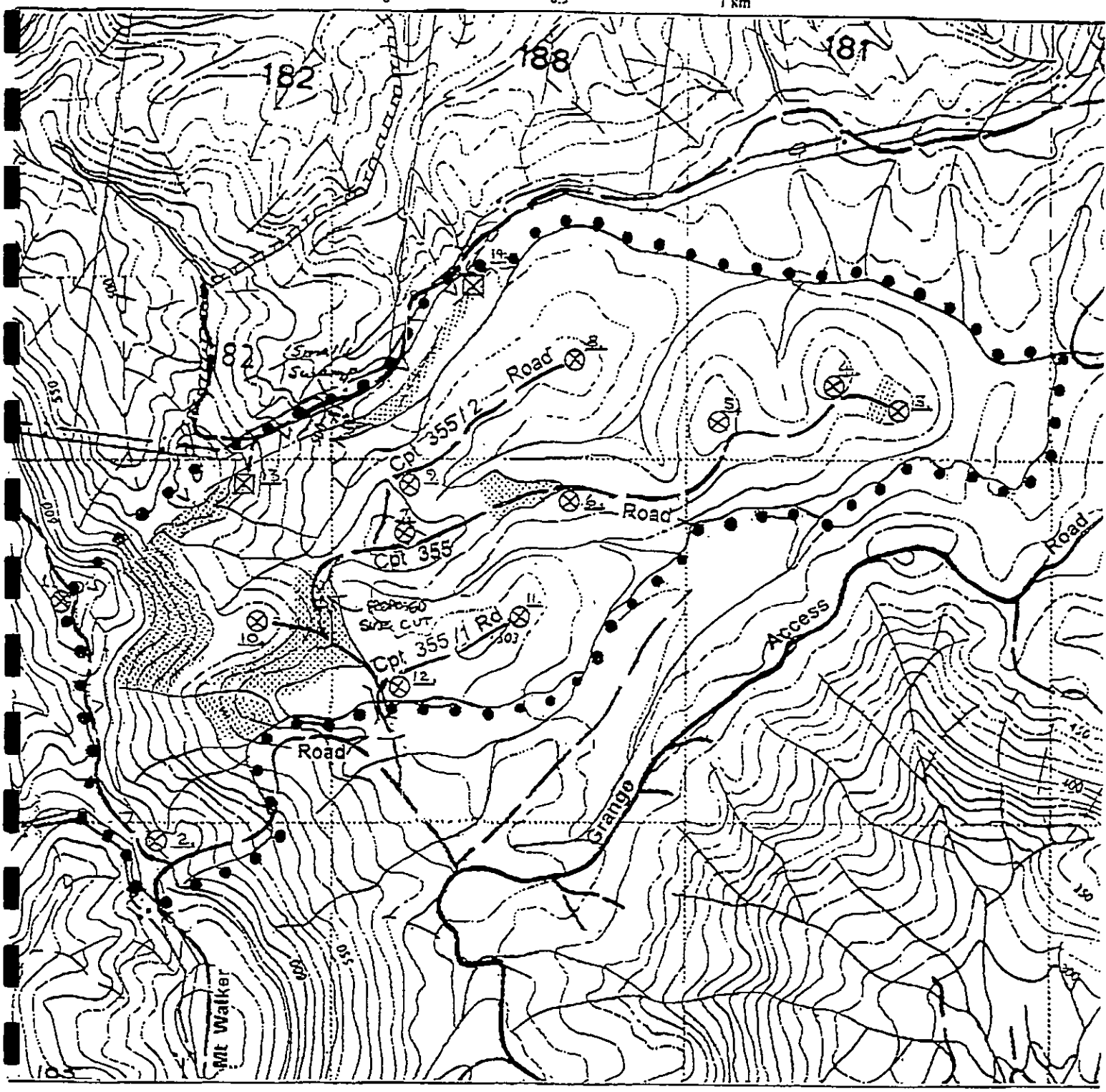
STATE FORESTS OF NSW

NORTHERN REGION - GRAFTON DISTRICT
HARVESTING PLAN - OPERATIONAL MAP

COMPARTMENT NUMBER ... 355.
GRANGE STATE FOREST

GN

SCALE 1 : 15000 CONTOUR INTERVAL 10 m
0 0.5 1 km



LEGEND

BOUNDARIES
State Forest .....
Compartment .....
ROADS.....
Minor Roads.....

HARVEST AREA
Normal Prescriptions .....
Down-hill snigging .....

NON HARVEST AREA
Visual Resource Protection

DUMP SITES
Dry Weather .....
Wet Weather .....

DRAINAGE FEATURES
Filter Strip .....

