REVEGETATION PLAN

for Lot 306 on Deposited Plan 409422

Prepared by the Shire of Kellerberrin as part of CPS 8253/1

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Introduction

The Shire of Kellerberrin is in the process of upgrading Baandee North Road from the road's beginning at Great Eastern Highway through to the Shire's northern boundary. This revegetation plan is provided as part of the offset proposal for CPS 8253/1. This clearing permit application covers the upgrade for SLK 10.54 through to SLK 23.00.

The purpose of this plan is to detail the actions the Shire of Kellerberrin will undertake to ensure the revegetation of the nominated site achieves a satisfactory standard as an offset. As detailed in the offset calculator (Appendix A), this revegetation is to provide an offset to 58.34% of the proposed total quantum of impact upon vegetation potentially representative of the Wheatbelt Woodland TEC. This revegetation plan is supplemented by a proposal to change the purpose of Reserve 33419 from 'Gravel' to 'Conservation.' This proposed change of purpose provides 42.98% of the required offset.

The suitability of the proposed revegetation site to provide the required offset is based on the fact that the proposed site has a soil type suitable to revegetate with species to be impacted by the clearing. The proposed revegetation site, while not directly adjacent to the area of impact, is within the Shire's boundary. Further information regarding this is provided in the section, Reference Site Floristic Data Collection.

As alluded to above, this revegetation plan is intended to be read alongside *Vegetation Condition Report Kellerberrin Shire Reserve R33419*. Between these two proposals, the vegetation types to be impacted by the clearing will be offset.

This revegetation plan has been developed by Dylan Copeland, in association with Steve Fry of Santaleuca Consulting, on behalf of the Shire of Kellerberrin. For further information, see the section, About the Authors.

Proposed Clearing Details

The proposed clearing is to allow for the upgrading and widening of Baandee North Road between SLK 10.54 and SLK 23.00. The proposal is for the clearing of 2.8393 hectares of native vegetation within the Baandee North Road Reserve, North Baandee (PINs: 1294752, 1294750, 1294746, 1294742, and 11848160). The application (reference CPS 8253/1) was received by the Department of Water and Environmental Regulation (DWER) on 14 November 2018.

For the maps of the proposed clearing area, please see Appendix B.

Proposed Revegetation Site

The revegetation is a new parcel of land created by the previously privately-owned subdivision of Lot 7545 on Deposited Plan 121265. The new parcel is Lot 306 on Deposited Plan 409422. For a map of the properties, please see Appendix C. The new titles created as a result of this subdivision and transfer of ownership are still pending. This parcel will be owned by the Shire of Kellerberrin.

The size of this new parcel is 23.0536 hectares. However, this parcel is bisected by the realigned Kellerberrin–Shackleton Road. The area to the east of the road will be the site of the revegetation and it is listed as 14.6953 hectares. The area covered by this revegetation plan, as indicated in the offset calculator at Appendix A, is 6.5000 hectares. The general revegetation site is indicated below as being 9.5000 hectares, of which 6.5000 hectares will be revegetated. The preference will be to leave a contiguous 3.0000 hectare section for future revegetation projects, but, as discussed below, there may be sections of rock that make revegetation difficult in patches. Ultimately, the site design will need to be finalised during on-ground works.

Map

Figure 1: Proposed Revegetation Site Map.

Background of Revegetation Site

The site was historically cleared for use as cropping and grazing farmland. When the Shire realigned Kellerberrin–Shackleton Road, the land was purchased from Boondine Pty Ltd and subdivided to allow the realignment. Since this occurred the site has not been used for agriculture or any other purpose. The transfer is waiting upon receipt of the new titles.

A desktop survey of the site indicated that the soils were, "Areas of rocky, red and greyish brown loamy sands and sandy loams formed from freshly exposed bedrock. Rock outcrop is common."[1]

The subsequent site visit confirmed this, Stephen Fry noting that, "The soils are mixed, but predominantly granite based. It is generally loamy soils with bare granite extrusions and clay pockets."[2]

The site slopes away, with the fall being approximately 1:38. The aspect of the site is lower slope and, as shown in Figure 1, there are some creek lines that run through the centre proposed revegetation site. The land either side of the centre also slopes inwards to the centre, with that fall being approximately 1:36. For the most part, the land is clear and arable with a consistent slope. The section of remnant vegetation on the opposite side of the old Kellerberrin–Shackleton Road marks the beginning of the valley floor and has significant areas that water runoff will pool before continuing to drain away to the north-east. The revegetation should be conducted along the contour lines as much as possible to reduce erosion.

The proposed revegetation site is bounded on all sides by constructed roads. To the north-east, the old Kellerberrin–Shackleton Road remains, and the camber of the road means that it forms a de facto contour bank. This means that revegetating the site will have little impact on the overall hydrology of the area because the historic road occurs at the base of the catchment area and would have been an obstacle for water runoff in all but the heaviest downpours.

The area intended for revegetation did not show any particular evidence of fauna but kangaroos are likely to visit. Rabbit numbers in the district have been relatively low over the last couple of years due to releases of various strains of the calicivirus. However, anecdotally, rabbit numbers are starting to rebuild.

Protection of the Site

The Shire was previously involved in an offset site at Lot 438 on Deposited Plan 195528. This involved the surveying off a section of the block and having it re-purposed for 'Conservation' through the Department of Planning, Lands and Heritage. Although this was a patch of remnant vegetation the same process will be followed for the new revegetation.

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[1] *Soil Landscape Mapping - Best Available (DPIRD-027)*, last updated 2019-08-03, https://services.slip.wa.gov.au/public/rest/services/SLIP_Public_Services/Soil_Landscape/MapServer/10, accessed 7 November 2019

[2] Stephen Fry. *Reference Site Survey*. Western Australia, 2019.

The Shire, as a potential alternative to this strategy, also investigated the possibility of placing a covenant on the revegetation site, but was advised by the Department of Biodiversity, Conservation and Attractions' Covenant Coordinator, Lei Zhang, (by email on 7 November 2019) that the site would not be suitable for a covenant due to the lack of significant adjacent remnant vegetation.

The Shire is familiar with the process, albeit a lengthy one, of surveying a section off and re-purposing it for conservation and believes this is the best way to ensure the long-term security of the site.

