Narrogin-Kondinin Road

Wickepin East 70.0 - 76.54

Revegetation Plan

Revision 1.0
August 2011

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1. PROJECT INFORMATION

1.1 Project Location

The project is located on the Narrogin Kondinin Road between 70.0 to 76.54 SLK which is approximately 1.5 km east of Wickepin (see Figure 1) and 215 km south-east of Perth. These revegetation works follow the widening of the road along this 6 ½ km section.

1.2 Road History

Gradual and steady increases in traffic levels along the Narrogin Kondinin Road have occurred as a result of increased grain freight movements in the area. This has increased the volume of vehicles using the Narrogin Kondinin Road to access the CBH bin in the town of Wickepin and Brookton. The width of the existing road is unsuitable for the increased traffic and these works are required to improve the road geometry and general road safety attributes along this section of road.

1.3 Proposed Works

The roadworks on this section of road between 70.0 – 76.54 SLK will be constructed in 2011/2012. The works will involve clearing an area up to 0.6 ha.

Following these roadworks 10.5 ha of revegetation will occur in a 20 metre strip of resumed farmland between 70.18 to 75.5 SLK (see aerial photo Figure 2).

1.4 Vegetation Description at 70.0 to 76.54 SLK

The vegetation in this area is mapped as Medium woodland; York gum, wandoo & salmon gum - Vegetation Association 1023. However in and around the project area only remnants in varying condition remain due to a long history of agricultural settlement. See Table 1 for a list of species identified in the vicinity of the project.

Family	Genus	Species	Common Name
Mimosaceae	Acacia	acuminata	Jam
Mimosaceae	Acacia	microbotrya	Manna Wattle
Casuarinaceae	Allocasuarina	huegeliana	Rock Sheoak
Chenopodiaceae	Atriplex	semibaccata	Berry Saltbush
Poaceae	Austrostipa	elegantissima	
Myrtaceae	Callistemon	phoeniceus	Lesser Bottlebrush
Casuarinaceae	Casuarina	obesa	Swamp Sheoak
Phormiaceae	Dianella	revoluta	Blueberry Lily
Myrtaceae	Eucalyptus	longicornis	Red Morrel
Myrtaceae	Eucalyptus	loxophleba	York Gum
Myrtaceae	Eucalyptus	salmonophloia	Salmon Gum
Myrtaceae	Eucalyptus	wandoo	Wandoo
Papilionaceae	Gastrolobium	parviflorum	
Papilionaceae	Gastrolobium	spinosum	Prickly Poison
Proteaceae	Grevillea	huegelii	
Chenopodiaceae	Halosarcia sp		
Proteaceae	Hakea	preissii	Needle Tree
Myrtaceae	Leptospermum sp		
Myrtaceae	Melaleuca	brevifolia	Small Leaf Bluebush
Myrtaceae	Melaleuca	uncinata	Broom Bush
Thymelaeaceae	Pimelea	argentea	Silvery Leaved Pimelea
Templetonia	Templetonia	sulcata	Centipede Bush

Table 1 – Species List Narrogin Kondinin Road, 70.0 – 76.54 SLK & Surrounding Area

2. REVEGETATION INFORMATION

The revegetation along this section of road will be via plantings with locally occurring indigenous species (Table 2) within the road reserve. The total area to be revegetated is 10.5 ha of previously farmland acquired for this project.

2.1 Weed Control

Weed control will involve herbicide treatments to reduce the amount of weeds present. This will reduce the competition for available water and nutrients with the native seedlings, leading to a more successful revegetation outcome. Weed control will be carried out after the 2012 opening rains and once the annuals emerge, it should also be completed several weeks prior to planting. Herbicide will be applied from a boom spray unit where accessible and hand sprayed in other areas. A herbicide application record sheet will be completed for all weed spray operations (Appendix 1).

Areas to be planted with seedlings will be sprayed during late April/May before planting (timing may vary with seasonal conditions). These sites will be sprayed with a residual herbicide (e.g. Simazine) and knockdown (e.g. Glyphosate) mix. Simazine will be sprayed at 2 kg/ha and Roundup PowerMax will be sprayed at a minimum 1 L/ha, with the carrier 100 litres of water per hectare.

A follow up spray in spring with Fusilade or Verdict may be required to control narrow leaf grasses. If narrow leaf grasses are prevalent on the site it would be anticipated this herbicide treatment would be required. Fusilade will be sprayed at a maximum 3.3 L/ha and if Verdict is used this will be sprayed at a maximum 0.4 L/ha, with the carrier 100 litres of water per hectare.

