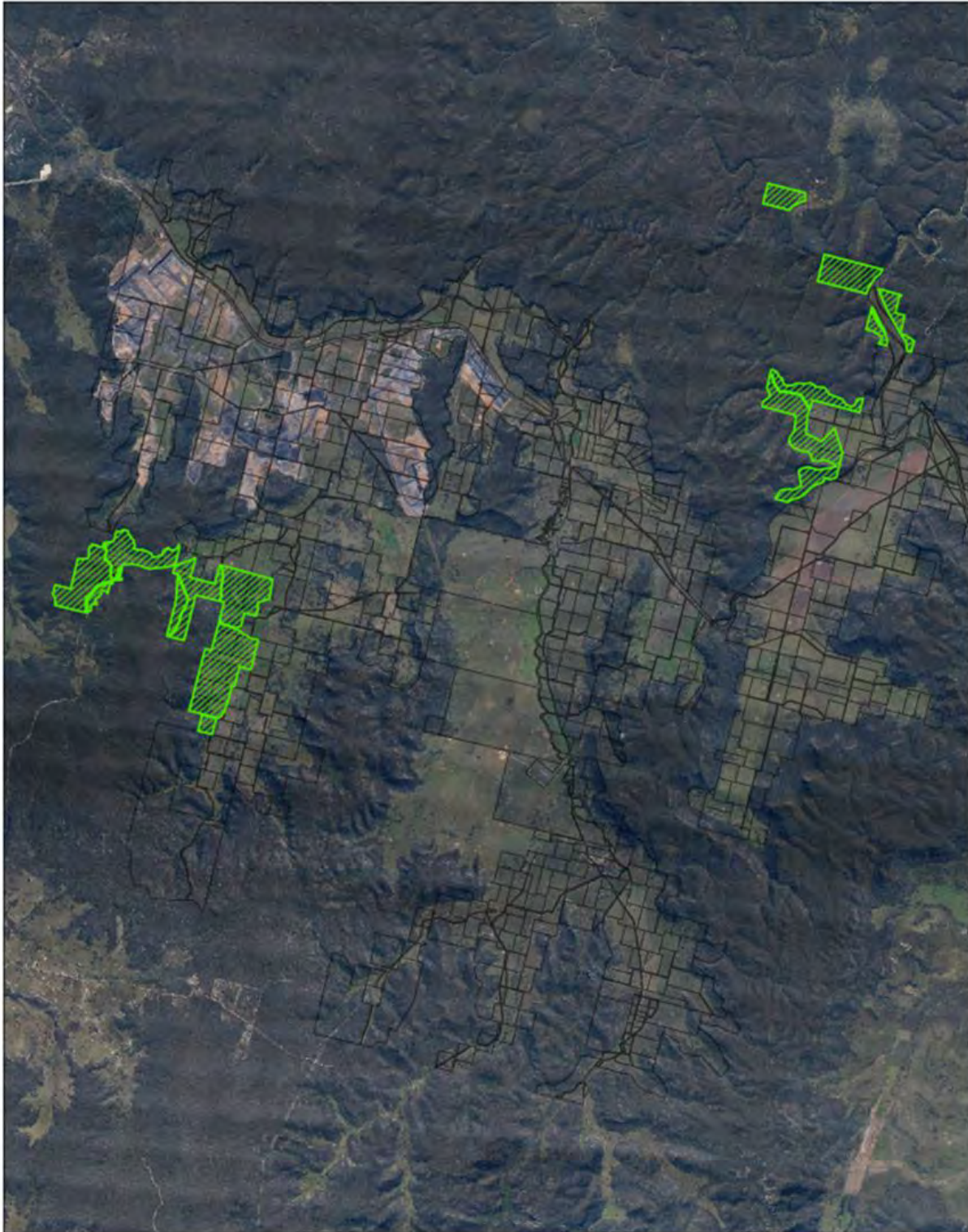
