1. Key Details

Land

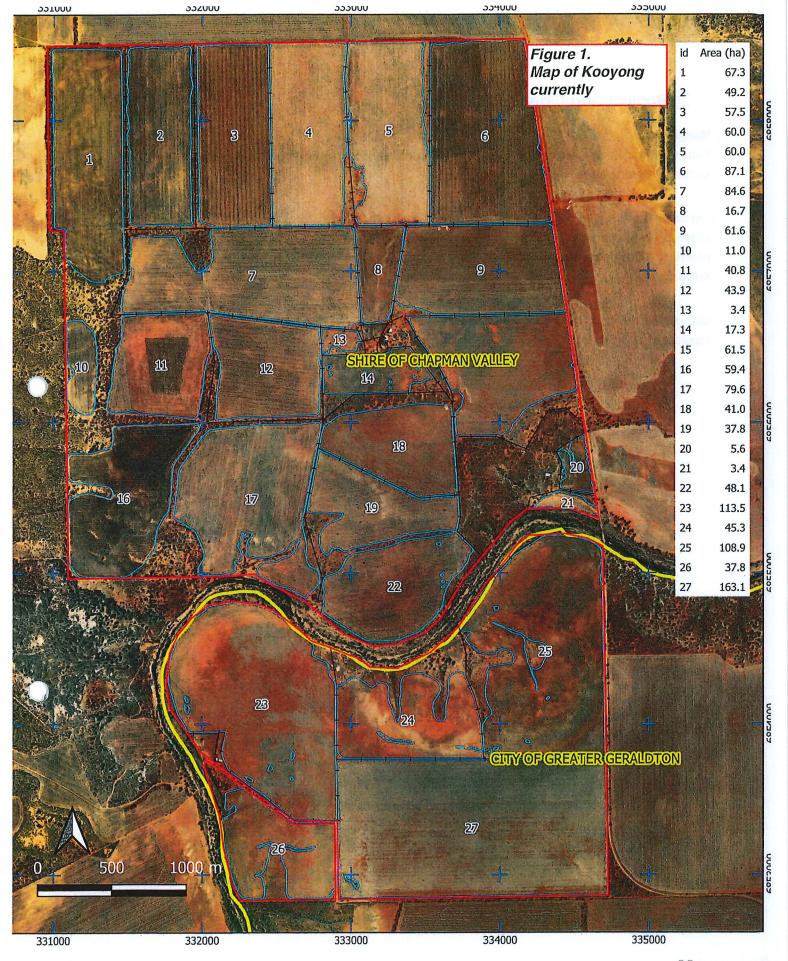
Kooyong farm

2543 Tenindewa North Rd, East Yuna, WA. Shire of Chapman Valley & City of Greater Geraldton

Table 1. Title details and area split of Koyoong between Shire of Chapman Valley and City of Greater Geraldton

	Area of Lot (ha)	Total Area in Shire (ha)	Total Area (ha)
Titles with Shire of Chapman Valley			
Lot 5894 on DP 226678	404.7		
Lot 5893 ON DP 226678	404.5		
Lot 5892 ON DP 226678	339.3		
Lot 8411 ON DP226678	64.7		
		1213.2	
Titles within City of Greater Geraldton		4)	
Lot 4473 ON DP138325	64.8		
Lot 4472 ON DP138324	64.8		
Lot 4724 ON DP138327	202.5		
Lot 4499 ON DP138326	121.5		
Lot 9745 ON DP161070	70.2		
		523.8	
			1737.0

A map of the property is shown in Figure 1.



Legend

- Property boundary (1,737.0 ha)
- Cleared agricultural area (1,465.4 ha)
- Buildings

Kooyong

Map of existing cleared areas

Map creation: 18 Feb 202: GDA94 MGA Z50 Dan Wild



2. Project and Objectives

Background

Carbon Neutral specialises in reforestation of biodiverse woodlands in the farming landscapes of the northern wheatbelt.

Carbon Neutral has been carrying out reforestation activities since 2009, continuing to improve and customise reforestation techniques with each season. In 2022, new revegetation activities aim to create meaningful corridors between areas of significant natural heritage and biodiversity value throughout the Kooyong property.