23.2.96

HARVEST PLAN DESK AUDIT CHECKLIST

Register No: 433 Date Received: 27 / 11 /1995

State Forest: GRANGE Compartment/~~Age Class~~: 355

District: GRAFTON State Forest No: 771

Region: NORTHERN Harvest/~~Thinning~~:

Forest Type: Native Forest/~~Native Plantation~~/~~Softwood Plantation~~* (delete)

WATER POLLUTION HAZARD CATEGORY

Factor	*Provided*		*Relevant*		*Comment*
	Yes	*No*	*Yes*	*No*	
R	✓		✓		R = 3000
K					K = 0.036 ; 0.053
S					as factored by SOILOSS 5.1
L					L = 20 M
C	✓		✓		C = 0.108

Soil Sampling personnel named and approved: J. Veness (Yes/~~No~~)

CALCULATION OF WATER POLLUTION HAZARD CATEGORIES

1.	Calculation provided	YES/NO
2.	Verified against SOILOSS	YES/NO
3.	Appropriate WPHC assigned	YES/NO
4.	Slopes associated with WPHC	YES/NO
5.	% Compartment per WPHC	YES/NO

Soil Unit 1: GRANITE

	% Cpt	Slope (°)	Catchment Size
WPHC 1	20	0 - ≤ 4	
WPHC 2	65	>4 - ≤ 18	
WPHC 3	5	>18 - ≤ 30	
WPHC 4			

Soil Unit 2: METASEDIMENT (if applicable)

	% Cpt	Slope (°)	Catchment Size
WPHC 1	1	0 - ≤3	
WPHC 2	3	>3 - ≤12	
WPHC 3	6	>12 - ≤30	
WPHC 4			

Soil Unit 3: _____ (if applicable)

	% Cpt	Slope (°)	Catchment Size
WPHC 1			
WPHC 2			
WPHC 3			
WPHC 4			

PROPORTION DISPERSIBLE SOIL

Soil Unit 1:

A Horizon % D: 15 x % C: 22 / 100 = 3·3
B Horizon % D: 71 x % C: 17 / 100 = 12·07 *

Soil Unit 2: (if applicable)

A Horizon % D: 22 x % C: 9 / 100 = 1·98
B Horizon % D: 48 x % C: 9 / 100 = 4·32

Soil Unit 3: (if applicable)

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

REPRESENTATIVE WATER MONITORING

Representative Water Monitoring Site: Middle Brother State Forest

Annual rainfall: 1200mm+ Geology: Granite

Forest Type: Blackbutt / Brush Box / Turpentine

HARVEST PLAN DESK AUDIT CHECKLIST

Condition	Condition	Comply	Comment
1 b	**Site Specific conditions** Attached site specific conditions to harvesting plan	N/A	
6	**Minimum protection widths for drainage line in native forests** Any prescribed streams, swamps and wetlands	Yes	
7	Any major water storages present	No	
9 (1 c)	Minimum protection widths Show filter strips on harvesting plan map	Yes	
9 (2)	Show protection strips on harvesting plan map	Yes	
10	Prescriptions for marking F, P, and B strips in the field	Yes	
20	**Operations within Native Forest Protection strips** Person responsible for identifying P strips in the field	Yes	
22	**Operations within Native Forest Buffer strips** Person responsible for identifying P strips in the field	Yes	
24	Specifications of techniques for minimising soil exposure and that any disturbance will cause no channelised flow in buffer strip	Yes	
25	**Minimum protection widths for drainage feature in native plantations** (as per 6 and 7)	N/A	
32	**Operations within Native Plantation Protection strips** (as per 20)	N/A	
33	**Operations within Native Plantation Buffer strips** (as per 22 and 24)	N/A	

Condition	Condition	Comply	Comment
34	**Minimum protection widths for drainage feature in Softwoods Plantations** (as per 6 and 7)	N/A	
40	**Operations within Softwood Plantation Filter Strips** Person responsible for determining 5 metre machinery zone	N/A	
46	**Operations within Softwood Plantation Buffer Strips** (as per 22 and 24)	N/A	
47	**Road design, construction and maintenance** Specify techniques for the road design, construction and maintenance	Yes	
48	Proposed road locations are shown on harvesting plan map	Yes	
49	Maximum slopes for road construction Specify techniques for road stabilisation within 6 months of construction for roads built on slopes > 30 °	N/A	
53	**Road Clearing** Specify techniques for clearing areas adjacent to roads with minimal disturbance to groundcover and topsoil and with 70% groundcover attained with 12 months	N/A	
57	**Borrow Pits and Gravel Pits** Specify techniques for 1. construction of stable batters 2. stabilisation at the completion of operations	N/A	

Condition	Condition	Comply	Comment
60	**Road Batters** Specify road batter stabilisation techniques	Yes	Seeding if subsoil exposed.
63	**Road Drainage** Specify road drainage structures to be used and techniques for: 1. conveying peak flow in 1:5 year event 2. diverting water onto stable surfaces 3. minimising unchecked flow of water from table drains directly to watercourses and drainage lines, snig tracks and log dumps 4. discharging onto surface or structure which provide efficient sediment trapping	Yes	
71	**Crossing of drainage features** Specify location and type of crossings at drainage features		type specified; location general.
78	**Road no longer required** Specify techniques to be used to stabilise roads that are no longer used	N/A	
81	**Dispersible Soil** Specify techniques used to protect roads and dispose of spoil that is dispersible	Yes	
89	Snig Track Construction Specify criteria for ensuring that snig tracks are located and constructed where they can be drained effectively	Yes	