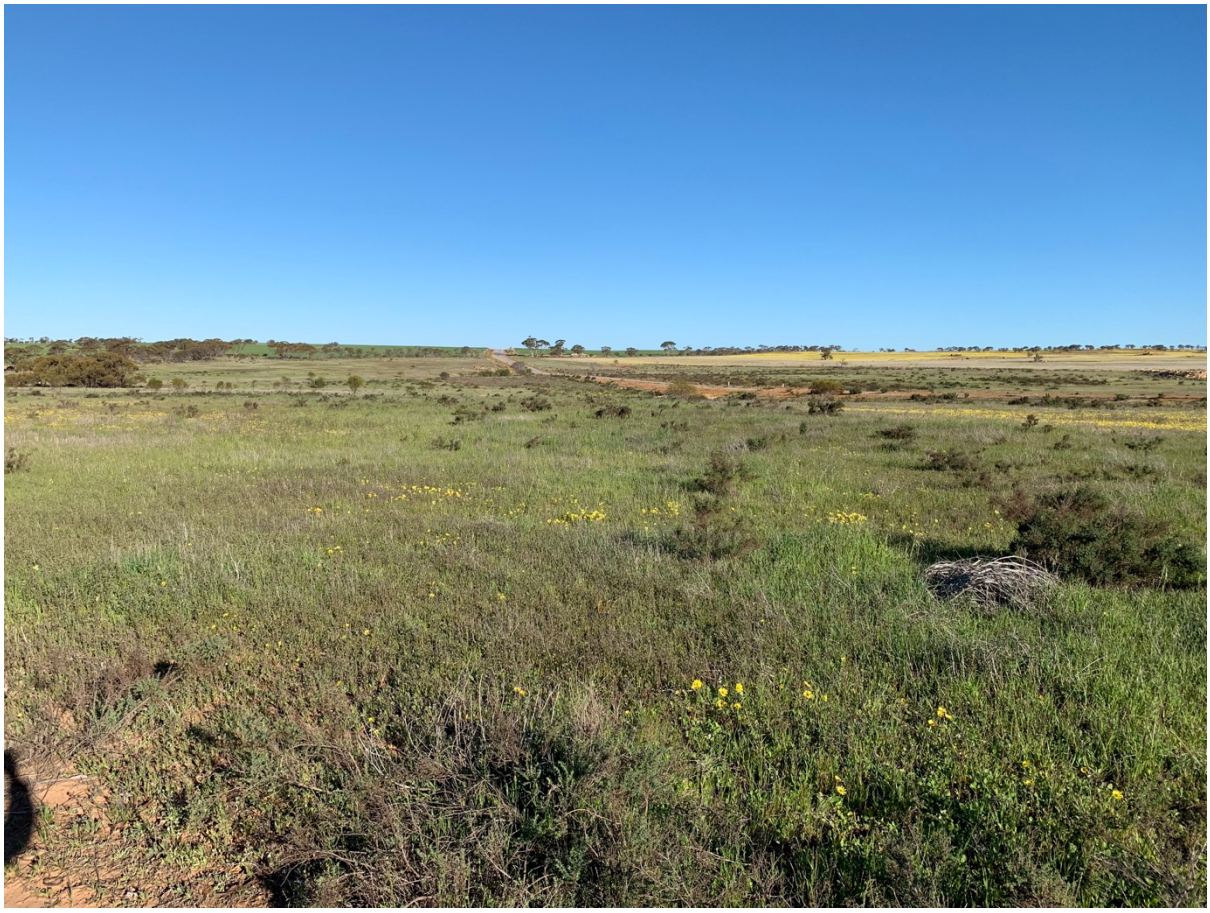

Figure 2: Looking south by south-east over the proposed revegetation site.

Current Disturbances and Threats

The site was previously cleared for agriculture. The land was utilised for cropping and grazing until the area was purchased by the Shire of Kellerberrin as part of the realignment of Kellerberrin–Shackleton Road. Since then, the land has not been farmed. The site is covered in agricultural weeds, with some native species, particularly *Acacia acuminata* and *Maireana brevifolia*, starting to re-establish. However, there is low floristic diversity and little to no native fauna habitat.

The site will require the removal of small amounts of agricultural rubbish and weed control before revegetating.

As indicated above, there are slight gradients at the site that will need to be considered when revegetating, that is, revegetating along the contour lines.

Revegetation Commitments

The intent of this plan is to provide a clear description of the techniques and strategies to be utilised to ultimately return 6.5 hectares of former agricultural land back to vegetation that meets the criteria to be considered Eucalypt Woodlands TEC. The Shire of Kellerberrin acknowledges that it may not be possible to restore the site to its original state. The revegetation should be similar in structure and content to comparable naturally occurring vegetation in the local area.

To achieve this vision, the Shire of Kellerberrin has identified the following objectives:

- that the revegetation will become resilient and self-sustaining;
- that the revegetation will become suitable for native fauna habitat;
- that the revegetation will meet the completion criteria outlined below.

Reference Site Floristic Data Collection

Please see the attached report, *Reference Site Survey: Revegetation Project on the Shackleton–Kellerberrin Rd Kellerberrin RE: CPS 8253/1* prepared by Santaleuca Consulting on behalf of the Shire of Kellerberrin.

The spatial data for the reference sites is also attached as a shapefile, *Reference Site Quadrats*.

Targets and Completion Criteria

Criterion	Baseline floristic data	Completion targets	Completion criteria
A(i)	Site species richness is 28 (native sp. only).	Minimum of 60% of native species returned, based on reference sites.	The revegetation site needs to achieve a minimum species richness of 17 native species, as recorded at the reference sites.
A(ii)	Species richness of the 20m x 20m quadrats at the reference site were 16, 18, and 17. Therefore, the average number of species/quadrat is 17.	Minimum of 60% of native species returned, based on reference sites.	The revegetation site needs to achieve a minimum species richness of 17 native species, as recorded at the reference sites.
A(iii)	There are three dominant tree species.	Return dominant tree species present at reference sites.	The revegetation site needs to have the three dominant tree species (*Eucalyptus loxophleba* ssp.

			loxophleba, *E. salubris* and *E. salmonophloia*) that were recorded at the reference sites.
A(iv)	Shrub species richness is 19.	Minimum of 60% of native species returned, based on reference sites.	The revegetation site needs a minimum of 12 shrub species, as recorded at the reference site.
B(i)	100 stems/hectare.	Minimum of 60% of stems/ha for dominant tree species returned, based on reference sites.	The revegetation site needs a minimum of 60 stems/ha.
B(ii)	900 stems/ hectare for large shrubs and 1400 stems/ hectare for small shrubs.	Minimum of 60% of stems/ha for dominant shrub species returned, based on reference sites.	The revegetation site needs a minimum of 540 stems/ha for large shrubs and 840 stems/ha for small shrubs.
D(i)	Quadrat 1 0% Quadrat 2 0% Quadrat 3 25%	Weed cover is no greater than in the reference sites.	The revegetation site should have a maximum of 25% weed cover. The two weed-free reference quadrats were not adjacent to the revegetation site. As the site was previously agricultural land it is likely that some weed species will persist at the site for at least the medium-term.
D(ii)	Quadrat 1 0% Quadrat 2 0% Quadrat 3 25%	Absent from the revegetation site.	The revegetation site needs to have major competitive weeds absent from the site.
D(iii)	No declared weeds are present.	Managed as required by the *Biosecurity and Agriculture Management Regulations 2013*.	Absent
E	Bare ground is 30%.	No more than 5% greater than in the reference sites.	This gives the slightly unwieldy figure of no more 31.5% of bare ground as an average for the revegetation site.
F(i)	The site is to offset Eucalypt Woodland.	The site must be revegetated to a level that offers the best	The revegetation site needs to have the three dominant tree species