2.2 Topsoil Management

For the Wickepin East Project the decision was made to keep the topsoil in situ. Although the area does have weeds present, it is considered the weed control program can tackle the majority of these weed species. By keeping the topsoil on site any nutrients, organic matter or micorrhizal fungi will remain to benefit the revegetation.

2.3 Fauna Management

It is recognised that vegetation inside road reserves can act as corridors for wildlife movement and removal of road reserve vegetation has the potential to impact on the movement of fauna. To increase fauna habitat any large boulders and wood debris brought to the surface during ripping will be left for habitat. Suitable large tree trunks that can be placed in the revegetation site following ripping may also be available from adjacent project clearing.

2.4 Dieback Management

The project area receives less than 400 mm average annual rainfall and as such, dieback is not considered to be an issue.

2.5 Machinery

Large earthmoving machinery and tractors will be required to prepare the site for planting. It is a requirement for the project that:

- Oil changes will not be carried out within the revegetation site.

- All machinery to be fitted with fire extinguishers.
- Any soil contaminated by oil or fuel will be removed from site and disposed of at an approved location.
- Fuel will not be stored on site.

2.6 Site Preparation

For the 10.5 ha planting sites mulched vegetation, where available, from the road works will be respread across the planting site to a minimum depth of 50 mm and not more than 100 mm thick. Mulch will be prioritised for the 3.0 hectare offset site with any remaining spread over the other 7.5 hectare revegetation area. After the mulch is spread the area will be ripped along the contour at 1-metre intervals and to a minimum depth of 300 mm with a grader or ideally a dozer. Using a dozer, a D6 or equivalent, means a ripping depth of 450+ mm can be achieved. This will ensure ripping is deep enough in the mulched areas and to create a suitable medium for the plants to establish. This ripping will occur in dry conditions (March/April) as this will shatter the soil and allow time for the site to settle before planting.

All ripping will be undertaken by a machine with a multi shank ripper to reduce the number of passes required and fitted with new Ground Engaging Tools (ripper boots) on the ripping shanks to further improve the quality of the site preparation.

2.7 Revegetation

Planting will occur in late June to July with 2,000 stems per hectare (1 plant per 5.0 m^2). Seedlings are to be 'hardened off' before planting and at this rate approximately 22,000 stems will be required to cover the 10.5 ha site (25,000 will be ordered to ensure there are adequate numbers) . Fertiliser for the planting won't be used as the majority of the land to be revegetated is old farmland which has been subjected to high fertiliser use over many years

Species	Common Name	Quantity
Acacia lasiocarpa	Panjang	1,500
Allocasuarina huegeliana	Rock Sheoak	2,000
Allocasuarina humilis	Dwarf sheoak	2,000
Callistemon phoeniceus	Lesser Bottlebrush	2,000
Calothamnus quadrifidus	One-sided Bottlebrush	3,000
Casuarina obesa	Swamp Sheoak	1,000
Dianella revoluta	Blueberry Lily	500
Eucalyptus longicornis	Red Morrel	1,000
Eucalyptus loxophleba	York Gum	1,000
Eucalyptus salmonophloia	Salmon Gum	1,000
Eucalyptus wandoo	Wandoo	1,000
Gastrolobium parviflorum		1,000
Gastrolobium spinosum	Prickly Poison	1,000
Hakea lissocarpha	Honey Bush	2,000
Hakea multilineata	Grass Leaf Hakea	1,000
Hakea preissii	Needle Tree	500
Hakea undulata	Wavy-leaved Hakea	1,000
Melaleuca uncinata	Broom Bush	2,000
Pimelea argentea	Silvery Leaved Pimelea	500
		25,000

Table 2 – Species List for Revegetation

2.8 Ongoing Maintenance & Monitoring

Monitoring of the revegetation effort will determine if follow up plantings will be required. The methodology for monitoring will involve establishing quadrants, photo monitoring points and utilising Main Roads' rapid assessment 'drive by monitoring'. The quadrants will be 100 m^2 (10 m by 10 m). The fixed corner points for the quadrant can also double as the location for the photo monitoring points. During monitoring revegetation success and weed invasion will be recorded using the monitoring sheets at Appendix 2.

The revegetation site will be inspected in November after planting to assess if infill plantings are required during the following winter. The site may still have a good survival rate in November but it is important to inspect the site early as seedling orders for the following winter are required at nurseries by December. If no infill is proposed a second inspection will occur in April/May of the following year. By this time the seedlings would have gone through their first summer and species density, diversity and weed load can be assessed.