Carbon Neutral has purchased Kooyong and has worked with neighbours and consultants to develop an integrated plan for the property which aims to:

- Retain the majority of the best agricultural cropping land in a single efficient tract for lease (or future sale) to experienced cereal croppers with good land management experience and already operating nearby,
- Maintain a large portion of the medium-quality limestone-based soils for regenerative grazing amongst tree plantings with experienced farmers from the region,
- Create wide biodiverse corridors of natural vegetation communities through the property,
 - o Funded by sale of carbon credits,
 - o Buffering the Greenough River,
 - o Adjoining other remnant vegetation nearby,
 - Creating an unbroken corridor with nearby reserves along the River and on adjoining properties,
 - o Involving a number of vegetation communities,
 - o Mostly targeting lower-productivity agricultural soils without recent cropping history, i.e.
 - limestone rubble-based soils,
 - yellow sands,
 - heavier soil types adjoining the river without recent cropping history, and
 - inefficient small paddocks.

This document focusses on the management and implementation of the biodiverse plantings proposed for the property.

The management of the Kooyong property by Carbon Neutral has the following objectives:

Commercial Objective

To continue agricultural production on the better soils on the property, and to integrate new plantings of mixed-species woodland based on the original pre-European vegetation throughout the property, for the purposes of long-term carbon sequestration and permanent biodiversity restoration.

Natural Resource Management Objective

To establish a productive and ecologically sound agricultural landscape bordering the Greenough River. High quality farmland used for cereal cropping to be integrated with new woodland corridors linking remnant vegetation and the river. The revegetation will improve biodiversity values on the site and in the local area. It will provide habitat for flora and fauna, sequester and store carbon dioxide from the atmosphere, increase soil organic matter, reduce soil erosion, reduce water recharge to saline groundwater aquifers, and help attract rainfall.

Community Objective

To enhance the natural aesthetics of the East Yuna landscape, and to provide quality cropping land for lease to nearby agricultural operators. To adhere to good neighbourly practices, carry out responsible fire risk mitigation, and carry out operations in accordance with all the respective legal, environmental and social obligations required in the State of Western Australia.

3. Document Scope

This document focuses on the planning and implementation of the revegetation works on the property. As a management plan, the document should be reviewed as necessary, updated and kept 'live'.

It contains relevant details and maps of the property, documented plans for establishment and longer term management of upcoming reforestation work, and a plan to manage the risk of fire.

In particular, it is expected that aspects of the document relating to revegetation will become more detailed as ecological knowledge of the site increases.

4. Relevant Codes of Practice

In addition to the laws of Western Australia, the following are relevant:

- Code of Practice for Timber Plantations in Western Australia (Forest Industries Federation (WA) Inc., 2014)
- Guidelines for Plantation Fire Protection (FESA, 2011) note that the agency FESA has now changed names to 'DFES'
- Code of Practice for the use of Agricultural Chemicals in Western Australia (2005, Agriculture Western Australia).

Furthermore, revegetation operations will be conducted with the requirement to abide by relevant safety standards, and only experienced and professional contractors will be engaged.

5. Site Features

Topography: Gently sloping to flat land, sand dunes in the west, dissected by the Greenough River.

Soil description: Yellow sands with dune ridges, red fine sands over calcrete, calcareous rubbly sands, clayey or stony mixed soils.

The farm includes some high quality cropping paddocks as well as some lower quality soils which have been omitted from cropping for several years.

Original vegetation is likely to have been dominated by species from the genera *Eucalyptus*, *Melaleuca*, *Allocasuarina* and *Acacia*.

6. Revegetation Overview

Integration of reforestation into Kooyong

Where Carbon Neutral has previously purchased degraded farms on the margins of the agricultural zones of the northern wheatbelt, revegetation has occurred across the large majority of arable and plantable land on these properties.

Kooyong provides an opportunity on one property to integrate reforestation with traditional agricultural activities. Carbon Neutral wishes to progress a model where the most productive farmland is retained for an ongoing contribution to the agricultural activities of the local community and region, while being able to fund the reintroduction of valuable biodiverse woodland into the landscape.

After discussions with neighbours and consultants, a farm plan has been created (Figure 2) involving designated revegetation corridors and cropping areas (Figure 2).