		chance to ultimately be considered as Eucalypt Woodlands.	(*Eucalyptus loxophleba* ssp. *loxophleba*, *E. salubris* and *E. salmonophloia*) at a minimum of 60 stems/ha.
F(ii)	Survival rate to be achieved.	If after 5 years of planting a survival rate of at least 35% is not achieved, all planted trees that have not survived must be replanted within 12 months and monitored for a further 2 years.	The revegetation site needs to ensure a survival rate for trees of at least 35% is achieved after five years. In-fill revegetation may be required to ensure this target is met.

These completion criteria were developed by using the data collected at the reference site and with reference to the purpose of the offset provided by this revegetation. For example, the minimum stems/ha for the *Eucalypt* species is 60% of the reference site value, as indicated at A(iii) and B(i). This equates to a revegetation target of to 60 stems/ha. This target aligns with the required density for *Eucalypt Woodlands of the Western Australian Wheatbelt* TEC, which is representative of the values required by the revegetation site, as displayed at F(i). The survival rate estimated at F(ii) was applied to the required density to calculate the planting density. The calculated planting density is 171 stems/ha, which is 1,112 stems for the 6.5 ha site. These species are normally grown by the nursery in 64-cell trays and so 1,152 stems will be ordered (384 of each *Eucalypt* species).

Species List Compilation

The species list has been compiled from the species list of the reference site. Chatfield's Nursery in Tammin has been consulted in regard to seed collection and species provision. Chatfield's have advised that they will most likely be able to have seed collected from the required species from within the Shire of Kellerberrin by their fully-licensed contract seed collector. If the required species and quantity of seed are unable to be collected from with the Shire of Kellerberrin, then it will be sourced from adjacent Local Government areas. The seed is able to be collected to fit the timeframe of the nursery's standard growing procedure. Seed collecting will be able to begin in summer of 2019/20 and be continued, as required.

Some of the species on the list are more difficult to grow than others. Chatfield's have also advised that for the annuals and smaller groundcovers, broadcasting of the seed is more appropriate than growing them out in a nursery setting. That seed will be collected by the nursery's seed collector at the same time as the other species.

Please see Appendix D for Chatfield's Certificate of Accreditation through from the Nursery Industry Accreditation Scheme Australia.

The quantities of seedlings to be planted have been calculated from required density per species, factoring in estimated survival rates, and rounded to the number of cells in a tray (64).

Please see Appendix E for the provisional seedling order.

Revegetation Techniques

The revegetation will see the site ripped and scalped with a Chatfield's tree planter. The seedlings will be subsequently hand planted into the rip lines. Hand planting will occur using Pottiputki-style hand-planters.

For species where seed is available, but the species is not amenable to the above revegetation technique, the seed will be broadcast by hand at the same time as hand planting.

For the revegetation, 12,480 seedlings will be ordered (see Appendix E). This works out to a planting density of 1,920 stems per hectare. When using the tree planter to scalp and rip, the distance between rows is approximately 3m. This means that the seedlings will be approximately 1.7m apart in the row.

The site will require neither topsoil nor mulch.

Site Preparation

Prior to planting the seedlings, the site will have prophylactic rabbit control activities in late summer to early autumn of the year of planting, 1 February 2021 to 15 March 2021.

The site will be sprayed with a knock-down herbicide prior to ripping, between 3 May 2021 and 11 June 2021, depending on the season and germination.

After the herbicide has taken effect, and the soil conditions are appropriate, the site will then be ripped with a Chatfield's tree planter. As well as ripping the site, the tree planter also performs a scalp of the topsoil. This clears away the seed bed and creates a water-harvesting effect.

Pre-ripping the site allows subsequent rain to penetrate the soil and enable the seedling roots to more easily spread, particularly if the soil has a high clay content.

The potential for rock at the site could make it unsafe to have someone on the tree planter planting seedlings. That combined with the potential for better establishment means that hand-planting is the preferred method for this site: "Hand planting can be just as quick and more successful than machine planting, if the preparation is well done. A Chatfield Tree Planting machine with the press wheels removed creates the perfect hand planting environment."[3]

[3] Hobbs and Fry, *Revegetation Guide by Soil Type for the Central and Eastern Wheatbelt* (2013), 5.

Figure 3: Seedlings planted with a Chatfield's tree planter. Note the scalped bare ground that is free of weeds and provides water harvesting.

Site Protection Actions

Fencing

The site is immediately bounded by road reserve. Beyond the rod reserves, the site is surrounded by fenced agricultural properties and is not accessible to stock in the normal course of events, and so does not require fencing.

Hygiene Measures

The Shire of Kellerberrin, due to its relatively low annual rainfall of 325mm, is beyond the known range *Phytophthora* species. However, the tractor, tree planter, hand planters, and any other equipment will be fully cleaned at the wash-pad before leaving the Shire depot and upon their return. The equipment will not come into contact with soil or native vegetation between the site and the Depot.

The constructed roads around the site indicate the hygiene boundaries. Equipment not required for the revegetation work (such as vehicles) will not access the site but will be parked along the old bitumen road. The staff conducting the hand-planting will brush down boots and equipment along the old bitumen road. The hard service and camber towards the site form a barrier against transmission. After brushing down boots and equipment, they will be sprayed with 70% Methylated spirits, ensuring they are dry before moving on.

Figure 4: The location of the area to be used for hygiene measures and its relative position to the revegetation site.

Maintenance and Contingency Measures

As laid out in the monitoring plan, the site will be monitored yearly for survival counts. This will occur early enough that in-fill seedlings can be ordered in October for planting the following July. Seedlings will be hand-planted using Pottiputki-style hand-planters into the spaces created by non-surviving plants into existing riplines. Large and/or consistent areas of failure which may be identified as unhospitable and avoided in future in-fill plantings.

By using the tree planter to scalp and rip the site prior to revegetation, the need for post-planting weed control should be greatly reduced. Weeds tend to be annual species and will be out-competed by perennial vegetation, once given the chance to establish. The weed burden will be established at each monitoring event and its impact upon the revegetation assessed, and remedial action taken as required. Given the size and location of the revegetation site, the remedial action will most likely be to spray the weeds in winter.

