

PF Formation

## **2013 Monitoring of revegetation at Hitchcock Road, Maroota**

5 December 2013



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# 1. Introduction

This report presents the findings of the third monitoring session of a rehabilitation area within PF Formation's sandmining operations at Hitchcock Road, Maroota.

## 1.1 Background

Expansion of an existing PF Formation sand mine at Hitchcock Road required clearing of 3.7 hectares of Sydney Hinterland Transition Woodland. It was proposed to offset this clearing with revegetation and re-creation of this community within a 7.9 hectare area on the western boundary of the site where quarrying has been completed. A key condition of the clearing being permitted is that PF Formation establishes at least 3.7 hectares of revegetation, recreating the Sydney Hinterland Transition Woodland community. Revegetation was commenced by PF Formation in 2004. To date an area of 4.2 hectares has been replanted (approximately 1 hectare in 2004, 2 hectares in 2006 and 1.2 hectares in 2011) with the aim to recreate the vegetation to be cleared from Lot 1 DP 1013943.

Monitoring of the rehabilitation of previously mined areas is a requirement of project approval and environmental reporting is required to provide some certainty that this revegetation will ultimately result in the creation of a naturally regenerating patch of Sydney Hinterland Transition Woodland. This monitoring needs to be undertaken regularly by independent consultants (not those undertaking the revegetation works) and to include assessment against the success criteria developed for rehabilitation within the site, as included in the consent conditions for the project.

Parsons Brinckerhoff undertook monitoring of the site in July 2010 (Parsons Brinckerhoff 2010) with a second monitoring session in October 2012. Based on the monitoring results of 2012 (Parsons Brinckerhoff 2012) and the progress towards the ecological completion criteria, the Department of Planning and Infrastructure approved the clearing of Sydney Hinterland Transition Woodland within the site in March 2013. Continuation of the monitoring of the rehabilitation and offset obligations are required in accordance with the project approval and to provide detailed reporting for inclusion in the next Independent Environmental Audit report for the quarry in 2014.

## 1.2 Objectives of revegetation

The objectives of revegetation within the Hitchcock Road site are to:

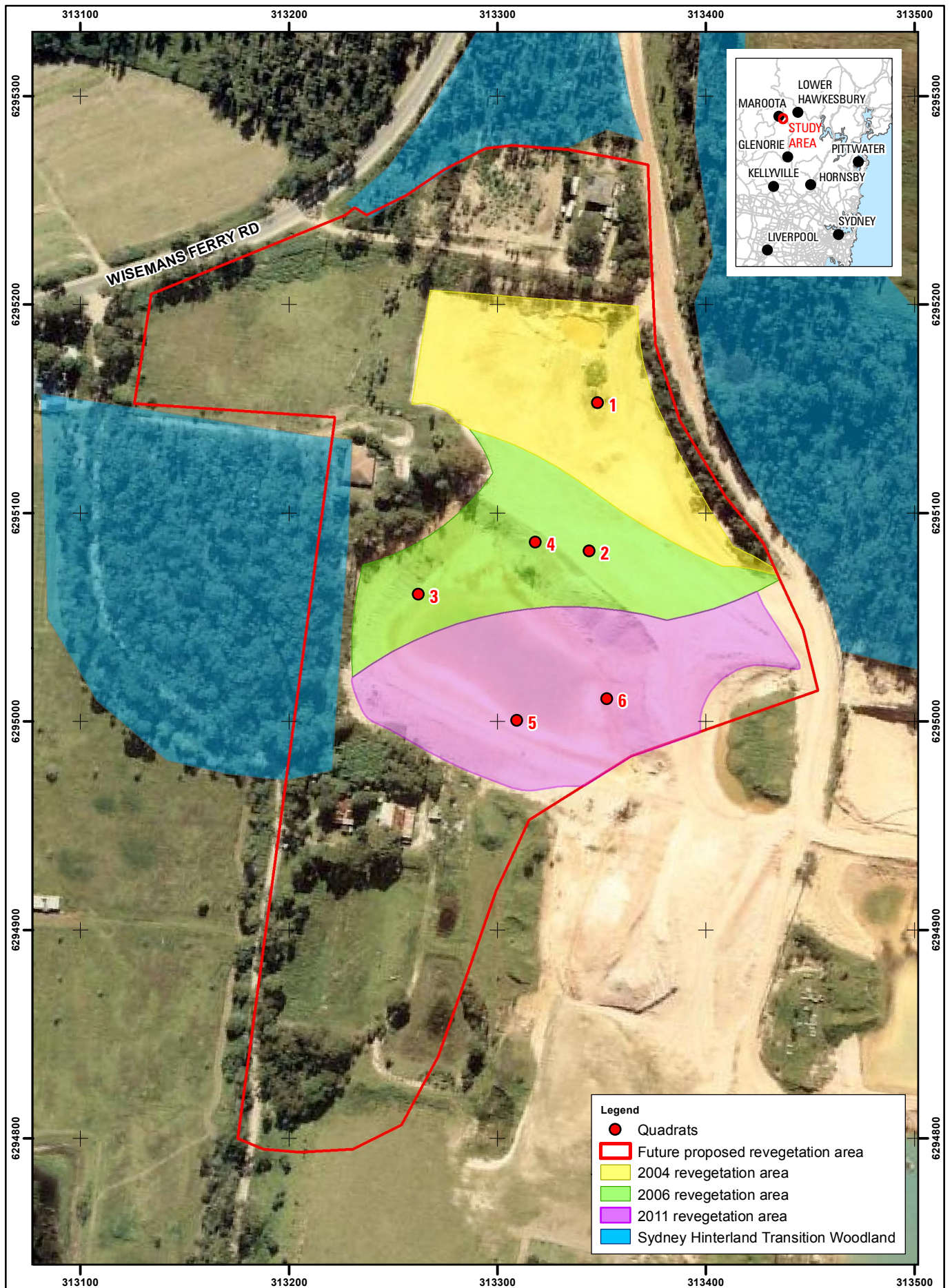
- rehabilitate and revegetate quarried areas
- revegetate with native vegetation characteristic of the community to be removed from Lot 1 DP 1013943, namely Sydney Hinterland Transition Woodland
- re-create the existing characteristics of this community, to provide an area suitable for offsetting the clearing of this community at that time.

## 1.3 Aims of report

The aims of this report are to:

- present the results of the monitoring survey
- analyse the results against the criteria for monitoring the success of rehabilitation and progress towards five, ten and fifteen year targets (see Section 2.3)
- provide recommendations on management actions required to assist in successful re-creation of Sydney Hinterland Transition Woodland within the site and to meet the long-term goals
- provide independent monitoring report for inclusion as part of the Independent Environmental Audit for the quarry in 2014.