The aims of the selection of land for revegetation were:

- o To create buffer plantings adjoining the Greenough River,
- To create corridors adjoining other remnant vegetation on or adjacent to the property,
- To create a significant corridor between nearby reserves along the River,
- o To include a full range of soil types and vegetation communities,
- To mostly target lower-productivity agricultural soils on the property, i.e. without recent cropping history, i.e.
 - limestone rubble-based soils,
 - yellow sands,
 - heavier soil types adjoining the river without recent cropping history, and
 - inefficient small paddocks.
- o To include sufficient revegetation land to make the project viable.

Our plan is based on retaining the best land as cropping land, which is in the north of the property (see 'Agriculture Area A' in Figure 2). These paddocks may be able to be cropped east-west for further improved efficiency. A stony section on the eastern end (ID 5) has been designated for revegetation. The current intention is for this cropping area to be leased initially to neighbours with a solid track record of cereal production and effective land management.

Yellow sands (IDs 1, 2, 6 & 8 on Figure 2) have been targeted for revegetation since the adjoin existing remnant vegetation and have not been cropped for many years. The high input costs and wind erosion issues makes these soils less than ideal for future cropping.

A small paddock of pink fine sand (ID 7) which is surrounded by good quality remnant vegetation and suffers from severe wind erosion has been included in the revegetation area.

Two consolidated areas of calcareous or fine sandy soils (see 'Agriculture Area B' in Figure 2) are designated for regenerative grazing. These paddocks have had some cropping in recent years, but are not considered arable. The southern portion will require fence removal to improve efficiencies of operations. It is the current intention to carry out a regenerative farming project on these paddocks.

A corridor between Cropping Parcel A and Cropping Parcel B (IDs 3 & 4) will also provide an area of woodland to be revegetated on the red sand soil type of the property.

Areas marked with ID 9-17 are designated for revegetation and adjoin the Greenough River. These consist of mixed soils which have mostly not been cropped for several years. The soils consist of a patchwork of calcareous rubbly sand, patches of red sand, clays on lower slopes near the river, and stony soils.

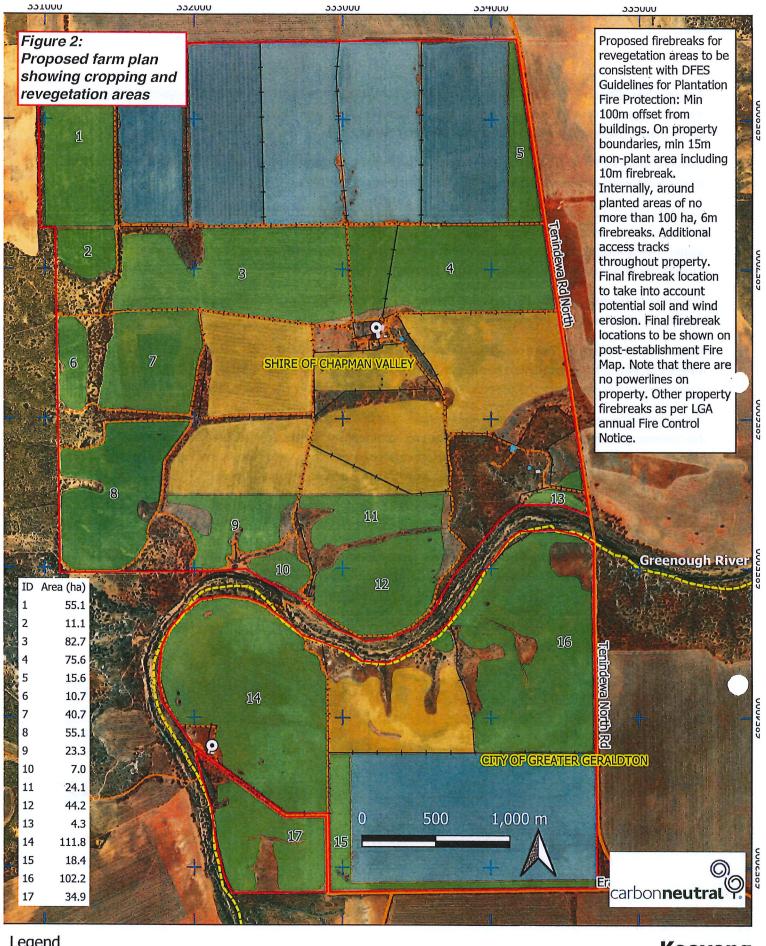
The proposed revegetation layout provides a significant boost to the connectivity of natural vegetation along the Greenough River. In addition, the plantings will complement the small Reserve immediately to the east of the property and provide a significantly wider corridor along the river joining up remnant vegetation to the west of the property and ultimately meeting with the East Yuna reserve (Figure 3).