Monitoring and Analysis

Monitoring of the revegetation site will be conducted in spring in each of the three years after the revegetation in 2021 (so beginning in spring 2022). The post-planting monitoring will use the same monitoring and analysis techniques as outlined in the Reference Site report. The recording format will be directly comparable to the "Reference Site Values Table" included in the report.

For quadrat level data, representative quadrats will be established and monitored to give data on each of the criteria outlined in the section on Targets and Completion Criteria.

For site level data, a reconnaissance survey will be conducted to establish vegetation condition site mapping and weed mapping. This survey will add to the species list and species richness. The reconnaissance survey may be augmented by the use of drone technology.

Schedule

STAGE	ACTIONS	TIMING	RESPONSIBILITY	YEAR 1	YEAR 2	YEAR 3	YEAR 4 AND BEYOND	ESTIMATED COST	FUNDING SOURCE
COMPLETION CRITERIA	Reference site surveys and development of completion criteria	Spring	Steve Fry, Santaleuca Consulting Dylan Copeland, Shire of Kellerberrin	X				$2,000.00	Shire of Kellerberrin
SITE PREPARATION	Development of hygiene plan	Spring	Dylan Copeland, Shire of Kellerberrin	X				$500.00	Shire of Kellerberrin
	Ripping	Early winter	Shire of Kellerberrin		X			$4,000.00	Shire of Kellerberrin
	Weed control	Early winter	Shire of Kellerberrin		X			$1,000.00	Shire of Kellerberrin
VEGETATION ESTABLISHMENT	Place seedling orders with Chatfield's Nursery	Early summer	Steve Fry, Santaleuca Consulting Dylan Copeland, Shire of Kellerberrin	X	Until completion criteria have been met and maintained for two years (within the timeframe of the clearing permit).			$8,736.00	Shire of Kellerberrin Shire of Kellerberrin
	Seed collection and seed management	Summer	Chatfield's Nursery	X	If required	If required	If required		
	Plant seedlings	July	Shire of Kellerberrin		X	Until completion criteria have been met and maintained for two years (within the timeframe of the clearing permit).		$5,000.00	Shire of Kellerberrin
MONITORING	Vegetation monitoring against completion criteria	Spring	Steve Fry, Santaleuca Consulting Dylan Copeland, Shire of Kellerberrin			X	Until completion criteria have been met and maintained for two years (within the timeframe of the clearing permit).	$7,500.00	Shire of Kellerberrin
	Weed monitoring	Spring	Steve Fry, Santaleuca Consulting Dylan Copeland, Shire of Kellerberrin			X	Ongoing annually until completion criteria met and maintained for two years (and as required in the clearing permit)		
MAINTENANCE AND CONTINGENCY	Weed control	After monitoring has indicated an issue	Shire of Kellerberrin			X	Ongoing annually until completion criteria met and maintained for two years (and as required in the clearing permit)	$1,000.00	Shire of Kellerberrin

	Remedial planting	July	Steve Fry, Santaleuca Consulting Dylan Copeland, Shire of Kellerberrin			X	Ongoing as indicated by monitoring	$2,500.00	Shire of Kellerberrin
REPORTING	Revegetation plan		Dylan Copeland, Shire of Kellerberrin. Includes datasets in their entirety (electronically), data analysis, results, discussion. Includes all from Appendix A checklist including completed checklist. Mapping and GIS shapefiles included	X				$2,500.00	Shire of Kellerberrin
	Annual progress report	June 30 each year	Dylan Copeland, Shire of Kellerberrin. Includes all datasets in their entirety (electronically), data analysis, results, discussion. Includes all from Appendix B checklist including completed checklist. Mapping and GIS shapefiles included		X	Ongoing annually until completion criteria met and maintained for two years (and as required in the clearing permit)		$2,400.00	Shire of Kellerberrin
								$37,136.00	

Budget

STAGE	ACTIONS	TIMING	COMMITMENTS / COMPLETION CRITERIA	ESTIMATED UNIT COSTS	TOTAL ESTIMATED COST	COMMENTS
INITIAL DATA COLLECTION AND SURVEY	Revegetation Plan	Spring 2019	Revegetation plan accepted by DWER.	$2,500.00	$2,500.00	
	Reference site surveys and development of completion criteria.	Spring 2019	Revegetation plan accepted by DWER.	$2,000.00	$2,000.00	Completed as part of the revegetation plan.
	Hygiene plan	Spring 2019	Part of the Revegetation plan.	$500.00	$500.00	Kellerberrin's annual rainfall of 325mm is below the 400mm required for Phytophthora species, but the Revegetation Plan includes a hygiene plan.
SITE PREPARATION	Fencing of revegetation site	N/A				
	Weed control.	June 2021	Reduce existing weeds at revegetation site before ripping and scalping.	$1,000.00	$1,000.00	
	Mulch spreading.	N/A				
	Ripping and scalping.	June 2021	The site will be ripped and scalped in one pass using a tree planter.	$4,000.00	$4,000.00	
	Fencing and signage.	N/A				
	Apply fertiliser and water crystals.	N/A				
VEGETATION ESTABLISHMENT	Seed collection, sorting and treatment.	Summer 2019/20 and following summers as required.			$8,736.00	The seedlings will be ordered from Chatfield's Nursery. Chatfield's have a contract seed collector who will deliver the seed to them. Chatfield's will then propagate the seedlings, growing them out until delivered.
	Purchase seedlings.	October 2020		$0.70		
	Plant propagation.	October 2020 to July 2021	9% overstorey, 37% midstorey and 55% understory.			
	Plant seedlings	July 2021		$5,000.00	$5,000.00	

	Direct seeding.	July 2021, if required.	Revegetate with endemic native species identified in the reference site surveys. Plant density should average 1,920 plants/ha. Use local provenance seed if available. No introduction of dieback to the site. Retain large trees where possible. 1 year (2 years; 3 years; 5 years) after planting: 95% (90%; 90%; 80%) survival of planted seedlings. 5% (10%; 25%; 50%) native plant cover.			
MONITORING	Vegetation monitoring and overall site inspection.	Spring of each calendar year for a period of three years after planting. If completion criteria have not been met, monitoring will continue for another 2 years.	If completion criteria have not been met after 5 years, contingency actions and further monitoring will be discussed with the Department of Water and Environmental Regulation.	$2,500.00	$7,500.00	
MAINTENANCE AND CONTINGENCY	Weed control.	Annually in late spring with a follow-up in Autumn as required, for a minimum of 3 years following cessation of planting (including replacement or infill planting).	No introduction of new weed species or spread of existing species.	$1,000.00	$1,000.00	
	Application of plant guards.	If required.				
	Remove rubbish.	If required.	Remove all rubbish and debris from the site.			
	Infill planting.	If required.		$1,250.00	$2,500.00	
REPORTING	Annual progress report.	Submit to DWER by 30 June each year.		$600.00	$2,400.00	
					$37,136.00	

About the Authors

This plan was produced by the Shire of Kellerberrin's NRMO, Dylan Copeland, in association with Steve Fry of Santaleuca Consulting.