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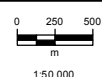


Map No: 2162329A\_GIS\_F001\_A3

Author: GK

Approved by: SH

Date: 31/10/2012



Scale ratio correct when printed at A4 Portrait

Coordinate System: GCS GDA 1994

**2012 Monitoring of revegetation at Hitchcock Road Sand Mine, Maroota**  
**Figure 1-1**  
 Revegetation areas and survey sites







## 2. Methodology

### 2.1 Nomenclature

Names of plants used in this document follow Harden (Harden 1992, 1993, 2000, 2002) with updates from PlantNet (Royal Botanic Gardens 2013) and the Australian Plant Census (Council of Heads of Australasian Herbaria 2010). Scientific names are used in this report for species of plant. Scientific and common names (where available) are provided in plant lists in Appendices A and B. Introduced species are identified within the text with an asterisk following the name, for example *Lantana camara*\*

### 2.2 Field survey

This is the third monitoring survey of the revegetation areas. The first site inspection was undertaken on 5 July 2010, the second undertaken on 25 October 2012 and this, the third undertaken on 2 December 2013. Fixed quadrats (20 x 20 m) were set up with edges running in a north-south, east west direction. Quadrats were marked with stakes at the north western and south western corners of the quadrat.

Within each quadrat, every species of plant present was recorded and its cover abundance estimated using a modified braun blanquet scale:

1. <5%- rare or few individuals
2. <5% common
3. 5–25%
4. 25–50%
5. 50–75%
6. 75–100%.

Additional information recorded at each quadrat site included:

- centre and south western corner of quadrat using GPS
- slope and aspect,
- landform
- soil type
- evidence of disturbance, condition
- evidence of canopy recruitment, natural regeneration
- fauna habitat values
- photographs from the south western corner of the quadrat (to the north, north east, east, south and west).

The location of quadrats is summarised in Table 2.1.

**Table 2.1**      **Quadrat survey locations**

Stratification	Quadrat identifier	Centre of site <sup>1</sup>		South west corner <sup>2</sup>	
		Easting	Northing	Easting	Northing
2004 revegetation area	1	313348	6295163	313335	6295148
2006 revegetation area	2	313343	6295082	313333	6295087
	3	313262	6295061	313253	6295059
	4	313318	6295086	313306	6295077
2011 revegetation area	5	313319	6295008	313309	6295000
	6	313363	6295018	313352	6295011

(1) UTM, WGS 84

(2) Location of monitoring photo point and stake marking the south western corner of quadrat

## 2.3 Criteria to assess rehabilitation success

Field surveys were undertaken in 2008 of the vegetation to be cleared to provide data on the typical characteristics of the community and provide baseline information against which the revegetation program can be assessed (Parsons Brinckerhoff 2008).

The criteria for assessment and the target values for these goals are provided in Table 2.2 on the following page.

**Table 2.2 Criteria to monitor success of revegetation**

Category	Criteria	Target			Condition of vegetation to be removed
		5 years	10 years	15 years	
Native species	Native species diversity (average number per 400 m <sup>2</sup> quadrat)	20	35	40	46
	Average number of characteristic species for the site occurring within 400 m <sup>2</sup>	15	20	27	34.5 (+/- 1.5)
	Native species cover (% cover in 400 m <sup>2</sup> quadrat)	>50	>85	>95	99
Weeds	Weed abundance (% of vegetation cover in 400 m <sup>2</sup> quadrat)	<50	<15	<5	<1
	Invasive or Noxious weed species (e.g. Lantana, Blackberry, exotic vines)	Controlled	Controlled	Controlled	Restricted
Vegetation structure	Vegetation structure	Canopy, shrublayer and groundcover species present. However, structure limited, generally consisting of low canopy and ground cover.	Canopy, shrublayer and groundcover species present. Structure beginning to develop.	Well structured and includes canopy, mid-storey and ground cover units	Well structured and includes canopy, mid-storey and ground cover units
Canopy <sup>a</sup>	Average canopy height (m)	4	8	12	12-16
	Native canopy cover (minimum % cover) [modified braun blanquet scale] <sup>b</sup>	5 [3]	5 [3]	5 [3]	5 [3]
Shrub layer <sup>a</sup>	Native shrub cover (minimum % cover) [modified braun blanquet scale] <sup>b</sup>	10 [3]	15 [3]	25 [4]	32.5 (+/-7.5) [4]
	Average shrub layer height (m)	0.5	1	1	1.25

Category	Criteria	Target			Condition of vegetation to be removed
		5 years	10 years	15 years	
<b>Ground cover</b>	Native ground cover (minimum % cover) [modified braun blanquet scale] <sup>b</sup>	5 [3]	10 [3]	10 [3]	15 (+/-5) [3]
<b>Ecosystem function</b>	Habitat values	Vegetation structure beginning to develop.	Woodland birds recorded.  Habitat structure beginning to develop, including groundcover such as leaf litter and fallen timber.	Woodland birds recorded.  Habitat structure beginning to develop, including groundcover such as leaf litter and fallen timber.	Provides minimal habitat for fauna, however, many woodland birds present.  Well structured habitat, includes moderate levels of leaf litter and fallen timber.
	Natural regeneration indicating dispersal of seed into site and/or presence of soil seed bank	Yes	Yes	Yes	Yes



## 2.4 Results

Photos of the vegetation to be cleared within Lot 1 DP 1013943 and the rehabilitation area quadrat sites are provided in Appendix B. Species recorded, vegetation structure and other environmental characteristics of the quadrat sites are summarised in Appendix C.

## 2.5 Species of plant

A total of 84 species of plant was recorded within the site during this monitoring session, of which 68 (81%) are native. A full list of species recorded within each quadrat and the vegetation structure is provided in Appendix C.

No species listed as noxious under the *Noxious Weeds Act 1993* or Weed of National Significance was recorded.

## 2.6 Assessment against criteria

The results of the field survey were assessed against the criteria for successful revegetation, using the five, 10 and 15 year targets (Table 2.3).

**Table 2.3 Assessment against criteria to monitor success of revegetation**

Category	Criteria	Target			Results		
		5 years	10 years	15 years	2004 revegetation area (9 years)	2008 revegetation area (7 years)	2011 revegetation area (2 years)
Native species	Native species diversity (average number per 400 m <sup>2</sup> quadrat)	20	35	40	33	23	16
	Average number of characteristic species for the site occurring within 400 m <sup>2</sup>	15	20	27	28	17	11
	Native species cover (% of species in 400 m <sup>2</sup> quadrat)	>50	>85	>95	94	78	54
Weeds	Weed abundance (% of vegetation cover in 400 m <sup>2</sup> quadrat)	<50	<15	<5	1	19	33
	Invasive or Noxious weed species (e.g. Lantana, Blackberry, exotic vines)	Controlled	Controlled	Controlled	Controlled	Controlled	Ground cover generally dominated by invasive species, but no noxious or highly invasive species present
Vegetation structure	Vegetation structure	Canopy, shrublayer and groundcover species present. However, structure limited, generally consisting of low canopy and ground cover.	Canopy, shrublayer and groundcover species present. Structure beginning to develop.	Well structured and includes canopy, mid-storey and ground cover units	Well structured and includes canopy, mid-storey and ground cover units	Canopy, shrublayer and groundcover species present. Structure beginning to develop.	Canopy, shrublayer and groundcover species present. However, structure limited, generally consisting of low canopy and ground cover.

