



PRIVATE FORESTRY SOUTHERN QUEENSLAND

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Timber Plantation Establishment Proposal

Prepared for
March 2010

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This proposal will outline:

1. Project objectives
2. Investigations to date
3. Constraints and risks
4. Plantation establishment process
5. Pre-plantation works
 - Vegetation management
 - Erosion mitigation
 - Infrastructure
6. Plantation establishment works
 - Plantation Design
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7. Costings
 - Pre-plantation costs
 - Plantation and revegetation costs



1. Project Objectives

As discussed with the landholders during the initial consultation, the objective of this plantation establishment is to:

- (a) create a long-term, financially viable timber resource;
- (b) employ best management practices for plantation establishment and maintenance leading to early site capture and successful forest development;
- (c) protect and enhance the remnant vegetation and landforms whilst increasing amenity and environmental capacity of the property;
- (d) increase the capital value of the property with a productive and sustainable land-use;
- (e) integrate lifestyle requirements of landholders;
- (f) maintain avenues for diverse income streams in timber and in developing markets for carbon sequestration and environmental services; and
- (g) have PFSQ carry out initial plantation establishment and intensive maintenance works over the first year and then to progressively transfer maintenance responsibility over to the landholder.

These objectives will be achieved by:

- Removing and disposing of weed infestations and dead wattles;
- Controlling soil erosion and slip forces over plantation areas;
- Establishing a commercially viable hardwood (eucalypt) plantation over specified areas;
- Mitigating risks to successful plantation establishment; and
- Creating appropriate plantation access and fire breaks with drained tracks.

2. Investigations to Date

Whilst investigating various options to best manage this project the following property visits have been carried out:

- Initial site visit and consultation with landholder (Gary Clarke and Sean Ryan) on 8th January 2010.
- Follow-up survey and measure plantation area (Dave Menzies – GIS Officer and Gary Clarke), delineate plantation types, assess physical soil properties, assess frost and fire risks, establish pre-plantation costs, delineate proposed treatment areas and develop weed management strategy.

The following enquiries have been made:

- Availability of planting stock
- Availability of plant hire contractors

3. Constraints and Risks

After initial visits some constraints and risks have been identified that, if realised, will affect the successful establishment of long term forestry on this property.

The major constraints are identified as:

1. Low frost risk to young trees (zero to two years old) across majority of plantation area.
2. Grazing/browsing/damage risk to young trees from hare, wallaby, kangaroo and rogue cattle.
3. Lower slopes have indications of poorer soil nutrient status and minor fire risk.
4. Past clearing and grazing have resulted in compaction of topsoil and hard sub-soils. Acceptable tree growth in these conditions will require sub-soil ripping. Pictures below show single-tree site preparation with a winged ripper and discs mounted on an excavator.
5. Risk of weed and grass competition to young trees. Timely slashing is important so as to provide maximum sunlight and maximum water/nutrient availability to the tree. Slashing should be timed to occur just before each spray maintenance. Note: If slashing operations are not carried out in a timely manner, the costs of spraying and pruning operations are compounded due to poor accessibility.



4. Property Reforestation Process

A. Consultation

Feasibility, direction, landscape management

B. Proposal

Site assessment, design, quote

C. Pre-plantation work

Broad acre slashing

Weed removal, treatment and disposal

Infrastructure rationalisation

Engineering, road and track work, drainage

Erosion mitigation

*Fee for
service*

D. Plantation Establishment – Contracted Works

Design

Mark-out

Pre-site preparation spray

Pre-site preparation slash (by owner)

Site preparation

Pre-plant spray

Plant supply

Plant and water-in

Mulch (on-site supply only)

Up to 10% replant if necessary

E. Plantation Maintenance

Post-plant slash (by owner)

Post-plant spraying

Form and access prune

Slash (by owner)

Spray

Form, access and lift prune

Slash (by owner)