The reference site floristic data was collected by Steve Fry, assisted by Dylan Copeland.

The completion criteria were developed by Dylan Copeland and Steve Fry.

Dylan Copeland, NRMO

Dylan Copeland has been providing Natural Resource Management Officer services to a number of Local Governments in the eastern Wheatbelt for over six years. During this time, he has been a Project Manager on the following revegetation projects:

- Connecting Biodiversity Across the Wheatbelt of Western Australia
- Engaging Landholders to Combat Vegetation Decline within Shire of Kellerberrin
- Engaging Landholders to Combat Vegetation Decline within Shire of Merredin
- Engaging Landholders to Combat Vegetation Decline within Mt Marshall Shire
- Engaging Landholders to Combat Vegetation Decline within Shire of Mukinbudin
- Engaging Landholders to Combat Vegetation Decline within Shire of Westonia
- Connecting Corridors Across Cunderdin
- Connecting Corridors Across Quairading
- Connecting Corridors Across Tammin
- Continuing to Combat Vegetation Decline within Shire of Kellerberrin
- Continuing to Combat Vegetation Decline within Shire of Merredin
- Continuing to Combat Vegetation Decline within Shire of Mt Marshall
- Continuing to Combat Vegetation Decline within Shire of Mukinbudin
- Continuing to Combat Vegetation Decline within Shire of Nungarin
- Continuing to Combat Vegetation Decline within Shire of Quairading
- Continuing to Combat Vegetation Decline within Shire of Westonia

This role included all aspects of the project, from design, development, and funding application, through to site visits, seedling lists and nursery orders, and reporting and acquittal (some of these projects are completed and some ongoing).

Dylan Copeland is contactable at the following addresses:

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Postal: Shire of Kellerberrin
PO BOX 145
Kellerberrin WA 6410

Steve Fry, Santaleuca Consulting

Since 1994, Steve Fry has been involved in all aspects of seed collecting and revegetation. Steve owned and operated Perenjori Tree Farm, provided contract revegetation services, collected and traded native seed, worked for various LGAs, and established his own sandalwood plantation (as well as contract services). Additionally, Steve is the about only person who lives in the eastern Wheatbelt from whom DWER will accept flora and vegetation surveys and reports.

Steve Fry is contactable at the following addresses:

Email:	fryclan@bigpond.com
Postal:	Santaleuca Consulting PO Box 278 Narembeen WA 6369

References

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Attachments

1. Combined V4.shp: spatial data for the clearing area;
2. Proposed Revegetation Site.shp: spatial data for the revegetation site;
3. Reference Site Quadrats.shp: spatial data for the reference site.

Appendix A

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Eucalypt Woodlands of the Western
EPBC Act status	Critically Endangered
Annual probability of extinction	6.8%
Based on IUCN category definitions	

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	Yes	Wheatbelt Woodland TEC	Area	1.17	Hectares	Santalaceae Consulting flora and vegetation survey
			Quality	7	Scale 0-10	
			Total quantum of impact	0.82	Adjusted hectares	
Threatened species habitat						
Area of habitat	No		Area			
			Quality			
			Total quantum of impact	0.00		
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

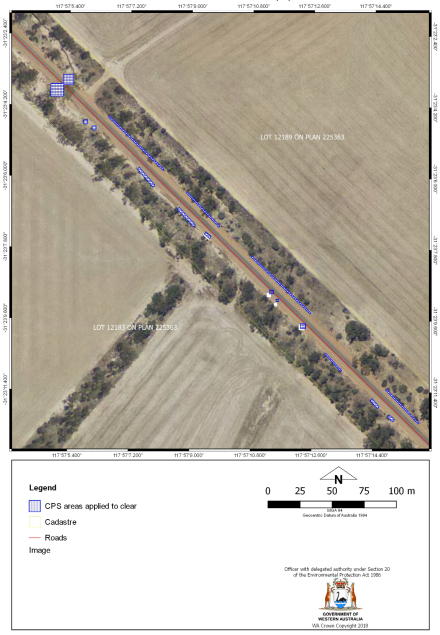
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	Yes	0.82	Adjusted hectares	Revegetation	Risk-related time horizon (max. 20 years)	20	Start area (hectares)	6.5	Risk of loss (%) without offset Future area without offset (adjusted hectares)	80% 1.3	Risk of loss (%) with offset Future area with offset (adjusted hectares)	30% 4.6	3.25	60%	1.95	0.52	0.48	58.34%	No	$13,000.00	
					Time until ecological benefit	20	Start quality (scale of 0-10)	1	Future quality without offset (scale of 0-10)	3	Future quality with offset (scale of 0-10)	7	4.00	80%	3.20	0.86				
Threatened species habitat																				
Area of habitat	No				Time over which loss is averted (max. 20 years)		Start area (hectares)		Risk of loss (%) without offset Future area without offset (adjusted hectares)	0.0	Risk of loss (%) with offset Future area with offset (adjusted hectares)	0.0								
					Time until ecological benefit		Start quality (scale of 0-10)		Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)									
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

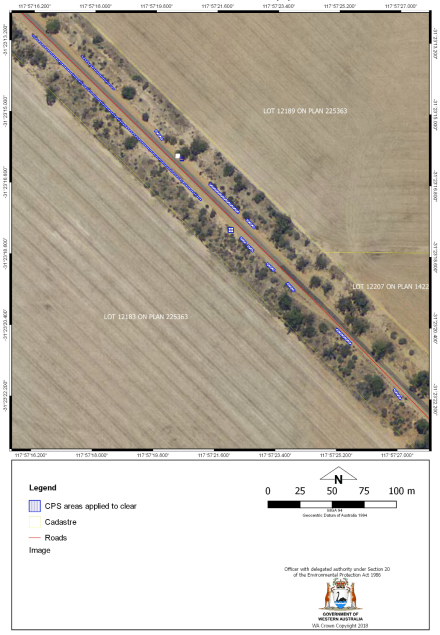
Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	0				$0.00		$0.00
Area of community	0.819	0.48	58.34%	No	$13,000.00	$52,475.45	$65,475.45
					$13,000.00	**$52,475.45**	**$65,475.45**

Appendix B

Draft Plan 8253/1(b)