Category	Criteria	Target			Results		
		5 years	10 years	15 years	2004 revegetation area (9 years)	2008 revegetation area (7 years)	2011 revegetation area (2 years)
Canopy <sup>a</sup>	Average canopy height (m)	4	8	12	12	6	0.2
	Native canopy cover (minimum % cover) [modified braun blanquet scale] <sup>b</sup>	5 [3]	5 [3]	5 [3]	25 [3]	13 [3]	0
Shrub layer <sup>a</sup>	Native shrub cover (minimum % cover) [modified braun blanquet scale] <sup>b</sup>	10 [3]	15 [3]	25 [4]	10 [3]	18 [3]	33 [4]
	Average shrub layer height (m)	0.5	1	1	1.5	2	1.4
Ground cover	Native ground cover (minimum % cover) [modified braun blanquet scale] <sup>b</sup>	5 [3]	10 [3]	10 [3]	55 [5]	52 [5]	17 [3]
Ecosystem function	Habitat values	Vegetation structure beginning to develop.	Woodland birds recorded. Habitat structure beginning to develop, including groundcover such as leaf litter and fallen timber.	Woodland birds recorded. Habitat structure beginning to develop, including groundcover such as leaf litter and fallen timber.	Woodland birds recorded. Habitat structure beginning to develop, including groundcover such as leaf litter and fallen timber.	Woodland birds recorded. Habitat structure beginning to develop, including groundcover such as leaf litter and fallen timber.	Species of all layers present, however, no distinct canopy layer developing yet. Leaf litter and fallen timber absent or very sparse.
	Natural regeneration indicating dispersal of seed into site and/or presence of soil seed bank	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Purple font indicates that the 5 year target has been met; black font that the 10 year target has been met, green font that the 15 year criteria has been met. Red font indicates that no target has been met.







### 3. Discussion and recommendations

There has been a general improvement in the habitat quality and native species diversity cover and vegetation structure since the previous monitoring survey in 2011. Erosion noted in previous years appears to be stable with increasing cover of groundcover vegetation. Key findings include:

- After 9 years the 2004 revegetation area:
  - ▶ has met the 10 and even 15 year targets in the majority of criteria. The only exception is that the:
    - native shrub cover (% cover) is at the 5 year target. This is not considered to require active management at this stage, and is likely to continue to develop towards the 10 and 15 year targets.
- After 7 years, the 2006 revegetation area:
  - ▶ has met the 5 year targets for all criteria
  - ▶ has met the 10 and 15 year targets for a number of criteria relating to vegetation structure (cover and vegetation height)
  - ▶ has some criteria that will require improvement to reach the 10 year target. However, at this stage no active management is considered necessary for these criteria as they are likely to improve naturally given time. These criteria are:
    - native species cover and diversity
    - decrease in weed cover
    - increase in canopy height.
- After 2 years, the 2011 revegetation area:
  - ▶ has had only a short time since rehabilitation
  - ▶ was dominated by early colonising species and ground cover weed species
  - ▶ has met few of the 5 year targets. The exceptions (species cover, native ground cover, shrub cover and height and weed abundance) provide some encouragement that given more time, this area will regenerate well.
  - ▶ requires regular visual assessments to check for spread of weeds that may inhibit germination and growth of native species.

Given the progress towards the targets, little additional work is considered necessary at this stage with natural regeneration considered likely to continue without active management. Recommendations for weed control and monitoring are summarised Table 3.1.

**Table 3.1 Recommendations to improve revegetation success**

Observation	Recommendation
<b>Monitoring</b>	
Monitoring has not been undertaken annually as part of the annual environmental reporting. However, based on the work undertaken and natural regeneration of the area, this has been appropriate.	<p>Given that the rehabilitation has met or exceeded the relevant targets for the 2004 and 2006 revegetation areas, monitoring next year is not considered necessary for these areas. In these areas monitoring in two years' time (i.e. at 11 and 9 years since rehabilitation respectively) would be sufficient.</p> <p>The 2011 revegetation area would benefit from regular visual inspections (twice yearly), particularly for weed abundance and cover. Where noxious, highly invasive species or dense weeds smothering native species are noted, these should be controlled. Detailed independent monitoring of this area in two year's would be sufficient.</p>
<b>Weeds</b>	
Weed abundance was generally low and restricted to the groundcover. Exotic grasses were dominant in patches.	<p>Consider broad spraying exotic grasses where they occur densely, particularly in the 2011 revegetation area. Broad spraying should be followed by:</p> <ul style="list-style-type: none"> <li>■ slashing and raking or mowing to remove excess debris and stimulate seed germination</li> <li>■ inspection for regeneration of native plants</li> <li>■ repeated broad spraying of germinating weeds if native regeneration is minimal</li> <li>■ spot-spraying and/or hand weeding if substantial germination of native species is recorded.</li> </ul>

The rehabilitation is progressing well and is generally meeting or exceeding the targets set. This suggests that given time the 2004 and 2006 revegetation areas are likely to continue to meet and exceed the target criteria. Given the promising results to date and the fact that the 2011 revegetation has been undertaken using similar methods as the 2004 and 2006 areas, with time, this area is likely to have similar success.



## 4. References

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Royal Botanic Gardens 2013, 'PlantNet - The Plant Information Network System of Botanic Gardens Trust (version 2.0)'.





# Appendix A

Revegetation works to date





# A1. Revegetation works to date

To date an area of 4.2 hectares has been replanted with the aim to recreate the vegetation to be removed from Lot 1 DP 1013943. The revegetation area is on the western boundary of the site (Figure 1.1) and further revegetation scheduled to the south as quarrying is completed. The revegetation area occurs adjacent to remnant vegetation, both within and adjacent to the site. This adjacent vegetation provides a potential seed source for natural seed dispersal into the revegetation area.

Greening Australia were commissioned to propagate tubestock from cuttings and seed from collected vegetation within Lot 1 DP 1013943 to enable the revegetation of quarried areas. The first collection period occurred from late 2000 to February 2002.

Rehabilitation and revegetation has commenced with further revegetation scheduled to the south as quarrying is completed. In 2004 over one hectare of the quarry that had been previously extracted and used as a silt pond was reshaped and prepared for rehabilitation by PF Formation staff. The top soil had been stored from an adjacent area with Sydney Hinterland Transition Woodland and was spread over the site. Further seed collected over the previous 4 years was broadcast over the site in June 2004 to augment the natural soil borne native seed bank.

In 2006 an additional area of approximately two hectares that had been previously mined was prepared for revegetation. The stored top soil was distributed over the site. Greening Australia then provided over 10,000 seedlings and supervised the planting in September to November 2006. An irrigation system was installed to water the plantings over that summer.

In 2011 an additional area of approximately 1.2 hectares was prepared for revegetation and stored top soil was spread over the site.

In 2011, additional work was undertaken as recommended in the 2010 report. This included weed control, erosion control and additional planting (of both seed and tube stock). Seed used for the revegetation was collected locally including from the former trig site. Species used for additional planting are listed in Table A.1.

No additional work has been undertaken on the site since the 2012 monitoring survey.