Condition	Condition	Comply	Comment
99	**Snig Track Drainage** Specify techniques to: 1. conveying peak flow in 1:2 year storm event 2. diverting water onto stable surfaces 3. minimising unchecked flow directly into watercourses and drainage lines, snig tracks and log dumps 4. divert water at a velocity which minimises damage to the structure	Yes	
109	**Downhill snigging** Specify measures to prevent concentrated water flow where downhill snigging occurs	Yes	
112	**Snig Tracks and Dispersible Soil** Specify measures to protect dispersible soils	Yes	
115	**Log Dumps** Specify location of log dumps on harvesting plan map	Yes	
119	**Specify techniques for:** 1. drainage of log dumps during and at completion of operation 2. Log dumps being left in a stable condition at the completion of operations	Yes	

Condition	Condition	Comply	Comment
125	**Burning** Specify key and strategic and operational details of burning: 1. Objective of burn 2. Method of ignition 3. Preferred season of burn	Yes	

Additional Harvesting Plan Requirements

1. Appropriate Variation Conditions (Condition 3 of the Harvesting Plan) Yes/~~No~~
2. Appropriate SFO Authority Conditions (Condition 5 of the Harvesting Plan) Yes/~~No~~
3. Canopy Gapping Conditions Yes/~~No~~

****
********** User's Name **********
****

SOIL LOSS ESTIMATION

The computer program, SOILOSS, uses the procedures of the Universal Soil Loss Equation (USLE) to predict the average annual soil loss due to sheet and rill erosion. It is based on extensive research in the United States and by the Soil Conservation Service in New South Wales.

The following report was prepared by SOILOSS:

==========

Estimation prepared for : GRANGE 355
Date : 27-11-1995 Time : 15:56 Report Number : 1

A = R x K x L x S x P x C

Rainfall Erosivity:	Rainfall Zone: 1	R = 3000
Soil Erodibility : User supplied		K = 0.036
Topography	:Slope: 4.0ø Slope Length: 20 m	LxS = 0.747
Support Practice	: No cultivation (P = 1)	P = 1.000
Management	:	
Rotation :		
Cultivations :		
Stubble Mgmt :	- User Supplied	C = 0.1080

Long-term average annual soil loss: **A = 8.7 t/ha**

==========

Estimation prepared for : GRANGE 355
Date : 27-11-1995 Time : 15:56 Report Number : 2

A = R x K x L x S x P x C

Rainfall Erosivity:	Rainfall Zone: 1	R = 3000
Soil Erodibility : User supplied		K = 0.036
Topography	:Slope: 18.0ø Slope Length: 20 m	LxS = 4.242
Support Practice	: No cultivation (P = 1)	P = 1.000
Management	:	
Rotation :		
Cultivations :		
Stubble Mgmt :	- User Supplied	C = 0.1080

Long-term average annual soil loss: **A = 49 t/ha**

Estimation prepared for : GRANGE 355
Date : 27-11-1995 Time : 15:56 Report Number : 3

A = R x K x L x S x P x C

Rainfall Erosivity:	Rainfall Zone: 1	R = 3000
Soil Erodibility : User supplied		K = 0.036
Topography	:Slope: 30.0ø Slope Length: 20 m	LxS = 6.639
Support Practice : No cultivation (P = 1)		P = 1.000
Management :		
Rotation :		
Cultivations :		
Stubble Mgmt :	- User Supplied	C = 0.1080

Long-term average annual soil loss: **A = 77 t/ha**

Estimation prepared for : GRANGE 355
Date : 27-11-1995 Time : 15:57 Report Number : 4

A = R x K x L x S x P x C

Rainfall Erosivity:	Rainfall Zone: 1	R = 3000
Soil Erodibility : User supplied		K = 0.053
Topography	:Slope: 3.0ø Slope Length: 20 m	LxS = 0.571
Support Practice : No cultivation (P = 1)		P = 1.000
Management :		
Rotation :		
Cultivations :		
Stubble Mgmt :	- User Supplied	C = 0.1080

Long-term average annual soil loss: **A = 9.8 t/ha**

Estimation prepared for : GRANGE 355
Date : 27-11-1995 Time : 15:58 Report Number : 5

A = R x K x L x S x P x C

Rainfall Erosivity:	Rainfall Zone: 1	R = 3000
Soil Erodibility : User supplied		K = 0.053
Topography	:Slope: 12.0ø Slope Length: 20 m	LxS = 2.772
Support Practice : No cultivation (P = 1)		P = 1.000
Management :		
Rotation :		
Cultivations :		

Stubble Mgmt : - User Supplied C = 0.1080

Long-term average annual soil loss: **A = 48 t/ha**

==========

Estimation prepared for : GRANGE 355
Date : 27-11-1995 Time : 15:58 Report Number : 6

A = R x K x L x S x P x C

Rainfall Erosivity: Rainfall Zone: 1 R = 3000
Soil Erodibility : User supplied K = 0.053
Topography :Slope: 30.0ø Slope Length: 20 m LxS = 6.639
Support Practice : No cultivation (P = 1) P = 1.000
Management :
Rotation :
Cultivations :
Stubble Mgmt : - User Supplied C = 0.1080

Long-term average annual soil loss: **A = 114 t/ha**

Request for Additional Information on Harvesting Plan for Grange State Forest, Compartment 355

8 December 1995

The EPA acknowledges the effort that has gone into producing this harvest plan. A number of points, however, require clarification.