One year after revegetation there should be 1,500 stems per hectare (75 % survival from the 2,000 stems per ha planted) and no less than 5 different species present per 100 m^2.

If the species density or diversity has dropped significantly below these amounts infill planting will be required. At the time of this inspection (April/May) there are still several months to ring around to nurseries in an attempt to locate seedlings for infill planting during June/July. There is also time to arrange follow up weed control if the weed load is determined to be detrimental to maintaining species density and diversity in the future. This weed control will again be through the use of herbicide and will either be in the form of broadscale application or spot treatment of affected areas.

For follow up weed control if a Simazine/Roundup mix is used (see Weed Control section) in planted areas this will be spot sprayed on target weeds to avoid overspray onto native plants. Broadscale application will again be through a boom using a Simazine/Fusilade or Simazine/Verdit mix, Roundup should be avoided in a boom spray situation as if sprayed over the planted vegetation this will kill the native plants as well. The only time spraying Roundup over planted vegetation will be considered is in areas with a large amount of broadleaf weed. Roundup can be used when these weeds first germinate at a rate of 0.1-0.2 L/ha, however timing is crucial as spraying must occur before these weeds become established. At this rate the leaves on the planted vegetation will slightly burn and growth might be set back for a few months, so this Roundup option will only be used as a last resort for controlling broadleaf weed in this revegetation site.

For three years after planting the health and quantity of the revegetation will be monitored. If determined during this monitoring that weed control is required then follow up herbicide applications will occur on problem weeds also for up to three years after planting. This monitoring may result in further plantings if species density or diversity has diminished. Generally infill planting will only be a viable option for the year following the initial planting. This is because several years after the initial works the canopy and root systems are beginning to develop, making it hard for newly planted seedlings to take hold and establish themselves.

2.9 Signage

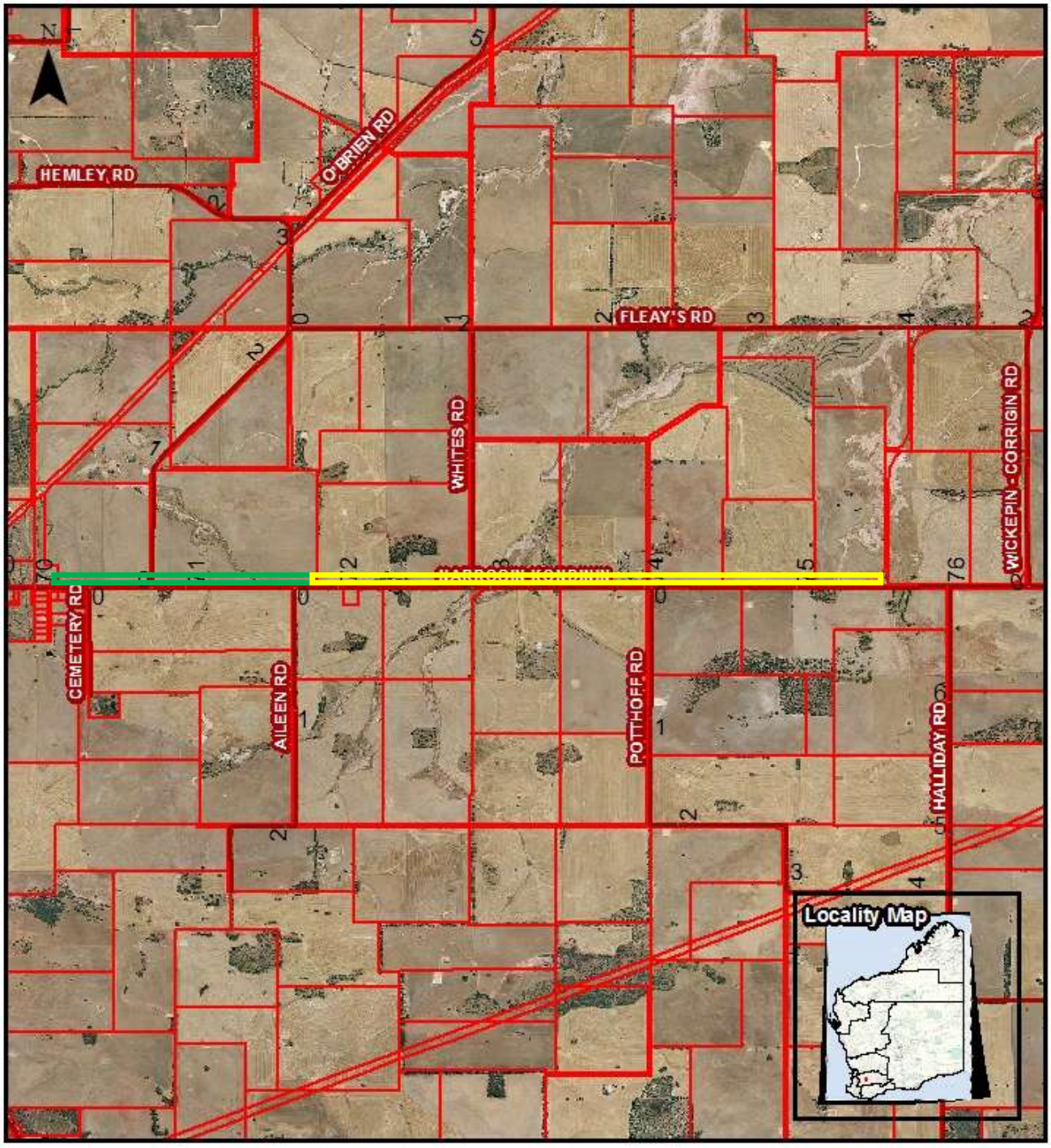
Revegetation sites will be signed with Main Roads' standard sign MR-GM-14 (http://standards.mainroads.wa.gov.au/NR/rdonlyres/F1263FEB-1A85-496D-8FDB-65C7292770E6/0/E27029_20090310130158697.PDF).