**Table 4.1 Additional plantings undertaken in 2011**

Scientific name	Common name	Previously recorded within Lot 1 DP 1013943	Species of Sydney Hinterland transition woodland	Additional plantings	
				Seed	Tubestock
<i>Acacia decurrens</i>	Black Wattle			Y	Y
<i>Acacia falcata</i>			Y	Y	Y
<i>Acacia fimbriata</i>	Fringed Wattle			Y	
<i>Acacia linifolia</i>	Flax-leaved Wattle	Y	Y		Y
<i>Acacia longifolia</i>			Y	Y	Y
<i>Acacia myrtifolia</i>	Red-stemmed Wattle	Y	Y		Y
<i>Acacia parramattensis</i>	Parramatta Wattle	Y	Y	Y	Y
<i>Acacia suaveolens</i>	Sweet Wattle	Y	Y	Y	Y

Scientific name	Common name	Previously recorded within Lot 1 DP 1013943	Species of Sydney Hinterland transition woodland	Additional plantings	
				Seed	Tubestock
<i>Acacia terminalis</i>	Sunshine Wattle	Y	Y	Y	
<i>Acacia ulicifolia</i>	Heath Wattle	Y	Y	Y	Y
<i>Allocasuarina littoralis</i>	Black Sheoak	Y	Y	Y	Y
<i>Angophora costata</i>	Sydney Red Gum	Y	Y	Y	Y
<i>Angophora floribunda</i>				Y	
<i>Angophora hispida</i>				Y	
<i>Austrodanthonia tenuior</i>			Y		Y
<i>Banksia ericifolia</i>	Heath Banksia				Y
<i>Banksia integrifolia</i>					Y
<i>Bursaria spinosa</i>	Native Blackthorn				Y
<i>Callistemon pinifolius</i>				Y	
<i>Chloris truncata</i>					Y
<i>Clematis aristata</i>		Y		Y	
<i>Daviesia acicularis</i>			Y		Y
<i>Daviesia ulicifolia</i>					Y
<i>Daviesia virgata</i>					Y
<i>Dianella caerulea</i>		Y	Y		Y
<i>Dichelachne crinita</i>					Y
<i>Dodonaea triquetra</i>			Y	Y	Y
<i>Elaeocarpus reticulatus</i>				Y	
<i>Eragrostis benthamii</i>			Y	Y	
<i>Eragrostis brownii</i>	Brown's Lovegrass		Y	Y	
<i>Eucalyptus crebra</i>			Y	Y	
<i>Eucalyptus eugenioides</i>	Thin-leaved Stringybark	Y	Y	Y	
<i>Eucalyptus eximia</i>				Y	
<i>Eucalyptus globoidea</i>				Y	
<i>Eucalyptus haemastoma</i>				Y	
<i>Eucalyptus moluccana</i>				Y	
<i>Eucalyptus pilularis</i>			Y	Y	
<i>Eucalyptus piperita</i>				Y	
<i>Eucalyptus punctata</i>	Grey Gum	Y	Y		Y
<i>Eucalyptus robusta</i>				Y	
<i>Eucalyptus saligna</i>					Y

Scientific name	Common name	Previously recorded within Lot 1 DP 1013943	Species of Sydney Hinterland transition woodland	Additional plantings	
				Seed	Tubestock
<i>Eucalyptus sp.</i>				Y	
<i>Eucalyptus sparsifolia</i>	Narrow-leaved Stringybark	Y	Y	Y	
<i>Gahnia sieberiana</i>				Y	
<i>Glycine clandestina</i>		Y	Y		Y
<i>Hakea sericea</i>		Y	Y		Y
<i>Imperata cylindrica</i> var. <i>major</i>	Bladey Grass	Y	Y	Y	
<i>Isopogon anemonifolius</i>			Y	Y	
<i>Kunzea ambigua</i>	Tick Bush		Y	Y	Y
<i>Leptospermum polygalifolium</i>				Y	
<i>Leptospermum trinervium</i>			Y	Y	Y
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush	Y		Y	Y
<i>Macrozamia spiralis</i>		Y	Y	Y	
<i>Petrophile pulchella</i>			Y	Y	
<i>Pittosporum undulatum</i>	Sweet Pittosporum	Y		Y	
<i>Poa labillardierei</i> var. <i>labillardierei</i>		Y		Y	Y
<i>Pultenaea villosa</i>			Y	Y	Y
<i>Syncarpia glomulifera</i> subsp. <i>glomulifera</i>	Turpentine	Y	Y	Y	
<i>Themeda australis</i>	Kangaroo Grass	Y	Y		Y

Following planting of the site, regular visual assessments of the site have been undertaken by PF Formation staff. Observations of the establishment of revegetation within the site, suggest that weeds initially took over the site, providing soil stability but within 12 months native plants stabilized. The native plants start growing rapidly 1 to 2 years following planting and the weeds begin to die off (pers comm. P Cummins, PF Formation).





# Appendix B

## Photos













# B1. Vegetation within Lot 1 DP 1013943 (2008)






# B2. Photomonitoring

Table B2.1      Quadrat 1 – 2004 rehabilitation area

Q1	2010	2012	2013
To north			
To east			



Q1	2010	2012	2013
To south			
To west			



Q1	2010	2012	2013
North east into centre			

Table B2.2
Quadrat 2 – 2006 rehabilitation area

Q2	2010	2012	2013
To north			



Q2	2010	2012	2013
To east			
To south			















Q2	2010	2012	2013
To west			
North east into centre			



Table B2.3
 Quadrat 3 – 2006 rehabilitation area

Q3	2010	2012	2013
To north			
To east			




Q3	2010	2012	2013
To south			
To west			









Q3	2010	2012	2013
North east into centre			

Table B2.4      Quadrat 4 – 2006 rehabilitation area

Q4	2010	2012	2013
To north			



Q4	2010	2012	2013
To east			
To south			









Q4	2010	2012	2013
To west			
North east into centre			



Table B2.5      Quadrat 5 – 2011 rehabilitation area

Q5	2012	2013
To north		
To east		
To south		












Q5		2012	2013
To west			
			

Table B2.6 Quadrat 6 – 2011 rehabilitation area

Q6		2012	2013
To north			



Q6	2012	2013
To east		
To south		
To west		

Q6	2012	2013
North east into centre	 A photograph showing a dry, sandy area with sparse, low-lying green vegetation. In the background, there is a dense line of dark green trees under a clear blue sky.	 A photograph showing the same area in 2013. The vegetation has grown significantly, with several tall, thin trees and dense green foliage in the foreground, partially obscuring the sandy ground. The background trees are still visible.