The points requiring clarification are as follows:

- The EPA acknowledges that an amendment to the Harvesting Plan regarding the moratorium on canopy gapping has been submitted with Harvesting Plan. The EPA, however, requests that State Forests remove all references and operational conditions for the creation of canopy gaps from the harvesting plan.

- Description 9 (page 6) under the section on "*Protection of Flora*" - in accordance with condition 6 of the Pollution Control Licence the small swamp on the northern boundary of compartment 355 must be protected by a filter strip, not a buffer strip. The EPA requests that State Forests omits the sentence that reads: "*However, where the swamp extends beyond the Visual Resource Strip it **shall** be protected by a 10 metre wide buffer strip*" and insert in its place: "*However, where the swamp extends beyond the Visual Resource Strip it **must** be protected by a 10 metre wide **filter** strip*"

- Condition 4.5 (c) (page 23) under the section on "*Flora Protection*" - in accordance with condition 6 of the Pollution Control Licence the EPA requests that State Forest omits the sentence that reads: "*The small swamp near the western part of the northern boundary of the compartment **shall** be protected with a 10 metre wide no activity buffer strip*" and insert in its place: "*The small swamp near the western part of the northern boundary of the compartment **must** be protected with a 10 metre wide **filter** strip*".

- Condition 4.7 (g) (page 30) under the section on "*Soil Erosion and Water Pollution Control Conditions*" - the EPA requests that State Forests omits the sentence that reads: "*Filter strips **shall** be retained along all watercourses and drainage lines within the net harvesting area of Compartment 355 at minimum widths as stated in Table 5 below.*" and insert in its place: "*Filter strips **must** be retained along all watercourses and drainage lines within the net harvesting area of Compartment 355 at minimum widths as stated in Table 5 below.*"

- Condition 4.7 (g) (page 30) under the section on "*Drainage Feature Protection*" - the EPA requests that the catchment area cited in Table 5 be consistent with Table 1 of the 1995/96 Pollution Control Licence.

- Condition 4.7 (i) (page 31) under the section *on "Felling & extraction filter and protection strips"* - the EPA requires that all pollution control licence conditions cited in the harvesting plan be quoted verbatim.

- The EPA requests that the harvesting plan provides details on what prescriptions are to be used to notify the contractor that the operation is moving onto a different soil unit, and thus a potential change in water pollution hazard class.

- Condition 4.7 (m) (page 33) under the section on *"Snig Track Drainage Line Crossings"* - the EPA requests that State Forests omits the sentence that reads: *"All snig track drainage line crossings **shall** be approved by the SFO* and insert in its place: *"All snig track drainage line crossings **must** be approved by the SFO..."*.

- Condition 4.7 (o) (page 33) under the section on *"Log Dumps"* - the EPA requests confirmation from State Forests, that this operation will strip, stockpile and replace topsoil from all log dumps on the granite soils, considering the nature of the dispersible subsoil. If so the EPA requests that State Forest provide additional operational conditions to protection this dispersible subsoil during operations.

- Condition 5.2 (b) (page 37) under the section on *"Marking Filter Strips and Protection Strips"* - the EPA requests that State Forests omits the sentence that reads: *"Filter strips, protection strips and drainage line buffer strips **shall** be retained..."* and insert in its place: *"Filter strips, protection strips and drainage line buffer strips **must** be retained..."*.

The EPA requires that State Forests provide responses to this request for additional information in the form of amended harvesting plan pages which can be inserted into the original plan.

File: REJECT10.DOC
location: N:\STEVEB\REJECT\

EPA

Environment Protection Authority
New South Wales

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

Telephone .02. 795 5000
Facsimile .02. 795 5002

Mr A J Howe
Manager - Forest Planning Branch
State Forests of NSW
Locked Bag 23
Pennant Hills NSW 2120

Our Reference: 600000D1

Your Reference: FPB 70846

8 December 1995

Dear Mr Howe,

I refer to State Forests' application received by the EPA on 27 November 1995 to vary the Pollution Control Licence for the Northern Region. The EPA has considered the harvesting plans listed below and rejects the application.

Compartment No.	State Forest	District
[illegible]	Granger	Grafton
655 (West)	Granger	Grafton

The above compartments requires the submission of additional information before the Pollution Control Licence can be varied to include them. Details of the additional information required are attached.