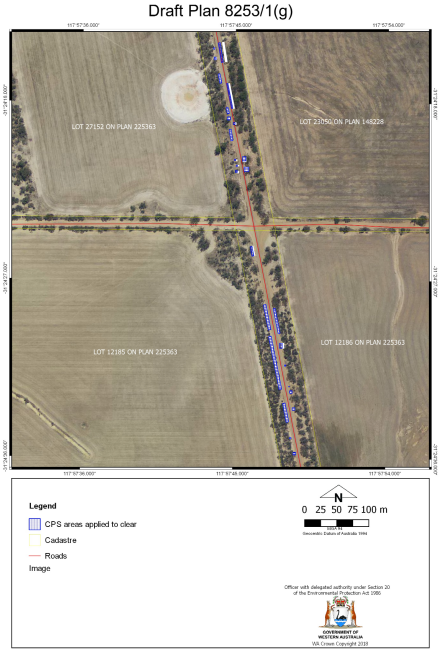


Draft Plan 8253/1(c)

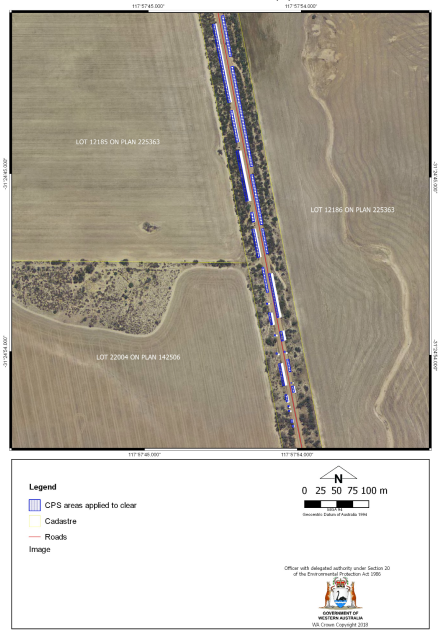


Draft Plan 8253/1(f)

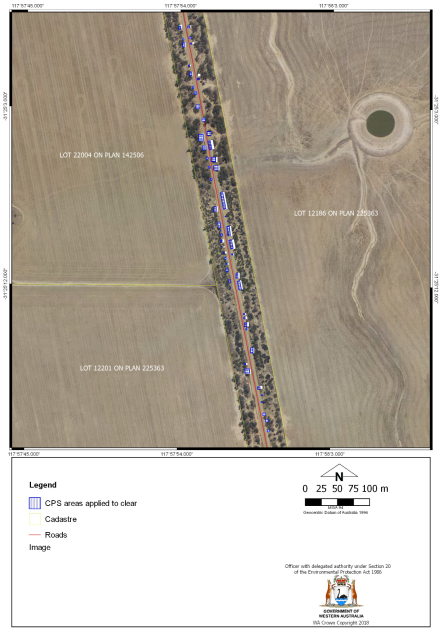
Draft Plan 8253/1(g)



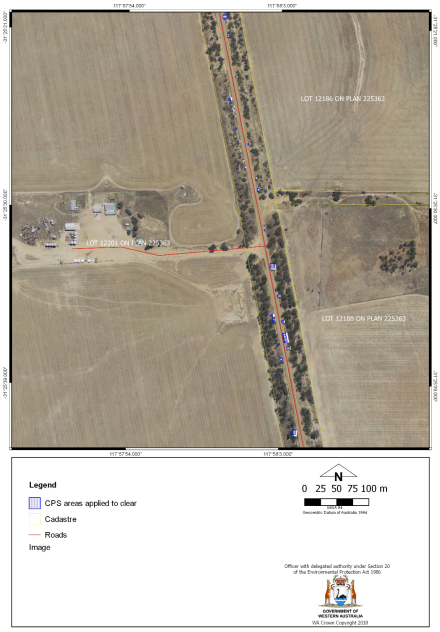
Draft Plan 8253/1(h)



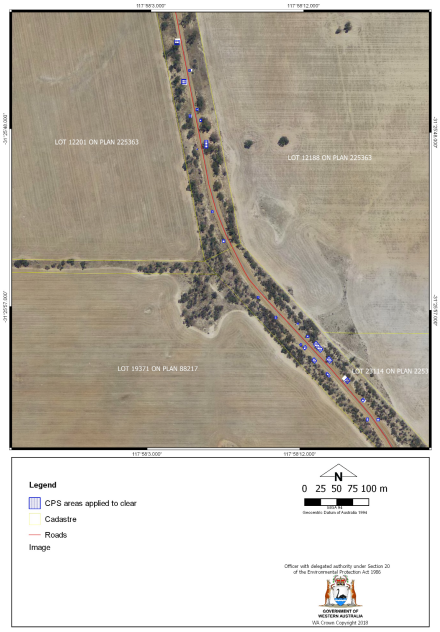
Draft Plan 8253/1(j)



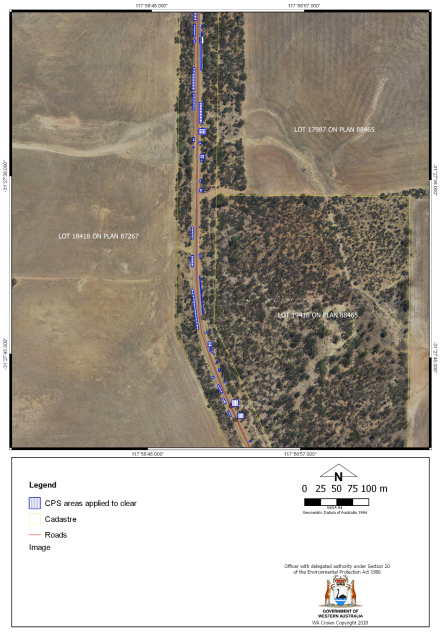
Draft Plan 8253/1(k)



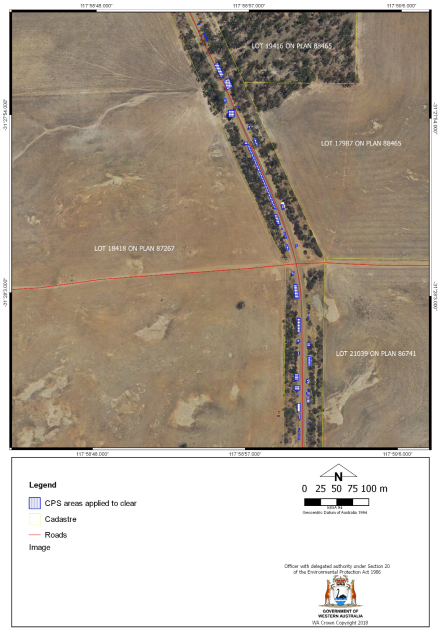
Draft Plan 8253/1(l)