# Appendix C

## Quadrat results





# C1. Quadrat results

**Table C1.1 Vegetation structure**

Vegetation layer	Height: range (median) m	% foliage cover	Dominant species
Quadrat 1			
T1	6-15 (12)	25	<i>Acacia parramattensis</i> , <i>Allocasuarina littoralis</i> , <i>Eucalyptus oblonga</i> , <i>Angophora costata</i>
S1	0.5-3 (1.5)	10	<i>Daviesia genistifolia</i> , <i>Bossiaea lenticularis</i> , <i>Ozothamnus diosmifolius</i> , <i>Oxylobium ilicifolium</i> , <i>Acacia parramattensis</i>
G1	0-0.5 (0.3)	55	<i>Entolasia stricta</i> , <i>Bossiaea lenticularis</i> , <i>Lomandra longifolia</i> ,
Notes:	Good regeneration. Canopy developing. Good layer of leaf litter and some dead grass; Very low cover of weeds, No weedy shrubs, weeds present only in groundcover layer; good soil health- soil lichens and moss; fauna habitat moderate- no hollows or timber, limited groundcover, leaf litter developing; lots of birds present.		
Quadrat 2			
T1	4-10 (8)	15	<i>Angophora costata</i> , <i>Syncarpia glomulifera</i> , <i>Acacia parramattensis</i> ,
S1	0.5-3 (1)	10	<i>Hakea dactyloides</i> , <i>Hakea sericea</i> , <i>Syncarpia glomulifera</i> , <i>Angophora costata</i>
G1	0-1 (0.3)	38	<i>Briza maxima</i> *, <i>Themeda australis</i> , <i>Hypochaeris radicata</i> *, <i>Andropogon virginicus</i> *
Notes:	Significant planting has been undertaken in the area. Lots of native seedlings, especially of <i>Hakea sericea</i> and <i>Eucalyptus</i> spp. Shrub layer is developing. Soil health developing with cryptograms present, <i>Themeda australis</i> dominant in patches; poor fauna habitat - no hollows, grass is dense, leaf litter developing, some senescent and fallen shrubs. Main weeds are <i>Andropogon virginicus</i> * and <i>Briza maxima</i> *.		
Quadrat 3			
T1	8-11 (9)	15	<i>Eucalyptus eugenioides</i> , <i>Angophora costata</i> , <i>Syncarpia glomulifera</i> , <i>Allocasuarina littoralis</i>
S1	2-5 (3)	30	<i>Leptospermum trinervium</i> , <i>Hakea sericea</i> , <i>Persoonia levis</i> , <i>Acacia fimbriata</i>
G1	0-1 (0.2)	65	<i>Entolasia stricta</i> , <i>Themeda australis</i> , <i>Andropogon virginicus</i> *, <i>Kunzea ambigua</i> , <i>Leptospermum trinervium</i>
Notes:	Canopy developing and tall shrub layer evident. Few weeds, only occasional introduced grass; good regeneration of natives including seedlings from seedbank and mature plantings; some erosion; good soil health- soil lichens and moss common; fauna habitat poor- no hollows or timber, sparse understory, limited leaf litter, lots of small lizards present.		



Vegetation layer	Height: range (median) m	% foliage cover	Dominant species
Quadrat 4			
T1	1.5-4 (2)	10	<i>Banksia ericifolia</i> , <i>Kunzea ambigua</i> , <i>Hakea dactyloides</i>
S1	0.2-1 (0.6)	15	<i>Acacia myrtifolia</i> , <i>spp.</i> , <i>Acacia ulicifolia</i>
G1	0-0.5 (0.4)	82	<i>Themeda australis</i> , <i>Hakea sericea</i> , <i>Andropogon virginicus</i> *, <i>Leptospermum trinervium</i> , <i>Briza maxima</i> *, <i>Kunzea ambigua</i>
Notes:	Erosion evident from previous surveys has stabilized, no eucalypts present; good recruitment; good native groundcover dominated by <i>Themeda australis</i> ; soil health developing with good cover of cryptograms, fauna habitat poor- no hollows or timber, limited groundcover or leaf litter		
Quadrat 5			
T1	-	-	-
S1	0.3- 2 (1.2)	30	<i>Acacia parramattensis</i> , <i>Acacia longifolia</i> , <i>Verbena bonariensis</i> *
G1	0-0.5 (0.3)	80	<i>Acacia parramattensis</i> , <i>Trifolium repens</i> *, <i>Conyza bonariensis</i> *, <i>Paspalum dilatatum</i> *
Notes:	Predominantly weedy groundcover, a diversity of <i>Acacia</i> spp. growing and some other native species germinating; leaf litter developing, shrub layer developing. Fauna habitat poor, evidence of kangaroos and rabbits.		
Quadrat 6			
T1	-	-	
S1	1-3 (1.5)	35	<i>Acacia parramattensis</i> , <i>Acacia longifolia</i> , <i>Acacia myrtifolia</i>
G1	0-0.5 (0.3)	20	<i>Acacia parramattensis</i> , <i>Sida rhombifolia</i> *, <i>Conyza bonariensis</i> *, <i>Plantago lanceolata</i> *, <i>Hypochaeris radicata</i> *
Notes:	Shrub layer developing with colonizing <i>Acacia</i> spp., regeneration of canopy species evident in groundcover including <i>Allocasuarina littoralis</i> and <i>Eucalyptus</i> spp., predominantly weedy groundcover however some regeneration of native ground cover species evident; Hard baked soil, with no leaf litter and some gully erosion evident. Fauna habitat poor, evidence of foxes and rabbits.		

Notes: T1= Tree layer; S1= Shrub layer; G1=Groundcover

**Table C1.2      Quadrat results: groundcover, vegetation cover, slope and aspect**

Characteristic	2010				2012						2013					
	1	2	3	4	1	2	3	4	5	6	1	2	3	4	5	6
<b>Ground cover (% cover)</b>																
Bare soil	5	6	13	33	5	8	15	20	50	80	0	5	10	10	10	80
Litter	57	2	5	0	41	25	5	-	-	-	40	15	15	2	5	0
Timber	1	0	0	0	-	2	-	-	-	-	2	2	0	0	0	0
Rock	5	2	1	5	2	-	-	2	3	2	1	0	0	2	3	2
Cryptogram	2	0	1	2	2	-	10	2	-	-	2	10	10	5	0	0
Vegetation	30	90	80	60	50	65	70	76	47	18	55	68	65	81	82	18
<b>Ground cover vegetation (% cover)</b>																
Native ground cover- grasses	20	15	70	25	28	10	53	45	1	-	44	25	43	60	15	5
Native ground cover- shrubs	2	2	5	2	3	3	5	5	5	5	3	2	10	10	5	5
Native ground cover- other	1	1	0	2	2	2	2	12	1	1	7	3	2	2	2	2
Exotic	7	72	5	30	10	50	10	20	40	12	1	38	10	9	60	6
<b>Vegetation cover (% cover)</b>																
Total native groundcover	23	18	75	24	33	15	60	51	7	6	55	30	55	72	22	12
Native overstorey	30	10	10	0	25	15	10	-	-	-	25	15	15	0	0	0
Native midstorey	10	10	20	8	10	8	25	10	-	-	5	10	30	15	30	35
Exotic cover (all layers)	10	72	5	30	10	50	10	20	40	12	1	38	10	9	60	6
<b>Slope (degrees)</b>	3	6	8	6	3	6	8	6	5	4	3	6	8	6	5	4
Aspect	S	S	SE	SE	S	S	SE	SE	SW	S	S	S	SE	SE	SW	S