Yours sincerely

GEOFF NOONAN
Manager, Waters and Catchments Policy

FOR ACTION OR NOTING BY		
ORIGINATOR	SB	8/12/95
1. A/MWCPIP		
2. MWCP		8/12/95
3.		
4.		

Previous Register # 433

Grafton District

RECEIVED 21/12/95

STATE FORESTS NORTHERN REGION

To	Forest Regulations Coordinator Forest Planning and Environment Branch, Head Office
From	Leonie Walsh
Date	December 12, 1995
Subject	Amended Harvesting Plan map - cpt 355, Grange SF
File No	286

As mentioned in my fax of 11/12, please find attached an amended harvesting plan map for cpt 355, Grange SF. This is to address point 7 on the EPAs list, relating to notification to the contractor that the operation is moving on to a different soil unit.

for R J Williams
District Forester
GRAFTON DISTRICT

CC:

NORTHERN REGION - GRAFTON DISTRICT
HARVESTING PLAN - OPERATIONAL MAP

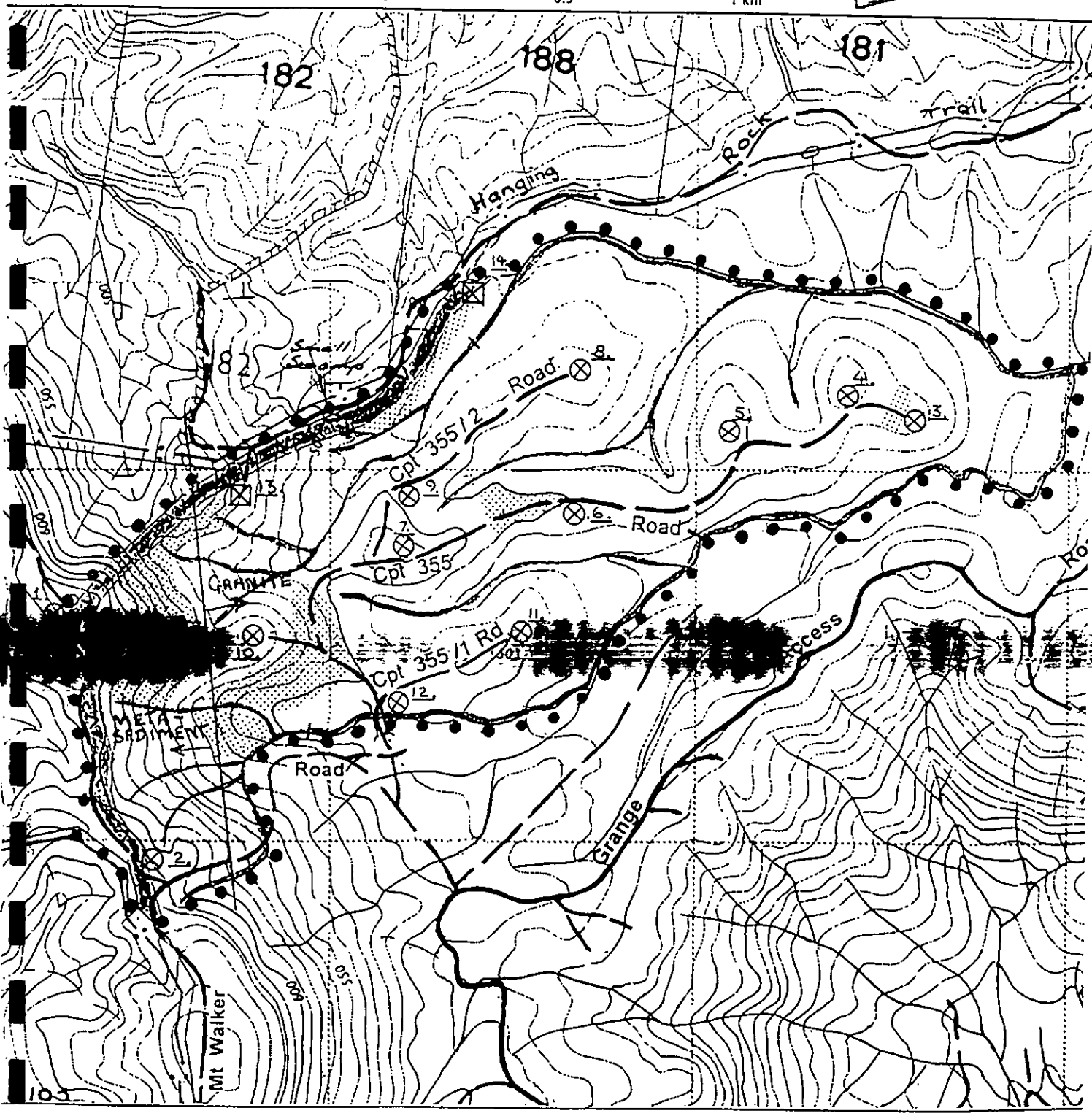
COMPARTMENT NUMBER ... 355
GRANGE STATE FOREST

STATE FOREST

GN

SCALE 1 : 15000 CONTOUR INTERVAL 10 m

0 0.5 1 km



LEGEND

BOUNDARIES

State Forest.....