Table 3 Revegetation Timeline

Aspect	Summer 2011	Autumn 2012	Winter 2012	Spring 2012	Summer 2012/13	Autumn 2013	Winter 2013	Spring 2013	Summer 2013/14	Autumn 2014	Winter 2014	Spring 2014	Summer 2014/15	Autumn 2015	Winter 2015
Seedling order															
Site preparation															
Initial weed control															
Seedling plantings															
Follow up weed control															
Monitoring															
Infill planting															
Maintenance weed control															

FIGURE 1 REVEGETATION LOCATION

FIGURE 2 AERIAL PHOTO, 70.0 TO 76.5 SLK



3.0 ha offset revegetation

7.5 ha other project revegetation

LEGEND

SLK Network

wbs_cad_mga50

0 0.3 0.6 1.2 Km

MAP INFORMATION
Geographic Coordinate System: Geocentric
Datum of Australia 1994 - Projection MGA Zone 50

PUBLISHER DETAILS

Directorate: Regional Services
Branch: Wheatbelt South Region
Author: Nigel Rowe
Data Currency: As Supplied

Project: Narrogin-Kondinin Road

APPENDIX 1 HERBICIDE APPLICATION SHEET

LOCATION AND APPLICATION

Road/Location :

Tank Capacity (Full):

Boom Width:

Hose Reel Description:

SPRAY PARAMETERS

Nozzle Type:

Nozzle Pressure:

L/Min Output:

Vehicle Speed:

Operators Name:

VOLUME OF CHEMICAL PER TANK

Carrier Fluid:

Herbicide(s):

Surfactant:

Date	Start SLK	Finish SLK	Left	Med	Right	Area(Ha)	Spray Hrs	Application (Boom/Hose)	Rate/Ha	Used(L)	Comments
					TOTALS						

WEATHER

Overcast Fine

Temp ° C

Humidity Low ❑ Med ❑ High ❑

Wind N ❑ S ❑ E ❑ W ❑

Speed km/hr: Knots:

REMARK / FACTORS AFFECTING PERFORMANCE

APPENDIX 2 REVEGETATION MONITORING SHEET

Used for a Monitoring Quadrants

Site Number		GPS		SLK		Side of Road	
Current Site Conditions							
Revegetation History							
Revegetation Species Present in 10 m x 10 m							
Number of species present in 10 m x 10 m		Number of individual plants present in 10 m x 10 m		Approximate number of plants present in one ha			
Weed Species Present							
Additional Comments							

Used for Rapid Assessment monitoring i.e. drive by monitoring

SLK from	SLK to	Landform	Reveg Treatment	Left Verge			Notes	Action Required
				Width (m)	Plant cover	Weed cover		

Plant Cover	Rating
Good cover > 50%	A
Fair cover 25-50%	B
Poor cover < 25%	C

Weed Cover	Rating
Few weeds present, isolated or small clumps (<10% cover).	1
Some weeds present - weed cover < revegetation cover.	2
Invasive species, grasses - weed cover > revegetation cover.	3