**Table C1.3 Species recorded**

Scientific name	Common name	Exotic	Recorded within Lot 1 DP 1013943	Species of Sydney Hinterland transition woodland	Recorded in rehabilitation area			Quadrat results (2013)					
					2010	2012	2013	1	2	3	4	5	6
<i>Acacia brownii</i>	Heath Wattle			Y	Y	Y	Y			1	1		
<i>Acacia decurrens</i>	Black Wattle				Y		Y		3				
<i>Acacia falcata</i>				Y	Y	Y	Y	1					
<i>Acacia fimbriata</i>	Fringed Wattle				Y	Y	Y			1	1		
<i>Acacia hispidula</i>				Y									
<i>Acacia linifolia</i>	Flax-leaved Wattle		Y	Y	Y	Y	Y	1		3			
<i>Acacia longifolia</i>				Y		Y	Y		2		2	3	3
<i>Acacia myrtifolia</i>	Red-stemmed Wattle		Y	Y	Y	Y	Y	1			1	1	3
<i>Acacia parramattensis</i>	Parramatta Wattle		Y	Y	Y	Y	Y	3	1		2		4
<i>Acacia parvipinnula</i>				Y			Y					3	
<i>Acacia saligna</i>	Golden Wreath Wattle	*			Y								
<i>Acacia suaveolens</i>	Sweet Wattle		Y	Y	Y	Y	Y		1				
<i>Acacia terminalis</i>	Sunshine Wattle		Y	Y	Y	Y	Y	1		2	1		
<i>Acacia trinervata</i>				Y			Y				2		
<i>Acacia ulicifolia</i>	Heath Wattle		Y	Y	Y	Y	Y		1	1		1	1
<i>Acetosella vulgaris</i>		*					Y					1	
<i>Acianthus fornicatus</i>	Pixie Caps		Y	Y			Y				2		
<i>Actinotus helianthi</i>				Y									
<i>Ageratina adenophora</i>	Crofton Weed	*	Y		Y								



Scientific name	Common name	Exotic	Recorded within Lot 1 DP 1013943	Species of Sydney Hinterland transition woodland	Recorded in rehabilitation area			Quadrat results (2013)					
					2010	2012	2013	1	2	3	4	5	6
<i>Agrostis avenacea</i>						Y	Y					2	2
<i>Allocasuarina littoralis</i>	Black Sheoak		Y	Y	Y	Y	Y	4	1	2	1	1	2
<i>Anagallis arvensis</i>	Scarlet Pimpernel	*				Y	Y		1				
<i>Andropogon virginicus</i>	Whisky Grass	*			Y	Y	Y		3	2	2		
<i>Angophora bakeri</i>	Narrow-leaved Apple		Y	Y	Y	Y	Y						
<i>Angophora costata</i>	Sydney Red Gum		Y	Y	Y	Y	Y	3	3	2			1
<i>Anisopogon avenaceus</i>				Y									
<i>Araujia sericifera</i>	Moth Vine	*	Y										
<i>Aristida benthamii</i>				Y									
<i>Aristida vagans</i>	Threeawn Speargrass		Y	Y									
<i>Aristida warburgii</i>				Y									
<i>Astroloma humifusum</i>				Y									
<i>Astroloma pinifolium</i>				Y									
<i>Austrodanthonia fulva</i>				Y									
<i>Austrodanthonia tenuior</i>				Y			Y					2	
<i>Austrostipa pubescens</i>			Y	Y									
<i>Banksia ericifolia</i>	Heath Banksia				Y	Y	Y		1				
<i>Banksia integrifolia</i>					Y	Y	Y		1				
<i>Banksia oblongifolia</i>					Y	Y							

Scientific name	Common name	Exotic	Recorded within Lot 1 DP 1013943	Species of Sydney Hinterland transition woodland	Recorded in rehabilitation area			Quadrat results (2013)					
					2010	2012	2013	1	2	3	4	5	6
<i>Banksia spinulosa</i> var. <i>spinulosa</i>				Y									
<i>Bidens pilosa</i>		*				Y	Y					1	
<i>Billardiera scandens</i>	Appleberry		Y	Y		Y	Y	1					
<i>Boronia polygalifolia</i>			Y										
<i>Bossiaea lenticularis</i>			Y	Y	Y	Y	Y	2					
<i>Bossiaea obcordata</i>			Y	Y	Y								
<i>Bossiaea rhombifolia</i> subsp. <i>rhombifolia</i>				Y									
<i>Breynia oblongifolia</i>	Coffee Bush		Y										
<i>Briza maxima</i>	Quaking Grass	*				Y	Y		3			1	1
<i>Brunoniella pumilio</i>	Dwarf Blue Trumpet		Y	Y	Y	Y	Y	1					
<i>Bursaria spinosa</i>	Native Blackthorn				Y	Y	Y		2				
<i>Caesia parviflora</i>				Y									
<i>Callistemon linearis</i>				Y									
<i>Callistemon rigidus</i>				Y									
<i>Cassytha glabella</i>				Y									
<i>Cassytha pubescens</i>				Y									
<i>Caustis flexuosa</i>				Y									
<i>Centaurium erythraea</i>		*				Y	Y		2	1		2	2
<i>Ceratopetalum apetalum</i>	Coachwood		Y										

Scientific name	Common name	Exotic	Recorded within Lot 1 DP 1013943	Species of Sydney Hinterland transition woodland	Recorded in rehabilitation area			Quadrat results (2013)					
					2010	2012	2013	1	2	3	4	5	6
<i>Cheilanthes sieberi</i>				Y			Y	1					
<i>Clematis aristata</i>			Y										
<i>Comesperma ericinum</i>	Pyramid flower		Y										
<i>Conyza bonariensis</i>	Flaxleaf Fleabane	*	Y		Y	Y	Y			1		2	2
<i>Corymbia eximia</i>				Y									
<i>Corymbia gummifera</i>	Red Bloodwood		Y	Y									
<i>Cyathochaeta diandra</i>				Y									
<i>Cynodon dactylon</i>	Couch						Y					1	
<i>Cyperus ?polystachyos</i>						Y	Y					1	
<i>Daviesia acicularis</i>				Y									
<i>Daviesia corymbosa</i>				Y									
<i>Daviesia genistifolia</i>	Broom Bitter Pea			Y	Y	Y	Y	1	1	1			
<i>Daviesia squarrosa</i>				Y									
<i>Dianella caerulea</i>			Y	Y		Y	Y		1				
<i>Dianella prunina</i>			Y	Y	Y	Y	Y		1		1		
<i>Dianella revoluta</i> var. <i>revoluta</i>				Y									
<i>Dichelachne crinite</i>	Long-haired Plume Grass						Y			2			
<i>Dillwynia acicularis</i>				Y									
<i>Dillwynia parvifolia</i>				Y									



Scientific name	Common name	Exotic	Recorded within Lot 1 DP 1013943	Species of Sydney Hinterland transition woodland	Recorded in rehabilitation area			Quadrat results (2013)					
					2010	2012	2013	1	2	3	4	5	6
<i>Dillwynia retorta</i>				Y	Y	Y	Y			1			1
<i>Dodonaea pinnata</i>				Y									
<i>Dodonaea triquetra</i>				Y									
<i>Drosera auriculata</i>				Y									
<i>Echinopogon caespitosus</i> var. <i>caespitosus</i>				Y									
<i>Einadia hastata</i>	Berry Saltbush		Y										
<i>Entolasia stricta</i>	Wiry Panic		Y	Y	Y	Y	Y	3		3			
<i>Entolasia whiteana</i>				Y									
<i>Epacris pulchella</i>	NSW Coral Heath			Y	Y								
<i>Epacris purpurascens</i> var. <i>purpurascens</i>				Y									
<i>Eragrostis benthamii</i>				Y									
<i>Eragrostis brownii</i>	Brown's Lovegrass			Y	Y	Y	Y	1		1			
<i>Eriostemon australasius</i>				Y									
<i>Eucalyptus ?saligna</i>					Y	Y							
<i>Eucalyptus beyeriana</i>				Y									
<i>Eucalyptus crebra</i>				Y									
<i>Eucalyptus eugenioides</i>	Thin-leaved Stringybark		Y	Y	Y	Y	Y		1	3		1	
<i>Eucalyptus notabilis</i>				Y	Y								
<i>Eucalyptus oblonga</i>	Stringybark			Y	Y	Y	Y	4					