The breakdown of total proposed planting area is 712.5 ha as well as some belts within the Regenerative Grazing Areas (Figure 2 and Table 2).

It should be noted that it is likely the layout will change from the current plan to some extent as plans are fine-tuned, but the overall intent and approach as described above will remain.

Table 2. Breakdown of good quality cropping areas and revegetation corridor areas on Kooyong by Local Government Authority under the proposed plan shown in Figure 2.

	Title area (ha)	Cropping area (ha)	Regenerative grazing area	Revegetation area (ha)
Shire of Chapman Valley	1213.2	298.2	341.6	445.2
City of Greater Geraldton	523.8	144.7	45.3	267.3
Total	1737.0	442.9	386.9	712.5



Legend

Property boundary

LGA boundary

Proposed biodiverse revegetation (716.8 ha)

Broadacre agriculture

Agriculture area A, best land (440.8 ha)

Agriculture area B, regenerative (260.6 ha)

Shire roads

Farm roads and tracks

Buildings

Water tanks, existing or proposed

50,000L fire water

Other tanks

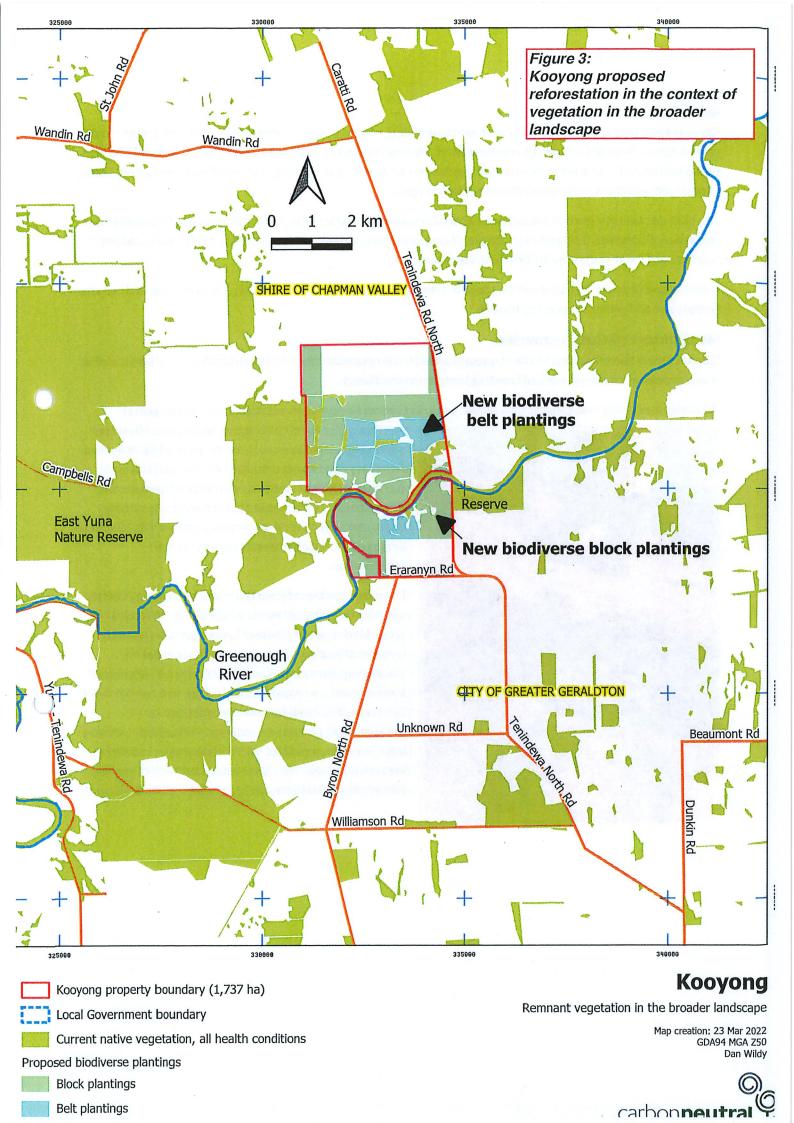
Image supplied by ArcGIS World Imagery

Kooyong

Proposed land use map including fire control measures

> Tenindewa Nth Rd, East Yuna, Shire of Chapman Valley &

> > Map creation:16 Mar 2022 GDA94 MGA Z50



Reference plan and goals

Revegetation plans for the site will continue to develop in terms of detail after further site assessment and consultation. This will include the refinement of the description of target site conditions, which will likely be based on natural occurrence of remnant vegetation on similar soils nearby. This will likely involve York Gum, *Acacia*, and *Allocasuarina*-dominated vegetation types.

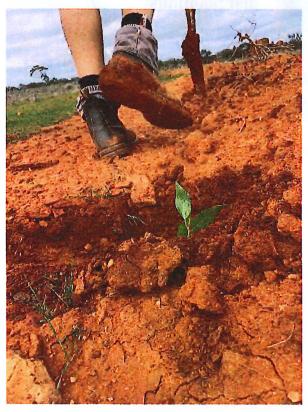
The plan details the short and long term activities required to achieve the restoration goals. This will include cessation of detrimental factors (grazing by hooved animals, water erosion, rabbit activity), and activities such as ongoing management, fire risk suppression.

Forest establishment activities will be focussed on larger shrubs and trees initially, allowing time and natural vectors to add further species to the mix.

Establishment silviculture overview

Silviculture is the term given to the strategies used in the establishment and management of a forest, and is one component of the process of creating long term woodlands.

Basic elements of establishment silviculture used on Carbon Neutral reforestation sites are (i) species



selection, (ii) ground cultivation techniques, (iii) water harvesting techniques i.e. V-or W- shaped planting lines are always used to accumulate rainfall, (iv) timing of operations, (iv) competitive vegetation management approaches, (v) techniques to deal with site-specific issues, and (vi) other parameters or goals that affect the design of the establishment systems for the reforestation.