Spray

*First year establishment
contract.*

*Services charged at a
hectare rate.*

*Four progressive payments
over 12 month period plus
deposit.*

Indicative requirements

F. Second year maintenance

Slash, spray, form and lift prune, slash,

spray, form and lift prune, slash, spray

*Charged at a
hectare rate.
Four progressive
payments over
12 months*

5. Pre-plantation Works

Objectives of pre-plantation works

- To create a clean paddock for commencement of plantation establishment
- To clear and treat weeds and dead black wattle infestations from areas to be reforested. The planting areas include mature native trees that will be retained.
- To dispose of weed material with minimal disturbance to grass cover, retained native trees and soil profiles.
- To provide for long-term property access to creek buffer zones and native forest areas for on-going maintenance activities.
- To mitigate soil erosion processes on existing infrastructure and gully zones (slip repair, eroding roads, scouring in gullies).
- Quantify final plantation areas and formalise design and costs.
- Construct small dam to owners specifications

Vegetation Management

It is recommended that weed removal in preparation for the reforestation development be carried out as a 'one pass' operation to gain efficiencies from plant hire costs, consultancy and labour.

After consulting plant hire contractors and investigating all available processes, the vegetation management process recommended is:

- (a) Cut (directional fall) woody weeds and dead trees with chainsaw at ground level and treat with glyphosate.
- (b) Rationalise boundaries between poor quality native forest and plantation areas to create accessible tracks and fire breaks.
- (c) Utilise excavator with stick rake to push material into heaps for disposal by burning (heap and burn operations will be carried out in conjunction with clearing to gain efficiencies, weather conditions permitting).
- (d) Spray individual weed infestations and competitive grasses with glyphosate.
- (e) Seeding of disturbed grass and surface soils immediately after clearing to ensure stability of soils. Carpet grass and Jap Millet would be used in summer. Rye grass would replace millet in winter.

NOTE: Chainsaw felling of vegetation will allow removal of vegetation with less disturbance of soils by retaining root balls. Stumps will be trimmed to ground level (for ease of slashing) and the excavator will be used to push material away from retained vegetation to a suitable position for burning disposal. A fire permit will be required so that burning can take place immediately. Permits are sourced from the local fire warden and coordinated by us as part of the overall service.

Slashing

Slashing is to be undertaken by the client as indicated in the Property Reforestation Process (above). To facilitate pre-plantation works, a broad-acre slash may be

required prior to chain sawing operations. This will aid visibility, operational access and plantation design if grass has gained significant height. On approval of this plan, we will endeavour to coordinate this slash with yourselves should it be required.

Erosion Mitigation

It is recommended that soil erosion processes in the gullies and existing roads be mitigated in conjunction with vegetation management operations. After consultation with earth moving contractors the following recommendations have been compiled.

Gully zones

Re-shape trench erosion and batter banks to allow effective establishment and management into the future. It is highly desirable, for safety and efficiency that all tree rows are trafficable and able to be slashed. Minor engineering will be carried out to facilitate slashing access wherever possible.

Dam construction and road repair

It is proposed that a small dam in the gully (indicated by Allen) be constructed as part of the pre-plantation works. It is envisaged that initial clearing and burning is done in conjunction with dam construction and road repair so as to make best use of excavator time.

Weed management

After the initial intensive clearing process (and at times when fire supervision is not necessary), the Quik Spray unit will be utilised to broadcast spray lantana infestations in the native forest areas with glyphosate.

Plantation areas

Quality, long-term roads and tracks are an important component of your forestry development. They provide access for maintenance, fire management and internal breaks between riparian areas and eucalypt plantation. When the trees are mature they provide access for harvesting operations.

Formal tracks on steep slopes are cut and fill and are constructed with an excavator and batter bucket. They require tractor-crossable batter banks, whoa-boy drainage humps and an appropriate grade to reduce the long-term risk of soil erosion.

Informal tracks on medium slopes are constructed with a small cut on the upper side to aid traction and whoa boy drainage humps where necessary.

Gently undulating slopes will not require formal or informal tracks, however it is recommended that whoa-boys are established at appropriate intervals to decrease the likelihood of rill erosion.

Three metre informal bay roads will be required at a maximum of 80 metre intervals in plantation areas for maintenance operations. Existing tracks/ridge roads will be used wherever possible.