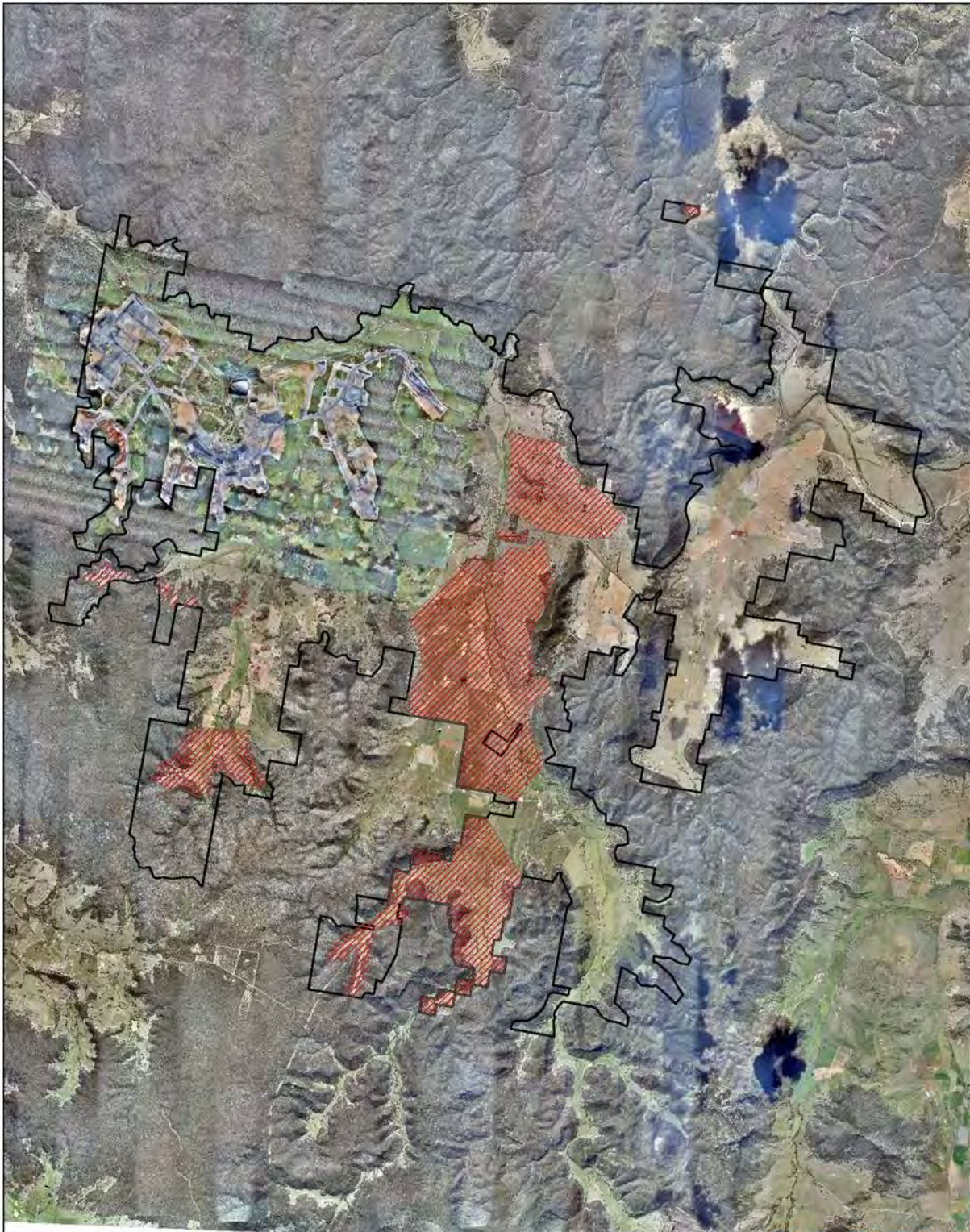