For mixed species reforestation, direct seeding is often used for the establishment of species which have a life cycle which is geared towards regeneration by seed (seed usually abundant, and germinates reliably). Conversely, many long-lived species do not regenerate by seed easily, or would require larger amounts of seed than is readily available, and these are grown in nurseries and planted as seedlings. This usually includes larger overstory eucalypt and melaleucas in southern Western Australia. For this reason, both direct seeding and seedling establishment are used by Carbon Neutral.

It is likely three to four ecological communities will be established on the site, based on mapping of landforms and soils. Carbon Neutral restoration plans typically involve the use of natural processes over time, such as the use of natural thinning for the most ideal and well-suited species to eventually dominate in the variety of micro-sites within the restoration area.

It is noted that silviculture plans typically change with new developments and seasonal conditions, and the details of plans in this document are likely to be subject to minor change even after final drafting.

Species to be established

The management activities will be designed to foster the natural recruitment of further species including grasses and forbs. The initial establishment event will involve the large overstory species which create the overstory of the forest environment.

The following list of species is likely to be planted in winter 2022:

Allocasuarina campestris

Bursaria occidentalis

Calothamnus quadrifidus

C. blepharospermus

C. formosus

C. phellosus

Eucalyptus arachnaea subsp arachnaea

E. camaldulensis subsp. arida

E. eudesmioides

E. ewartiana

E. gittensii subsp. gittensii

E. horistes L.A.S.Johnson & K.D.Hill

E. jucunda

E. kochii subsp. borealis

E. leptopoda

E. loxophleba subsp. loxophleba

E. loxophleba subsp. supralaevis

E. obtusiflora

E. oldfieldii

E. rigidula

Melaleuca atroviridis

M. eleuterostachya

M filifolia

M. nematophylla

M. radula

M. stereophloia

Xylomelum angustifolium

The list of species likely to be established by direct seeding is currently being developed and will be based primarily on recent seed collection from the area. The seed list is likely to involve approximately 30 species from the following genera:



Acacia

Allocasuarina

Atriplex

Calothamnus

Eremaea

Eremophila

Eucalyptus

Grevillea

Hakea

Melaleuca

Senna

Timeline of reforestation activities

Proposed establishment year: 2022

Timing is of critical importance to successful outcomes in establishment activities. Carbon Neutral is accustomed to working with the critical timelines of reforestation projects each year. Note that any consultation processes may have season-imposed constraints on them, so Carbon Neutral can make decisions and allow the project to stay on track and meet the ultimate deadline of establishment with ideal site conditions.