6. Plantation Establishment Works

Please refer to the aerial photo and design overlay.

With appropriate site preparation and design, the majority of the area will be capable of supporting successful and viable timber production. Section four of this proposal outlines the processes involved in plantation establishment and maintenance.

Plantation Design

This plantation establishment plan is designed to gain as much productive land as possible, through efficient use of space and time, as well as providing protection for sensitive environmental assets such as creeks, dams and remnant vegetation by re-creating natural forest processes across your property.

Planting zones will be established under a standard commercial eucalypt plantation regime (please see below for a description of standard eucalypt plantation layout). Retained mature native trees will be incorporated into the design.

Under good growing conditions and appropriate management one would expect an intense maintenance period of three years for eucalypt plantation. After this period maintenance intensity drops off and cattle may be re-introduced to plantation areas for short, 'crash grazing' activities. Cattle should be permanently excluded from sensitive gully and creek areas.

This layout is designed to re-create natural forest processes across your property and maximise productivity in the varying regimes.



Crash-grazing a seven year old plantation (Eucalyptus cloeziana)

Plantation Layout

Standard Commercial Eucalypt Plantation Layout

Brief description of design and operational features of standard Eucalypt Plantation establishment:

1. Stocking: 1 000 trees per hectare
2. Row direction: parallel to major slopes with tractor/slashing access to the inter-row for maintenance purposes
3. Row length: maximum row length 80 meters
4. Row spacing: 4 metre centres across the slope with tree spacings at 2.5 metres down the row.
5. Top of ridge access tracks with contour tracks at appropriate intervals (50-80 m) across the slope delineating tracks to be maintained or established between plantation areas and riparian zones.
6. Site preparation: single tree, excavator based site preparation to be used to maximise forest development whilst minimising risk of surface and slip soil erosion.
7. Species selection shall be determined by their:
 - Suitability to soils and site
 - Performance in plantation silvicultural systems
 - Highest end-use value
 - High utilisation prospects in early thinning procedures

With these selection criteria considered it is recommended that the majority of the plantation area is planted in a eucalypt polyculture. Dominant species and indicative percentages are listed below:

- 50% *Eucalyptus pilularis* (Blackbutt)
- 25% *Eucalyptus cloeziana* (Gympie messmate)
- 10% *Corymbia citriodora* subsp. *variegata*
- 10% *Eucalyptus propinqua* (small-fruited grey gum)
- 5% *Eucalyptus siderophloia* (grey ironbark)

The plantation area will be delineated into three planting zones based on the soil conditions and exposure present. Generally the planting zones will consist of single dominant species that best suit the conditions, mixed with a small percentage of secondary species. The final delineation of planting zones will be decided after site preparation allows for a more detailed analysis of soil changes. Three broad zones have been identified, including the zone adjacent to Blackbutt stand dominated by Blackbutt; zone against western boundary dominated by Gympie messmate; and the zone along the creek (and up the Stringybark boundary) dominated by Grey Gum.

Planting

Planting is done with 'Aqua Spears' based on four wheel drives with Quik Spray Units. The Quik Spray pumps pressurised water through a hose to the Aqua Spear which is used to both dig and water the planting site at the same time. A consistent supply of water for planting is required throughout the planting phase and later for spray maintenance. The water source should be close to the plantation site and accessible by a venturi system (on the Quik Spray – 5 m hose) or with a fire fighter pump and hose (can be supplied by PFSQ for the planting stage).



Left: Quik Spray Unit – remote-control, retractable reels, 600 L tank and fire fighter pump. Right: Aqua Spear – planting with pressurised water.



Left: Dribble Bar – spraying knockdown herbicide in plantation intra-rows. Right: Lift pruner a two year old plantation.

7. Costings

Pre-plantation Costs

All costs associated with work carried out before plantation establishment are on a fee for service basis due to the variable nature of this work. We have provided an estimate of this work.

Consultancy, site assessment and proposal

Consultancy rate xx/hr
Travel \$0.xx/km

\$xxxxx due at presentation of plantation establishment proposal. This includes initial site visit and associated travel costs.