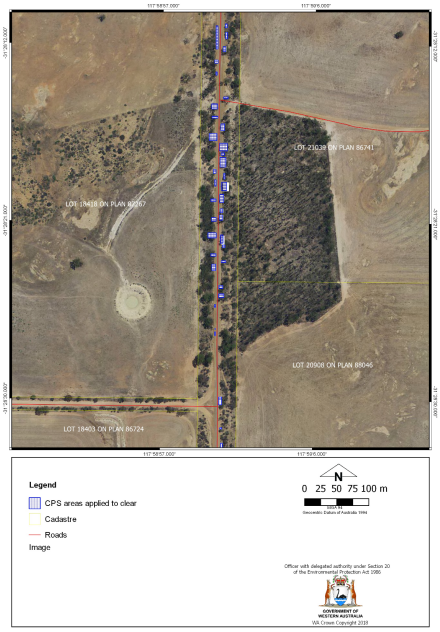
Draft Plan 8253/1(q)



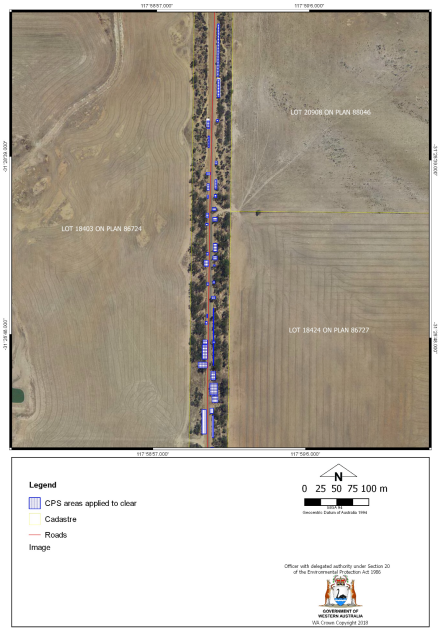
Draft Plan 8253/1(r)



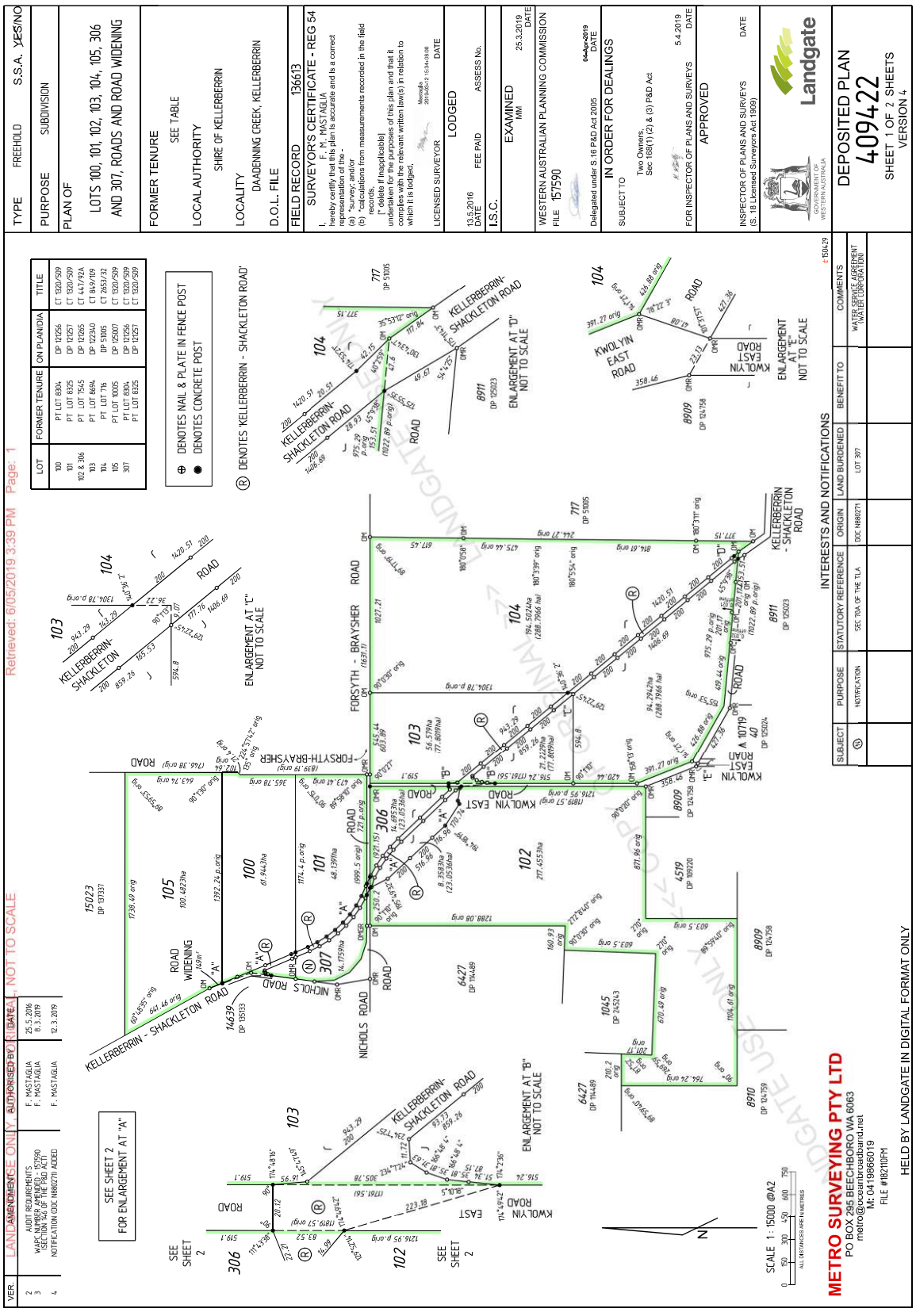
Draft Plan 8253/1(s)



Draft Plan 8253/1(t)