8 Mar 2022	Settlement of property
Mar/Apr 2022	Final restoration planning, final silvicultural design. Organisation of resources and personnel Site mark out, pre-ripping if required. Sheep removed.
Apr/May 2022	Pre-establishment organisation.
Jun/Jul 2022	Broad knockdown spray. Site cultivation (scalping and ripping) including direct seeding. Seedling planting.
Aug/Sep 2022	Monitoring and infill as required
Oct/Nov 2022	Monitoring for insect impact, follow up spraying
2022	Repeat of above for infill or remaining unplanted areas.

7. Establishment Aspects

Layout of revegetation areas

Planting areas will be less than 100 ha in size, as shown in Figure 2. Any blocks which are shown as being over 100 ha will have an internal access track at the time of establishment, incorporated in final maps.

Plantings will involve rows typically at 6m spacing. These will be curved to follow the contour to allow rainfall to infiltrate and to minimise water and wind erosion.

Where establishment occurs in the less productive Agriculture Area B (See Figure 2), belts of trees are planned to be further apart to improve access for pasture management and grazing.

Cultural heritage sites

A survey of known Indigenous or European cultural or heritage sites will be carried out on the proposed reforestation area, and the results included in future management planning. This will include database searches. Currently the Greenough River is a known indigenous heritage site which will be left undisturbed.

Buffer zones and setbacks

Planting operations will be confined to land that was previously cultivated and cropped.

The layout of the plantings aims to avoid having revegetation corridors close to house and shed infrastructure (see Figure 2). In any event minimum setbacks will be 50m from non-habitable sheds and 100m from habitable houses as per DFES/FESA guidelines.

Ground preparation plan

Building on recent reforestation activities in the region, two systems are likely to be used across the site.

- Lines created with a scalper and ripper (e.g. Chatfield tree planter), which can contain direct seeded species with or without seedlings which have been raised in a nursery. Direct seeding lines are designed to create an even and controlled seed bed for accurate seed placement and minimal further burial, with a water-harvesting 'V' profile.
- Seedling-only lines which are scalped, deep ripped and formed to created water-accumulating shapes ahead of the winter rains using Chatfield tree planter.

Erosion considerations

Site preparation takes into account the likelihood of erosion from wind or water. Contour site workings can be used to minimise water erosion, and the presence of continuously curving lines prevent very large areas being exposed in the event of a damaging wind. Presence of weed material on unplanted inter-rows is seen as beneficial in holding topsoils in the event of damaging winds.

Management of competitive plant species during establishment phase

Native perennial species, i.e. the plants being established as part of the establishment phase, are usually slower growing in the first year than winter-active annual pasture species, and can be choked out and killed in the first spring by moisture competition from more these aggressive annual species.

During establishment operations, Carbon Neutral typically uses light topsoil scalping to remove competitive annual species from near the establishing woodland species in the first year. Herbicide at label rates may be used prior to planting as a broadacre application to knock down competitive weed species in the inter-rows.

After establishment, a light ground cover of mixed pasture species ("weeds") between planting rows can be beneficial in providing a micro-climate for establishing trees over the summer months, including protection from wind events. The subsequent build up of dead weed material promotes soil biological processes and water infiltration following any rain.

Existing recent regrowth

The presence of existing native regrowth in some areas of the revegetation sites can be detrimental to establishing seedlings, since the perennial plants are very effective at depleting soil moisture levels in the soil which would otherwise be relied on by the newly established seedlings for survival during the first summer.

The intention is not to clear existing young regrowth vegetation but work around it. Areas with heavy regrowth may receive supplementary infilling with additional species.

Remnant vegetation

Remnant vegetation on the property will not be disturbed or cleared. Adjacent new plantings of similar species will enhance the longevity of the existing remnant vegetation.