Vegetation Management Costs

These estimations have been compiled on the presumption that the whole plantation area should have all necessary vegetation modification carried out at one time. It is also presumed that the vegetation modification is shaped to allow the majority of the land to be managed in the long term with total forest cover.

As these weed trees each have different levels of work required to fall, treat and extract from plantation, gully and fence zones, it is difficult to accurately quantify time and expenditure. Variables that may influence the final cost of vegetation management include weather, availability of fire permits and the individual difficulty of each tree. The following figures are strictly 'ball park' estimations. In saying this, every care has been taken to bring estimations as close as possible to the final figure. Negotiations will take place with clients if the final estimated cost looks to significantly exceed expectations. All 'out of contract' (pre-plantation establishment) expenditure will be recorded on a daily basis and will be provided with invoice

An estimation of all erosion mitigation works, falling, heaping and burning all woody vegetation within the plantation area, re-stack/re-burn heaps, construct/maintain access tracks and whoa-boy within the designated mapped area and dam construction is as follows:

- Chainsaw felling, consultancy, excavator supervision and labour
- Excavator and Float
- Plant hire (Fire fighting unit)
- Burning and chainsaw materials
- Spray materials
- Accommodation and Travel

Estimated pre contract works TOTAL \$x xxxx + GST

Plantation Costs and Processes per Hectare

Plantation Area = 3.4 Ha

<u>Costs per hectare for plantation establishment and 12 month maintenance regime</u>	
Process	Cost per hectare
Deposit for planting stock purchase	\$xxxx
<u>Plantation Consultancy & Overheads</u>	
<u>Site design</u>	
<u>Mark out</u>	
<u>Pre-site preparation spray</u>	
<u>Site preparation - winged ripper mounted on excavator</u>	
Transport (float)	
Materials & Travel	
1st Progressive payment due (approx June/July)	\$xxxxx/ha
<u>Pre-plant spray</u>	
<u>Plant supply</u>	
Plant, water-in and mulch (on-site slash residue)	
Mulch supply (off-site extra if required)	extra
Mulch distribution and placement (extra if required)	extra
2nd Progressive Payment Due (approx October 2009)	\$xxxxx/ha
Post-plant spray	
10% re-plant	
Access and form prune	
Spray	
3rd Progressive Payment Due (approx Jan 2010)	\$xxxxx/ha
Access and form prune	
spray	
Lift and form prune	
spray	
4th Progressive Payment due (approx May 2010)	\$xxxxx/ha
Total Cost per hectare excluding GST	\$xxxxx

Summary of costs

Consultancy, site assessment and proposal including initial site visit (GSt inc) **\$x xxx**

Estimation Out of Contract (pre-plantation)
Vegetation management (GST inclusive) **\$ x xxx**

Plantation

Final Plantation Areas is measured by GPS after the plantation layout is complete with costing adjustments if necessary.

Estimated eucalypt plantation area = 3.4Ha

3.4 Ha x \$ xx xxx/Ha **\$xx xxx**

GST **\$xxxx**

Total 12 month contract plantation costs **\$xx xxx**

Slashing

Please note that failure to slash plantation consistently impedes access along plantation rows and considerably slows spray and pruning activities. We will coordinate our maintenance activities with you so that slashing can be done in advance of our arrival. If slashing is not done and grass is tall and heavy, our maintenance costs are increased and this difference will be passed on to the landholder. We understand that heavy rainfall may preclude timely slashing and allowances are made in this case. We also have slashing contractors available for hire if the landholder is unable to slash on time.

Treatment costs

Native Forest treatment costs have been estimated to be \$xxx per hectare plus travel and accommodation. This figure will be revised once plantation operations have begun as we may be able to carry out treatment work in conjunction with plantation operations so as to save on travel. You will also be eligible for the Re-veg.net thinning incentive (approximately \$xx per hectare). This may not be available until after the financial year. Please note that these figures are estimates and will be revised along the track. Three areas for treatment have been identified, each 1-3 hectares in size.