Compartment .....

Soil Unit

ROADS.....

Minor Roads.....

HARVEST AREA

Normal Prescriptions .....

Down-hill snigging .....

NON HARVEST AREA

Visual Resource Protection
P.M.P.1.1.6.(Modified Harvesting).

Riparian Zone .....

DUMP SITES

Dry Weather .....

Wet Weather .....

DRAINAGE FEATURES

Filter Strip .....

Protection Strip.....

Open Crossing .....

FACSIMILE TRANSMISSION

To	Forest Regulations Coordinator		
Attention	KRIS GOUNDER	Date	11/12/95
Your Ref		Our Ref	(066)432131
From	Leonie Walsh	Phone	(066)432022
No of Pages	23 (including this cover page)		286

STATE FORESTS
NORTHERN REGION

State Forests of
New South Wales
Grafton District
PO Box 386
Grafton NSW 2460
Phone (066) 432 022

Message

EPA Request for further information -
Cpt 355 and 355West, Grange SF

Following are amended pages for these plans. They address all the EPA's requests except the following:

- *Condition 4.7 (i) Felling and extraction [illegible] and protection strips*
  The EPA have requested for both plans that the GL conditions must be quoted verbatim. My understanding was that this is required where the plan refers directly to the Licence, which it does not do in this case. Five plans from this district have already been approved with the same wording as these drafts. I would also ask why it is necessary for this part and not others. I would prefer to leave the wording as is to ease understanding and facilitate compliance. I do not believe the current wording is inconsistent with the Licence. Is there room for negotiation on this point?

- *Point 7 Cpt 355*
  The operational map will be amended to show the boundary between the soil types. I will send you a copy of the amended map tomorrow.

- *Point 2 Cpt 355West*
  I think this statement was made by the Harvesting Plan contractor. Veness and Associates undertook a survey of this compartment, in addition to the EIS soils survey, and did not refer to this "intrusion". I would prefer to rely on Veness' report and take this reference out of the plan altogether. Will the EPA accept this?

- ***Condition 4.7 (g) Table 5 (both plans)***

  I have inserted a comment specifying that the widths given in Table 5 meet or exceed the requirements of the PCL. I am advised by Urunga District that they had a plan approved recently with similar wording.

As I mentioned, I will be out of the office tomorrow, but will try and get back early to give you a call. Thanks for your help.

for R J Williams
District Forester
GRAFTON DISTRICT

Clusters of 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 co-ordinated with other fire control agencies through the Nymboida District Fire Plan.

In Compartment 355 bark and logging debris will be progressively spread through the logged area and/or accumulated in small heaps on the dumps 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**.

2C - FLORA PROTECTION

Description 7 - Presence of Protected or Endangered Plant Species

No species listed Rare or Threatened have been detected in this compartment and none are expected to occur.

References 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

Very small patches of Myrtle rainforest (not mappable at 1:25,000) are scattered along Chips Creek in the eastern section of the compartment.

Description 9 Protection of Flora

The very small patches of rainforest scattered along Chips Creek would mostly be within the Riparian Habitat Zone and be protected by that zone. However, where these patches extend beyond the Riparian Habitat Zone they shall be protected by a 10 metre wide buffer strip. The rainforest patches can be recognised by the presence of Kurrajong, Corkwood and Bangalow Palms.

The small Melaleuca swamp on the northern boundary would partly be within the Visual Resource Strip and be protected by that strip. However, where the swamp extends beyond the Visual Resource Strip it must be protected by a 10 metre wide filter strip.

2.4 FAUNA PROTECTION

Description 10 Endangered and Protected Fauna Occurrence

(a) General

Glossy Black Cockatoos and Powerful Owls are the only Schedule 12 species that have been detected in Compartment 355. Schedule 12 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-tail 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

Compartment 355 includes Dry Hardwood forest and Moist Hardwood forest with xeromorphic understory and Moist Hardwood forest with mesic understory. 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) 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.

(d) Refugia Areas

No areas of critical habitat for Schedule 12 species have been located in the net harvest area and no refugia areas have been set aside. Casuarina trees suitable for Glossy Black Cockatoos exist through the compartment and the Cockatoos have been seen feeding in the compartment. Forest management activities will promote the growth of Casuarina.

(d) Harvesting Debris

Debris from the selective harvesting shall be removed from within approximately 5 metres of the butts of retained habitat trees in forests with a xeromorphic understory and forests with a mesic understory if a ground burn would be carried, 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 shall be returned to the logging area and dispersed as far as is practicable around the net harvest area or stacked in small heaps on log dumps.

(e) Directional Felling

Directional felling techniques are to be employed to minimise damage to retained trees, to avoid hang ups and to maintain values of Riparian Habitat Zones, the very small scattered patches of rainforest, filter strips, protection strips and buffer strips.