**APPENDIX 4**  
**LAND MANAGEMENT**



<b>Legend</b> WCPL Landholdings 2022 Weed Control				<b>Wilpinjong Coal</b> <b>2022 Weed Control Areas</b>			
Spatial Reference Name: GDA 1994 MGA Zone 55	Review ID: 1	Date Exported: 17/03/2023 2:45 PM	Drawn: JH	Drawing No. H6_332		<small>Peabody makes every effort to ensure the quality of the information available on this map. Before relying on the information on this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purpose, and should obtain any appropriate professional advice relevant to their circumstances. Peabody cannot guarantee and assumes no responsibility for the accuracy, currency or completeness of the information and by using this map you accept that Peabody has no liability for any loss or damage in any form whatsoever caused directly or indirectly from the use of this map.</small>	



Wilpinjong Coal 2021 Weed Control Areas	
Spatial Reference Name: GDA 1994 MGA Zone 55	Date Exported: 21/03/2022 1:43 PM Drawer: JF



0 0.5 1 2 3 4



Kilometers

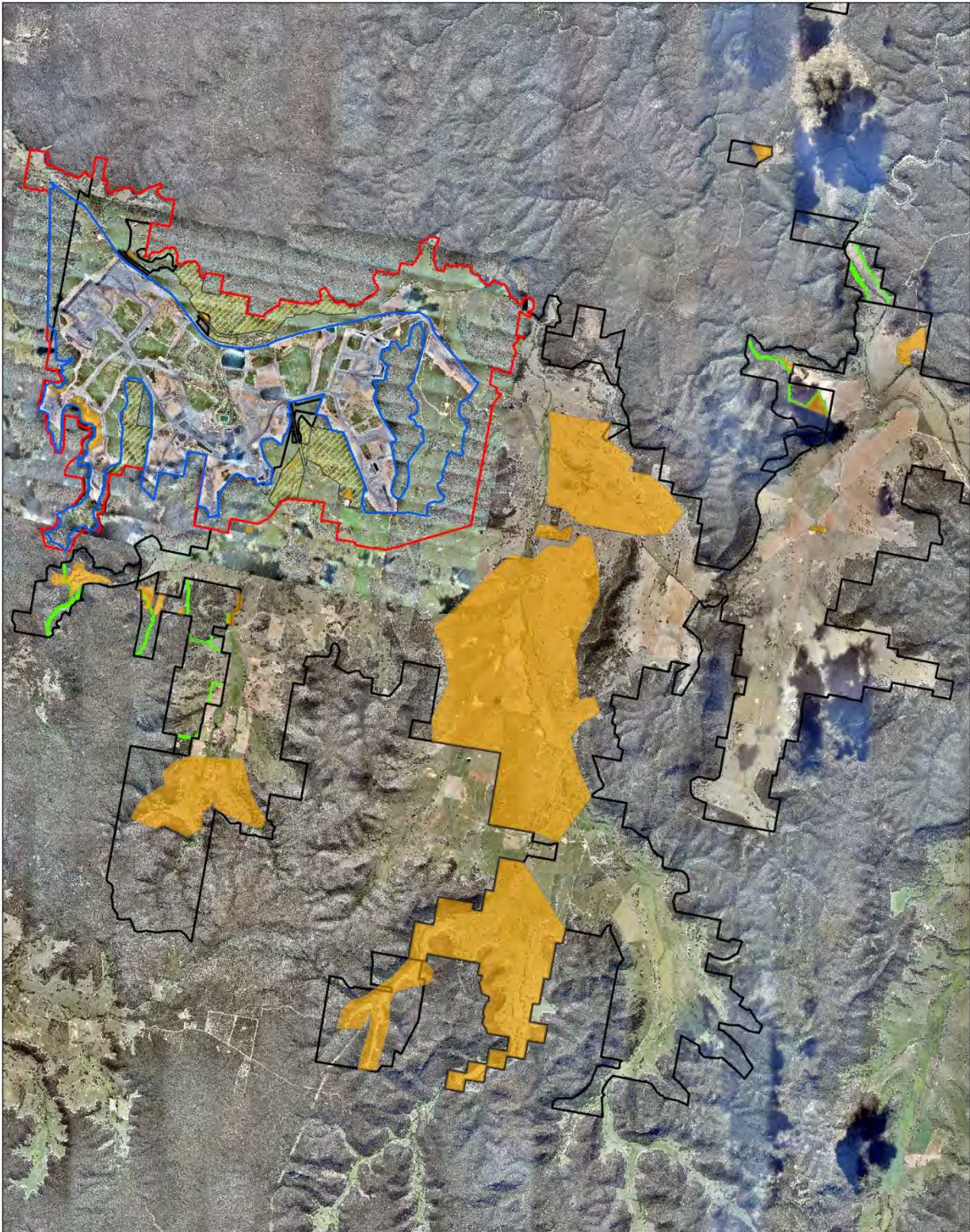
**Legend**

Approvals/Boundary

- WCPL\_Landholdings
- 2021 Weed Control

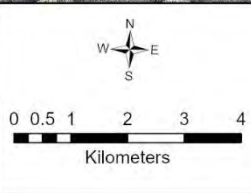


Peabody makes every effort to ensure the quality of the information available on this map. Before relying on the information on this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their circumstances. Peabody cannot guarantee and assumes no responsibility for the accuracy, currency or completeness of the information and by using this map you accept that Peabody has no liability for any loss or damage in any form whatsoever caused directly or indirectly from the use of this map.



Wilpinjong Coal  
2020 Weed Control

Spatial Reference Name: GDA 1994 MGA Zone 55	Date Exported: 8/03/2021 11:21 AM Drawer: JF
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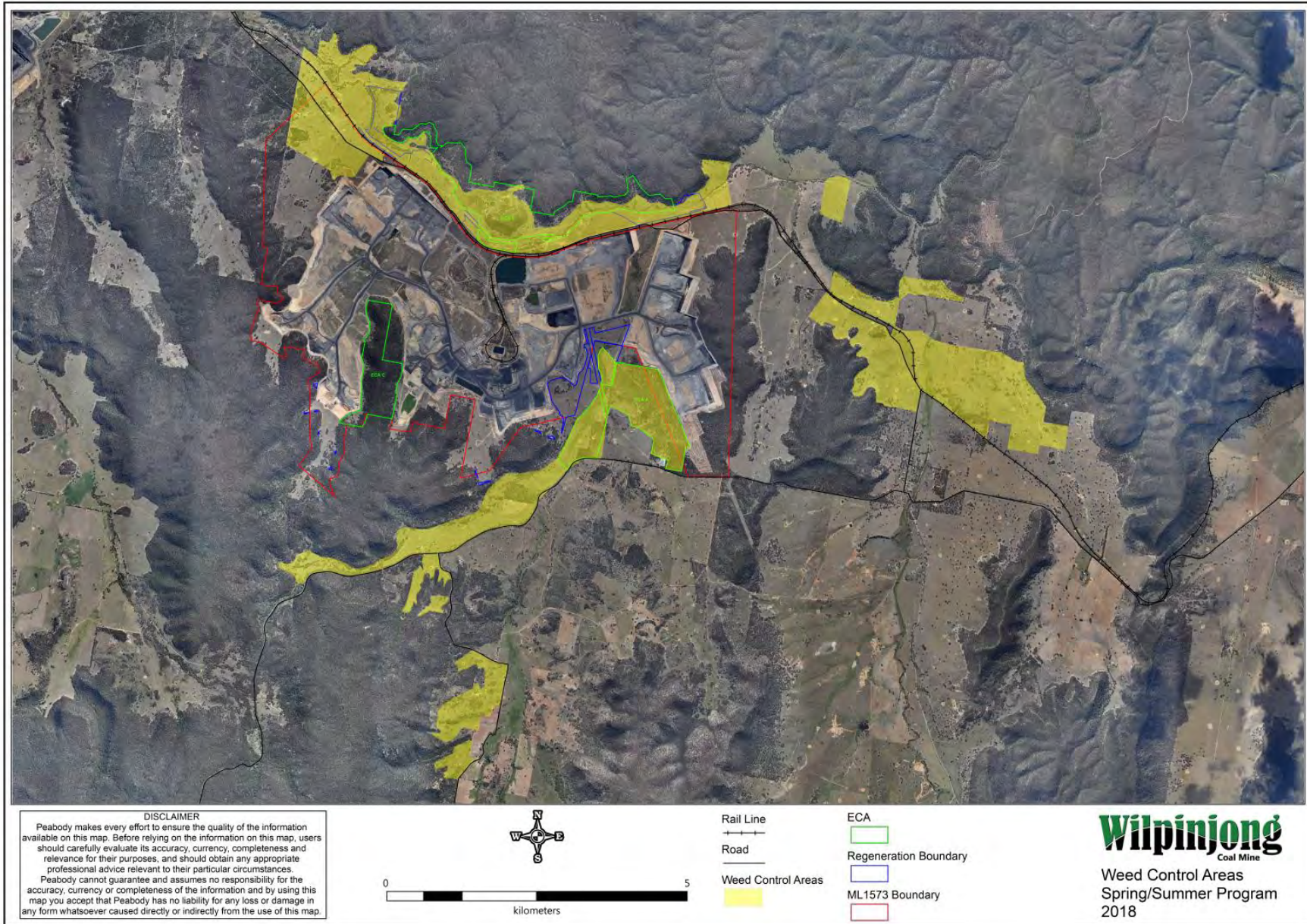