Scientific name	Common name	Exotic	Recorded within Lot 1 DP 1013943	Species of Sydney Hinterland transition woodland	Recorded in rehabilitation area			Quadrat results (2013)					
					2010	2012	2013	1	2	3	4	5	6
<i>Eucalyptus pilularis</i>				Y									
<i>Eucalyptus punctata</i>	Grey Gum		Y	Y	Y	Y	Y	2					
<i>Eucalyptus resinifera</i> <i>subsp. resinifera</i>				Y									
<i>Eucalyptus scias</i> subsp. <i>scias</i>				Y									
<i>Eucalyptus sclerophylla</i>			Y	Y									
<i>Eucalyptus</i> sp.						Y	Y				1		1
<i>Eucalyptus sparsifolia</i>	Narrow-leaved Stringybark		Y	Y									
<i>Eucalyptus squamosa</i>				Y									
<i>Exocarpos cupressiformis</i>	Native Cherry				Y	Y	Y	1					
<i>Exocarpos strictus</i>	Dwarf Cherry		Y	Y		Y							
<i>Glycine clandestina</i>			Y	Y	Y	Y	Y	1	2		1		
<i>Glycine tabacina</i>			Y	Y		Y	Y	2					1
<i>Gnaphalium</i> sp.					Y	Y	Y		2			2	
<i>Gompholobium glabratum</i>	Dainty Wedge Pea		Y	Y									
<i>Gompholobium grandiflorum</i>				Y									
<i>Gompholobium inconspicuum</i>				Y									

Scientific name	Common name	Exotic	Recorded within Lot 1 DP 1013943	Species of Sydney Hinterland transition woodland	Recorded in rehabilitation area			Quadrat results (2013)					
					2010	2012	2013	1	2	3	4	5	6
<i>Gompholobium minus</i>				Y									
<i>Gompholobium pinnatum</i>				Y									
<i>Gompholobium uncinatum</i>				Y									
<i>Gonocarpus tetragynus</i>				Y									
<i>Gonocarpus teucroides</i>					Y	Y	Y			1			
<i>Goodenia bellidifolia</i> subsp. <i>bellidifolia</i>			Y	Y			Y	2					
<i>Goodenia hederacea</i> subsp. <i>hederacea</i>				Y									
<i>Goodenia heterophylla</i>			Y	Y									
<i>Grevillea buxifolia</i> subsp. <i>buxifolia</i>	Grey Spider Flower		Y	Y									
<i>Grevillea diffusa</i>				Y									
<i>Grevillea longifolia</i>				Y									
<i>Grevillea mucronulata</i>				Y									
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>				Y									
<i>Grevillea phyllicoides</i>				Y									
<i>Grevillea sericea</i>				Y									
<i>Grevillea sphacelata</i>				Y									
<i>Haemodorum planifolium</i>				Y									



Scientific name	Common name	Exotic	Recorded within Lot 1 DP 1013943	Species of Sydney Hinterland transition woodland	Recorded in rehabilitation area			Quadrat results (2013)					
					2010	2012	2013	1	2	3	4	5	6
<i>Hakea dactyloides</i>	Broad-leaved Hakea			Y	Y	Y	Y		2	2	1		
<i>Hakea sericea</i>			Y	Y	Y	Y	Y			2	3		
<i>Hardenbergia violacea</i>	False Sarsaparilla		Y	Y	Y	Y	Y	1	1			1	1
<i>Hibbertia aspera</i> subsp. <i>aspera</i>				Y									
<i>Hibbertia bracteata</i>				Y									
<i>Hibbertia diffusa</i>				Y									
<i>Hibbertia serpyllifolia</i>				Y									
<i>Hibbertia</i> sp.					Y	Y							
<i>Hovea linearis</i>			Y	Y									
<i>Hybanthus monopetalus</i>				Y									
<i>Hypochaeris radicata</i>	Catsear	*			Y	Y	Y		2		2	2	3
<i>Imperata cylindrica</i> var. <i>major</i>	Bladey Grass		Y	Y	Y	Y	Y	1		2			
<i>Isopogon anemonifolius</i>				Y									
<i>Jacksonia scoparia</i>				Y									
<i>Juncus</i> sp.			Y		Y	Y							
<i>Kunzea ambigua</i>	Tick Bush			Y	Y	Y	Y	2		3	2		
<i>Lagenifera gracilis</i>				Y									
<i>Lambertia formosa</i>	Mountain Devil			Y									

Scientific name	Common name	Exotic	Recorded within Lot 1 DP 1013943	Species of Sydney Hinterland transition woodland	Recorded in rehabilitation area			Quadrat results (2013)					
					2010	2012	2013	1	2	3	4	5	6
<i>Lasiopetalum ferrugineum</i>				Y									
<i>Lasiopetalum rufum</i>				Y									
<i>Laxmannia gracilis</i>				Y									
<i>Lepidosperma latens</i>				Y									
<i>Lepidosperma laterale</i>			Y	Y	Y	Y	Y	2					
<i>Leptomeria acida</i>				Y									
<i>Leptospermum parvifolium</i>				Y									
<i>Leptospermum trinervium</i>				Y	Y	Y	Y	2		3	2		
<i>Leucopogon juniperinus</i>			Y		Y	Y	Y	1		1			
<i>Leucopogon lanceolatus</i>	Lance Beard Heath		Y										
<i>Leucopogon muticus</i>				Y									
<i>Leucopogon virgatus</i>				Y									
<i>Lindsaea microphylla</i>				Y									
<i>Lissanthe sapida</i>				Y									
<i>Lissanthe strigosa</i>				Y									
<i>Lobelia gracilis</i>				Y									
<i>Logania pusilla</i>				Y									
<i>Lomandra confertifolia</i> subsp. <i>rubiginosa</i>				Y									

Scientific name	Common name	Exotic	Recorded within Lot 1 DP 1013943	Species of Sydney Hinterland transition woodland	Recorded in rehabilitation area			Quadrat results (2013)					
					2010	2012	2013	1	2	3	4	5	6
<i>Lomandra cylindrica</i>				Y									
<i>Lomandra filiformis</i> subsp. <i>coriacea</i>				Y									
<i>Lomandra filiformis</i> subsp. <i>filiformis</i>				Y									
<i>Lomandra glauca</i>				Y									
<i>Lomandra gracilis</i>			Y	Y									
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush		Y		Y	Y	Y	2	1	1	1		
<i>Lomandra multiflora</i> subsp. <i>multiflora</i>			Y	Y									
<i>Lomandra obliqua</i>			Y	Y									
<i>Lomatia silaifolia</i>	Crinkle Bush		Y	Y									
<i>Macrozamia spiralis</i>			Y	Y									
<i>Medicago</i> sp.		*				Y							
<i>Melaleuca nodosa</i>				Y									
<i>Micrantheum ericoides</i>				Y									
<i>Microtis</i> sp.						Y							
<i>Mirbelia rubiifolia</i>				Y									
<i>Monotoca scoparia</i>				Y									
<i>Myrsiphyllum asparagoides</i>	Florist's Smilax	*	Y										
<i>Olearia microphylla</i>				Y									