4.5 Flora Protection

(a) Rare or Endangered Species

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

(b) Rainforest Protection

The very small scattered patches of rainforest in the eastern section of the compartment shall be inspected ahead of logging. Seemingly, they are all located in the Riparian Habitat Zone along Chips Creek. Any that might extend outside the Zone shall be protected with a 10 metre wide no activity buffer strip.

(c) Melaleuca Swamp

The small swamp near the western part of the northern boundary of the compartment must be protected with a 10 metre wide filter strip.

4.6 Fauna Protection

(a) Sightings of Fauna

Glossy Black Cockatoos and Powerful Owls are the only Schedule 12 species that have been detected in Compartment 355. Schedule 12 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-tail 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 Schedule 12 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.

(h) Tree Marking Rules for Filter Strips, Protection Strips and Buffer Strips

The SFO shall mark the Visual Resource Strip, the Swamp area, Riparian Habitat Zones, small rainforest areas where required and filter strips in the compartment progressively ahead of harvesting operations. The licensee or contractor shall be responsible for measuring off-sets to a protection strip from a filter strip as indicated by the SFO to determine the boundary of the protection strip adjacent to the filter strip. (See also 4.2, 5.2)

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

(I) Felling and Extraction from Filter Strips and Protection 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 hand brushing 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.

OPERATIONS WITHIN NATIVE FOREST PROTECTION STRIPS

Trees located in protection strips may be felled, but only if they can be directed out of the strip.

Where trees are felled out of protection strips in accordance with the previous condition above, State Forests must ensure that:

(a) a minimum of 50 per cent canopy cover is retained within the protection strip; and

(b) the retained canopy is evenly spread throughout the strip. Gaps and clusters of trees must not be created within the protection strip; and

(c) the tree is extracted from the strip in the direction of the line of the log;

(d) any furrows resulting from log removal are diverted at the edge of the protection strip, so that concentrated water flow is diverted onto undisturbed areas.

Crowns of trees may be felled into protection strips

Where crowns of trees are felled into protection strips in accordance with the previous condition above, State Forests must ensure that;

(a) logs are extracted from the protection strip in the direction of the line of the log; and

(b) any furrows resulting from tree removal are diverted at the edge of the protection strip, so that concentrated flow is diverted onto an undisturbed area.

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

(j) Extraction from Drainage Depression Buffer Strips

Soil disturbance in drainage depression buffer strips must be minimised by use of the following techniques:

- no snigging along drainage depressions.
- minimal use of blade.
- logs shall be approached in reverse gear.
- minimal change in direction while snigging logs out of drainage depressions.

(k) Snig Tracks

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

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 licensee/contractor 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 temporally suspended in accordance with Tables 6a or 6b.

- Tracks approaching log dumps must be located so as to direct water away from the dump immediately before reaching the dump.

(M) Snig Track Drainage Line Crossings

The drainage lines in the compartment only flow intermittently and were dry at the time of recent inspections. All snig track drainage line crossings must be approved by the SFO before construction and shall be open causeways utilising the natural surface at the site. There should be little need to cross drainage lines, and little need to modify the channel or banks of the drainage lines that are crossed. Crossings must be rehabilitated after use, all loose material 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 at the rate of 20 Kg/ha.

(n) Dispersible Soils

It is not anticipated that snigging will expose significantly dispersible Granite sub-soil. To minimise the possibility walkover extraction techniques will be utilised wherever practicable. If small lengths of sub-soil are exposed, top soil from the track construction must be spread over the track surface at the site, and at the completion of the use of the track, cut batters must be seeded with rye grass at the rate of 20 Kg/ha.

(o) Log Dumps

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

Before use, only about 10 cm of topsoil must be stripped and stockpiled for subsequent respreading at the completion of operations. As the topsoil layers are up to about 70 cm in deep, this is note expected to expose any of the dispersable subsoil. If any accidental exposure of the subsoil occurs topsoil must be immediately respread over the disturbed area.

Dumps must be constructed with outfall drainage.

At the completion of operations any debris at or near the edge of the dump must be moved away from standing vegetation into the dump area. The topsoil must be spread uniformly over the dump area which shall be left in a neat stable condition.

(p) Prescribed Burning

Pre-logging burning

The will be no pre-logging burning associated with the harvesting of Compartment 355.

Post-logging burning

Post-logging burning of Compartment 355 will 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 compartment 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.

(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. [COLP 7.2, PCL Sch 4 C 93]

4.6 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. Accordingly, the Australian Group Selection system (Jacobs, 1955) will be implemented.

(c) Tree Marking

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.

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

(b) Habitat Trees

Compartment 355 includes Dry Hardwood forest and Moist Hardwood forest with xeromorphic understory and Moist Hardwood forest with mesic understory. 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 understory shall be four trees per hectare. For the purpose of this prescription a xeromorphic understory 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 understory shall be six trees per hectare. For the purpose of this prescription a mesic understory 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 compartment 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. In forests with a xeromorphic understorey tree heads shall be removed from within approximately 5 metres of identified habitat trees. Tree heads shall be removed with minimum disturbance to understory vegetation and on-ground logs. In forests with a mesic understorey logging slash within a radius of 10 metres of identified habitat trees is not to be spot burnt. Alternatively, if a ground burn can be carried in this forest type then burn conditions shall follow those agreed upon for xeromorphic understorey.