Planting of seedlings

Seedlings will be planted at a density of approximately 350 per hectare in winter months.

Seedling quality is one of the critical factors affecting the likelihood of success. Seedlings will be sourced from experienced nurseries with a proven track record operating in regional WA.

Nutrition

Soil testing will be used to gain knowledge on site mineral levels and salinity levels. Small amounts of conventional fertilizer, slow release fertilizer, or carbon-rich compost material may be added during the ground preparation phase as a result of this testing.

Insect management

Monitoring in the months following the establishment is critical to identify issues that can be altered by management practices.

In the unlikely event that monitoring and assessment indicates that foliar application of pesticides are required, these will be through ground based application by authorised providers at label rates.

Disease

Diseases in new plantings trees will be monitored at routine inspections, and if control measures are required they will be in line with industry practices.

Survival assessment and replanting

As well as ongoing monitoring, plantings will be surveyed for survival approximately 8 months following planting. This will identify any infill and replanting that will be required to be carried out to ensure that Carbon Neutral and customer expectations are met. Replanting in 2023 would involve the repeat implementation of many of the steps described for the establishment in 2022.

8. Longevity of Planted Woodlands

The woodland and shrublands being re-created are intended to remain into the future without harvest.

Carbon Neutral restoration typically involves the use of natural processes over time to allow the planted woodlands to grow and develop and match the site.

Natural agents such as the incursion of seeds and spores in wind and through animal movement will slowly contribute to the biodiversity of the site. Animals and fungi will return naturally.

Natural thinning, where the most well-suited species eventually dominate in the variety of micro-sites within the restoration area, is an inevitable process. It is expected that some trees will die out over time, while others most suited to the particular planting site will survive and dominate.

There may be an ability to incorporate species that are useful for traditional indigenous harvest, such as fruits, nuts and wood products. In particular, naturally occurring *Santalum* species (e.g. Quandong and Sandalwood) may be incorporated in very low rates through suitable areas. Low rates (e.g. ten *Santalum* per hectare) ensure that the parasitic load of the *Santalum* does not adversely impact the woodland long term.

9. Ongoing Management

A critical component of restoring natural woodlands is setting up systems to enable natural processes to continue through time, such as new seedling recruitment, and protection from damaging processes.

This involves aspects such as ongoing monitoring, ensuring that cloven-hooved animals (goats and sheep) are able to be effectively excluded (in the first three years), cool burning can be considered, rabbits, foxes and feral cats can be controlled, and fire risk management can be carried out as required.

Monitoring

Regular monitoring of the property and the plantings will be carried out, with emphasis on frequent checks through the early establishment phase, and in the lead up to and during the fire season. This includes general property inspections as well as forest health surveys.

Grazing

Grazing (agistment) has been used in the past for controlling fire risk in plantations, but long-term observations by Carbon Neutral, and experience in the rangelands of the Murchison, have increasingly shown the negative influence of traditional grazing of sheep on long-term woodland health. However, grazing in a more regenerative manner is an important part of improving soil carbon.

On the fine sands which occur on Kooyong, livestock grazing can cause episodic and severe wind erosion as there is evidence of currently. On heavier soils, grazing can cause the soil to be packed by hard-hooved sheep, causing run off rather than infiltration after rain. New germinating native species are often eaten before they can establish. Changes occur gradually so can't be noticed, but long-term exclusion observations show dramatic differences in biodiversity values and restoration success between long-ungrazed and grazed woodlands.

To balance these issues with fire risk management, short intensity and highly controlled grazing may be used as a tool for reducing high fuel loads.

Fencing will be maintained at a level which is adequate for the management goals of the property.

Patchwork burning

While difficult to operationalise, the long-established practice of patch-work low-intensity burning can be beneficial to the goals of the woodland restoration once established seedlings have grown to a size to withstand the impact of low intensity fire. This practice reduces build-up of fuel loads to dangerous levels and stimulates germination of some species. Small patchwork burning giving a mosaic effect across the site enhances the diversity of habitats and ecosystems within the restoration area. Cool season burning will likely feature as an aspiration in the restoration plan.

Feral animal control

Feral animal control (foxes, rabbits, pigs) will be carried out as required by law.

Fire management

Fire management is addressed separately below.