Scientific name	Common name	Exotic	Recorded within Lot 1 DP 1013943	Species of Sydney Hinterland transition woodland	Recorded in rehabilitation area			Quadrat results (2013)					
					2010	2012	2013	1	2	3	4	5	6
<i>Opercularia diphylla</i>				Y									
<i>Opercularia varia</i>				Y									
<i>Oxalis perennans</i>					Y	Y	Y	1					
<i>Oxylobium ilicifolium</i>	Prickly Shaggy Pea		Y		Y	Y	Y	1					
<i>Ozothamnus diosmifolius</i>	White Dogwood		Y	Y	Y	Y	Y	1					
<i>Pandorea pandorana</i>	Wonga Vine		Y										
<i>Panicum simile</i>	Two-colour Panic		Y	Y	Y	Y	Y	1					
<i>Paspalum dilatatum</i>	Paspalum	*			Y	Y	Y	1	2		1	3	2
<i>Passiflora sp.</i>	Passionfruit		Y										
<i>Patersonia glabrata</i>				Y									
<i>Patersonia longifolia</i>				Y									
<i>Patersonia sericea</i>				Y									
<i>Pennisetum clandestinum</i>		*				Y	Y					2	3
<i>Persicaria decipiens</i>	Pepperweed					Y							
<i>Persoonia hirsuta</i>				Y									
<i>Persoonia lanceolata</i>				Y									
<i>Persoonia laurina</i>				Y									
<i>Persoonia levis</i>	Broad-leaved Geebung			Y	Y	Y	Y	1		2			
<i>Persoonia linearis</i>	Narrow-leaved Geebung		Y	Y									

Scientific name	Common name	Exotic	Recorded within Lot 1 DP 1013943	Species of Sydney Hinterland transition woodland	Recorded in rehabilitation area			Quadrat results (2013)					
					2010	2012	2013	1	2	3	4	5	6
<i>Persoonia oblongata</i>				Y									
<i>Persoonia pinifolia</i>				Y									
<i>Petrophile pulchella</i>				Y									
<i>Petrophile sessilis</i>				Y									
<i>Philotheca hispidula</i>				Y									
<i>Phyllanthus hirtellus</i>				Y									
<i>Pimelea curviflora</i> var. <i>curviflora</i>				Y									
<i>Pimelea linifolia</i> subsp. <i>linifolia</i>				Y			Y			1			
<i>Pittosporum undulatum</i>	Sweet Pittosporum		Y										
<i>Plantago lanceolata</i>	Lamb's Tongues	*			Y	Y	Y		2	1		2	2
<i>Platysace ericoides</i>				Y									
<i>Platysace lanceolata</i>			Y										
<i>Platysace linearifolia</i>				Y									
<i>Poa labillardierei</i> var. <i>labillardierei</i>			Y				Y					2	1
<i>Podolobium scandens</i>				Y									
<i>Polyscias sambucifolia</i>	Elderberry Panax		Y										
<i>Pomax umbellata</i>			Y	Y									
<i>Poranthera microphylla</i>			Y										

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					2010	2012	2013	1	2	3	4	5	6
<i>Pratia purpurascens</i>	Whiteroot		Y	Y									
<i>Prostanthera howelliae</i>				Y									
<i>Pteridium esculentum</i>	Bracken				Y	Y	Y			1			
<i>Pterostylis acuminata</i>				Y									
<i>Pterostylis longifolia</i>				Y									
<i>Pultenaea ferruginea</i>				Y									
<i>Pultenaea microphylla</i>			Y										
<i>Pultenaea polifolia</i>				Y									
<i>Pultenaea scabra</i>			Y	Y									
<i>Pultenaea tuberculata</i>				Y									
<i>Pultenaea villosa</i>				Y		Y	Y				2	2	2
<i>Scaevola ramosissima</i>			Y	Y									
<i>Schizaea bifida</i>				Y									
<i>Schoenus imberbis</i>				Y									
<i>Senecio madagascariensis</i>	Fireweed	*			Y	Y	Y	1	1		1	2	2
<i>Setaria gracilis</i>	Slender Pigeon Grass	*			Y	Y							
<i>Sida rhombifolia</i>	Paddy's Lucerne	*	Y		Y	Y	Y		2		1	3	2
<i>Solanum mauritianum</i>	Wild Tobacco Bush	*	Y										
<i>Solanum nigrum</i>	Black-berry Nightshade	*	Y										



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					2010	2012	2013	1	2	3	4	5	6
<i>Sonchus oleraceus</i>	Common Sowthistle	*	Y										
<i>Stylidium</i> sp.					Y	Y	Y			1			
<i>Styphelia laeta</i> subsp. <i>laeta</i>				Y									
<i>Syncarpia glomulifera</i> subsp. <i>glomulifera</i>	Turpentine		Y	Y	Y	Y	Y		3	2	1	1	
<i>Thelymitra pauciflora</i>				Y									
<i>Themeda australis</i>	Kangaroo Grass		Y	Y	Y	Y	Y		3	2	4		3
<i>Thysanotus tuberosus</i> subsp. <i>tuberosus</i>				Y									
<i>Trachymene incisa</i> subsp. <i>incisa</i>				Y									
<i>Tricoryne simplex</i>				Y									
<i>Trifolium arvense</i>	Haresfoot clover	*				Y	Y		2			2	2
<i>Trifolium repens</i>	White Clover	*			Y	Y	Y		2			3	2
<i>Verbena bonariensis</i>	Purpletop	*			Y	Y	Y		2			2	1
<i>Veronica plebeia</i>	Trailing Speedwell		Y										
<i>Vicia sativa</i>		*			Y	Y							
<i>Wahlenbergia stricta</i>	Tall Bluebell				Y	Y	Y		2		2	2	2
<i>Xanthorrhoea concava</i>				Y									
<i>Xanthorrhoea media</i>				Y									

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					2010	2012	2013	1	2	3	4	5	6
<i>Xanthorrhoea minor</i> subsp. <i>minor</i>				Y									
<i>Xanthorrhoea resinifera</i>				Y									
<i>Xanthorrhoea</i> sp.	Grass tree		Y										
<i>Xanthosia pilosa</i>				Y									
<i>Xanthosia tridentata</i>				Y			Y	1					
<i>Xylomelum pyriforme</i>	Woody Pear		Y	Y									

Notes:

Cover abundance scores:

- (1) 5%- rare or few individuals
- (2) <5% common
- (3) 5-25%
- (4) 25-50%
- (5) 50-75%
- (6) 75-100%