Appendix C


TYPE FREEHOLD S.S.A. YES/NO
PURPOSE SUBDIVISION
PLAN OF
LOTS 100, 101, 102, 103, 104, 105, 306 AND 307, ROADS AND ROAD WIDENING
FORMER TENURE
SEE TABLE
LOCAL AUTHORITY
SHIRE OF KELLERBERRIN
LOCALITY
DAADENNING CREEK; KELLERBERRIN
D.O.L. FILE
FIELD RECORD 136613
SURVEYOR'S CERTIFICATE - REG 54
I, F. M. MASTAGLIA
hereby certify that this plan is accurate and is a correct representation of the -
(a) boundaries; and/or
(b) variations from measurements recorded in the field records,
[* delete if inapplicable]
undertaken for the purposes of this plan and that it complies with the relevant written law(s) in relation to which it is lodged.
LICENSED SURVEYOR
LODGED
13.5.2016 DATE
FEE PAID
ASSESS No.
I.S.C.
EXAMINED MM 25.3.2019 DATE
WESTERN AUSTRALIAN PLANNING COMMISSION FILE 157590
Delegated under S.16 P&D Act 2005 04-Dec-2019 DATE
IN ORDER FOR DEALINGS
SUBJECT TO
Two Owners
Sec 168(1) (2) & (3) P&D Act
5.4.2019 DATE
FOR INSPECTOR OF PLANS AND SURVEYS
APPROVED
INSPECTOR OF PLANS AND SURVEYS (S. 18 Licensed Surveyors Act 1909) DATE
Landgate
DEPOSITED PLAN 409422
SHEET 1 OF 2 SHEETS
VERSION 4
LOT | FORMER TENURE | ON PLAN/DIA | TITLE
100 | PT LOT 8304 | DP 112256 | CT 1320/509
101 | PT LOT 8325 | DP 112257 | CT 1320/509
102 & 306 | PT LOT 7545 | DP 112265 | CT 1447/924
103 | PT LOT 8694 | DP 122340 | CT 1849/109
104 | PT LOT 716 | DP 51805 | CT 2653/32
105 | PT LOT 10005 | DP 125007 | CT 1320/509
307 | PT LOT 8304 | DP 112256 | CT 1320/509
PT LOT 8325 | DP 112257 | CT 1320/509
DENOTES NAIL & PLATE IN FENCE POST
DENOTES CONCRETE POST
DENOTES 'KELLERBERRIN - SHACKLETON ROAD'
INTERESTS AND NOTIFICATIONS
SUBJECT | PURPOSE | STATUTORY REFERENCE | ORIGIN | LAND BURDENED | BENEFIT TO | COMMENTS
(S) | NOTIFICATION | SEC 70A OF THE TLA | DOC N880271 | LOT 307 | | WATER SERVICE AGREEMENT WATER CORPORATION
VER. LAND AMENDMENT ONLY. AUTHORISED BY DATE
2 AUDIT REQUIREMENTS F. MASTAGLIA 25.5.2016
3 WAPC NUMBER AMENDED : 157590 (SECTION 146 OF THE P&D ACT) F. MASTAGLIA 8.3.2019
4 NOTIFICATION (DOC N880271) ADDED F. MASTAGLIA 12.3.2019
HELD BY LANDGATE IN DIGITAL FORMAT ONLY
SCALE 1 : 15000 @A2
ALL DISTANCES ARE IN METRES
SEE SHEET 2 FOR ENLARGEMENT AT "A"
ENLARGEMENT AT "A" NOT TO SCALE
ENLARGEMENT AT "B" NOT TO SCALE
ENLARGEMENT AT "C" NOT TO SCALE
ENLARGEMENT AT "D" NOT TO SCALE
ENLARGEMENT AT "E" NOT TO SCALE
KELLERBERRIN - SHACKLETON ROAD
KWOLYIN EAST ROAD
NICHOLS ROAD
FORSYTH - BRAYSHER ROAD
ROAD WIDENING
METRO SURVEYING PTY LTD
PO BOX 295 BEECHBORO WA 6063
metro@oceanbroadband.net
M: 0419866019
FILE #18210DPM
Retrieved: 6/05/2019 3:39 PM Page: 1
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Appendix D

Nursery Industry Accreditation Scheme, Australia

Est. 1996

ACCREDITED NIASA NURSERY

Setting the Standards

Certificate of Accreditation

This is to certify that

Chatfields Tree Nursery

complies with the standards of the

Nursery Industry Accreditation Scheme Australia

Certification Period – 2019

ACCREDITED NIASA NURSERY

Setting the Standards

Peter Vaughan
Nursery & Garden Industry Australia
Chief Executive Officer

Karen Brock
Nursery & Garden Industry Australia
President

NIASA is an independently audited 'Best Management Practice' (BMP) program operating under national BMP Guidelines defining nursery production technology and strategies that support plant health, system design and cropping efficiencies. NIASA underpins this business through a process of continual change and improvement driven by the application of scientifically assessed research and development outcomes.

Appendix E

Species		Storey	Required storey density per ha	Average density per species	Total species count required per ha	Estimated survival rate	Required # to plant per ha	Actual # to plant per ha	Total order (rounded to tray size)
Acacia	***erinaceae***	Large shrub	540	12	45	80.0%	56	59	384
Acacia	***hemiteles***	Large shrub	540	12	45	80.0%	56	59	384
Acacia	***acuminata***	Large shrub	540	12	45	80.0%	56	59	384
Acacia	***microbotrya***	Large shrub	540	12	45	80.0%	56	59	384
Allocasuarina	***campestris***	Large shrub	540	12	45	80.0%	56	59	384
Amphipogon	***caricinus***	Grass		0		80.0%	0	0	0
Atriplex	***semibaccatta***	Small shrub	840	7	120	80.0%	150	148	960
Atriplex	***vesicaria***	Small shrub	840	7	120	80.0%	150	148	960
Austrostipa	***elegantissima***	Grass		0		80.0%	0	0	0
Borya	***constricta***	Ground cover		0		80.0%	0	0	0
Daviesia	***hakieoides***	Large shrub	540	12	45	80.0%	56	59	384
Dianella	***revoluta***	Small shrub	840	7	120	80.0%	150	148	960
Enchylaena	***tomentosa***	Small shrub	840	7	120	80.0%	150	148	960
Eremophila	***drummondii***	Small shrub	840	7	120	80.0%	150	148	960
Eucalyptus	***salubris***	Tree	60	3	20	35.0%	57	59	384
Eucalyptus	***salmonophloia***	Tree	60	3	20	35.0%	57	59	384
Eucalyptus	***loxophleba ssp loxophleba***	Tree	60	3	20	35.0%	57	59	384
Hakea	***preissii***	Large shrub	540	12	45	80.0%	56	59	384
Lawrencella	***rosea***	Annual		0		80.0%	0	0	0
Maireana	***brevifolia***	Small shrub	840	7	120	80.0%	150	148	960
Melaleuca	***adnata***	Large shrub	540	12	45	80.0%	56	59	384
Melaleuca	***uncinata***	Large shrub	540	12	45	80.0%	56	59	384
Pittosporum	***angustifolium***	Large shrub	540	12	45	80.0%	56	59	384
Podotheca	***gnaphaloides***	Annual		0		80.0%	0	0	0
Rhagodia	***preissii***	Small shrub	840	7	120	80.0%	150	148	960
Santalum	***acuminatum***	Large shrub	540	12	45	80.0%	56	59	384
Senna	***artemisioides***	Large shrub	540	12	45	80.0%	56	59	384
Waitzia	***acuminata***	Annual		0		80.0%	0	0	0
					1440		**1,896**	**1,920**	**12,480**