10. Fire Management Plan

Aim

The aim of the fire management plan is to create a documented reference point for fire management of Kooyong.

This section should be used primarily by Carbon Neutral Pty Ltd to manage fire risks on the properties.

The plan should be reviewed and updated periodically as contact details may change, and goals of land use and approaches to fire management may be updated from time to time.

Reference documents are the Shire of Chapman Valley Firebreak Notice 2021/22, City of Greater Geraldton Guidelines for Plantation Fire Protection (2011) and the Code of Practice for Timber Plantations in Western Australia (2014).

Significant infrastructure

On the property: Sheds south of river, main sheds north of river, house, water tanks. There are no powerlines on the property.

Fire appliances and availability

No appliances will be immediately available on the property. The arable areas of the property will be leased out, and it will be expected that the lessee will have necessary fire appliances on their own properties nearby.

Water points

Fire water will be maintained on site permanently through the use of strategically located water tanks with at least 50,000L permanently available on both sides of the river. Tanks will be filled from existing bores on the property or from rainfall storage systems.

One water point will be on the south side of the river (City of Greater Geraldton) and one will be on the north (Shire of Chapman Valley). Both proposed fire water points are easily accessible by the main farm road network.

The locations of water tanks are shown on the Proposed land use map (Figure 2). Water points will be signposted at strategic points within the plantation.

Fire maps

A fire map compliant with the FESA Guidelines for Plantation Fire Protection will be produced once establishment is complete and prior to the first summer. This will show access points, firebreaks, tracks, water points, hazards and final plantation layout. Maps will be placed in a brightly painted cylinder ('map tube') at the main access points into the property.

Key details that will appear on the final fire map are shown on the Proposed Land Use Map (Figure 2) which includes details of access tracks, internal and boundary firebreaks and water points.

Vehicle access and firebreak construction

Access has been designed with reference to the FESA Guidelines for Plantation Forest Protection. It must be noted this Guideline was prepared for plantations more typical of the higher rainfall south west region with tree heights in the order of 25m. Revegetation on Kooyong will be with endemic mixed species which may reach maximum heights of 10m but more typically 5m.

The following approach is planned:

- * Proposed tracks will make use of existing tracks where these are usefully positioned, or establishes new tracks to minimise potential for long term erosion issues on the site where possible. Currently proposed internal tracks are shown on the map in Figure 2.
- * Additional access is in the form of boundary firebreaks and access around the perimeters of the planting areas.

- * Setbacks from fences or remnant vegetation around the property boundary will be 15m.
- * In addition to the setbacks, firebreaks on the property external boundary of 10m width will be maintained as bare earth, as per FESA Guidelines for Plantation Fire Protection (2011).
- * A network of firebreaks of 6 m width will be maintained throughout the property around planting areas of up to 100 ha.

Firebreak maintenance

Firebreak maintenance requirements will be periodically assessed through the fire season, with the aim of maintaining them to specifications of the relevant 2021/22 Fire Break Notice during the required fire season period.

Firebreaks will be maintained primarily through the use of herbicides at label rates, or via mechanical cultivation.

Power transmission lines

There are no power transmission lines on the property.

Potential ignition sources and measures to reduce hazards

Potential ignition sources are

- Lightning
- Vehicles/machinery on the properties
- Powerline faults
- Fires from activities on the properties such as welding/angle grinding
- Neighbouring fires such as hop-overs from stubble burns

Measures to reduce fire hazard on Carbon Neutral land include

- Restricting access to unwanted traffic
 - o Implementing a policy of closing boundary gates even when there are no livestock present.
- Possible use of periodic grazing with sheep so that livestock trample and eat grassy weeds
- Maintaining bare areas around the buildings through use of herbicide and slashing where required.

Fire detection, reporting and initial response

Fire detection traditionally relies on all people in the area (neighbours, Carbon Neutral personnel, etc) being vigilant for smoke.

At the first sign of smoke, the relevant local bush fire brigade should be immediately contacted. Several numbers are available to be called (contact details above).

An alternative is to contact 000.

Initial response and attack of fires will be through the local bush fire brigade network due to the fact that speed of response is a significant factor in suppression of fires. Carbon Neutral resources would be useful in in the event of larger fire, or for mop up and fire ground monitoring.