Revegetation and rehabilitation

Revegetation of the minor roads following harvesting will be through natural regeneration. All crossbank rollover drains shall be left in working condition and crossfall (outfall) drainage reinstated.

Dispersible soils

It is not anticipated that the Granite sub-soil will be exposed on the roads during the harvesting. If small sections of the sub-soil are exposed, top soil from the road or imported gravel shall be spread over the road surface at the site and the cut and fill batters shall be seeded with rye grass at the rate of 20 Kg/ha.

(f) Slope Limits for the Area

Maximum slope for harvesting	30 degrees
Maximum slope for snig track construction	30 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

(g) Drainage Feature Protection

Riparian Habitat Zones exist 20 metres either side of watercourses, drainage lines and drainage depressions with catchments greater than 40 hectares. These zones have the same harvesting exclusion specifications as wildlife corridors.

Filter strips and protection strips must be retained along all watercourses and drainage lines within the net harvest area of Compartment 355 at minimum widths as stated in Table 5 below. These minimum widths meet or exceed the requirements of the Pollution Control Licence.

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

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

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

- Tracks approaching log dumps shall be located so as to direct water away from the dump immediately before reaching the dump.

(M) Snig Track Drainage Line Crossings

The drainage lines in the compartment only flow intermittently and were dry at the time of recent inspections. All snig track drainage line crossings must be approved by the SFO before construction and shall be open causeways utilising the natural surface at the site. There should be little need to cross drainage lines, and little need to modify the channel or banks of the drainage lines that are crossed. Crossings must be rehabilitated after use, all loose material shall be removed from the channel, as far as practicable the crossing point shall be reshaped to its original condition and seeded with rye grass at the rate of 20 Kg/ha.

(n) Dispersible Soils

It is not anticipated that snigging will expose significantly dispersible Granite sub-soil. To minimise the possibility walkover extraction techniques will be utilised wherever practicable. If small lengths of sub-soil are exposed, top soil from the track construction shall be spread over the track surface at the site, and at the completion of the use of the track, cut batters shall be seeded with rye grass at the rate of 20 Kg/ha.

(o) Log Dumps

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

Before use, only about 10 cm of topsoil shall be stripped and stockpiled for subsequent respreading at the completion of operations. As the topsoil layers are up to about 70 cm in deep, this is note expected to expose any of the dispersable subsoil. If any accidental exposure of the subsoil occurs, topsoil must be immediately respread over the disturbed area.

Dumps shall be constructed with outfall drainage.

At the completion of operations any debris at or near the edge of the dump shall be moved away from standing vegetation into the dump area. The topsoil shall be spread uniformly over the dump area which shall be left in a neat stable condition.

(p) Prescribed Burning

Pre-logging burning

The will be no pre-logging burning associated with the harvesting of Compartment 355.

Post-logging burning

Post-logging burning of Compartment 355 will 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 compartment 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.

Part 5 CONDITIONS FOR SUPERVISING FOREST OFFICERS (SFOs)

Condition 5.1 SFO Authority to Supervise Harvesting Operation

(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 will be:

The appointed Hardwood Marketing Foreman, Grafton District.

(b) Relieving SFOs

Relieving SFOs , if required will be:

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 drainage line crossing for snig tracks - for this plan area all crossings will be open causeways.

All approvals shall be noted on the harvesting plan.

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 shall be marked for extraction. (Also see Part 4.2)

Habitat trees and habitat recruitment trees for fauna protection

Habitat trees and habitat recruitment trees will 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 Visual Resource Strip, the small Melaleuca Swamp, any small Rainforest areas and Riparian Habitat Zones shall be marked ahead of harvesting operations.

(b) Soil Erosion and Water Pollution Control

Marking of filter strips and protection strips

Riparian Habitat Zone prescriptions are equivalent to or greater than filter/protection strips and drainage line buffer strip requirements. There is no need for filter/protection strips and drainage line buffer strips where they would be embedded in riparian habitat zones. Hence, filter/protection strips shall only be marked in the field where they are not embedded in riperian habitat zones.

Filter strips, protection strips and drainage line buffer strips must be retained along all drainage features at the minimum widths as specified in Table 6 in Part 4.7 (g).

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.

The SFO is responsible for ensuring that the licensee or contractor is correctly measuring off-sets to a protection strip (See also Part 4.7 (h)).

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 (h)).

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 shall be followed.

(b) Fauna Reporting and Mitigation Prescriptions

Reports of sightings of any Schedule 12 fauna as required in Part 4.6 (a) must be made to the District Marketing Forester within 24 hours of the sighting being made. 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 situ
- any instances where effective cross bank drainage of a snig track is not effected within two days of completion of sniggling from the area served by the track.