- Legend**
- 2020 Weed Control
  - SSD6764 Development Disturbance Limit
  - SSD 6764 Development Consent Boundary
  - Regeneration Area
  - Enhancement & Conservation Areas (ECAs)
  - Biodiversity Offset Areas (BOAs)
- Approvals/Boundary**
- WCPL\_Landholdings

Peabody makes every effort to ensure the quality of the information available on this map. Before relying on the information on this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their circumstances. Peabody cannot guarantee and assumes no responsibility for the accuracy, currency or completeness of the information used by using this map you accept that Peabody has no liability for any loss or damage in any form whatsoever caused directly or indirectly from the use of this map.



	<p><b>Legend</b></p> <p><b>Weed Control</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; border: 1px solid black; margin-right: 5px;"></span> 2019</li> <li><span style="display: inline-block; width: 15px; height: 10px; border: 1px solid blue; margin-right: 5px;"></span> Regeneration Areas Boundary</li> <li><span style="display: inline-block; width: 15px; height: 10px; border: 1px solid green; margin-right: 5px;"></span> ECAs</li> </ul> <p>— Road</p> <p>—+— Sandy Hollow Rail Line</p> <p>— Colliery Holding Boundary</p>	<p><b>Wilpinjong Coal</b> <b>2019 Weed Control Program</b></p>				
<p>Spatial Reference Name: GDA 1994 MGA Zone 55</p>		<p>Review ID: 1</p>	<p>Date Exported: 11/02/2020 10:55 AM</p>	<p>Drawn: JF</p>	<p>Drawing No. WILP - AR19 Weed Control</p>	<p>Peabody makes every effort to ensure the quality of the information available on this map. Before relying on the information on this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their circumstances.</p> <p>Peabody does not guarantee and assumes no responsibility for the accuracy, currency or completeness of the information and by using this map you accept that Peabody has no liability for any loss or damage in any form whatsoever caused directly or indirectly from the use of this map.</p>



### 2022 Rehabilitation Photographic Register

Please refer to **Figure A** for locations of photographs and **Table A** for the 2022 Rehabilitation Photographic Register.

**Notes:** Annual photos of rehabilitation activities during the reporting period were provided in Appendix 7 and provided an historical account of the performance of primarily cover crops, until the performance and completion criteria for BVT and Regent Honeyeater habitat relevant to the Mine’s rehabilitation areas was approved on the 24 April 2019. WCPL are in the process of establishing new photographic monitoring points in select rehabilitated areas of the mine. The result of the new photographic monitoring will be provided in the 2023 Annual Review.

**Figure A – Rehabilitation Photograph Locations**

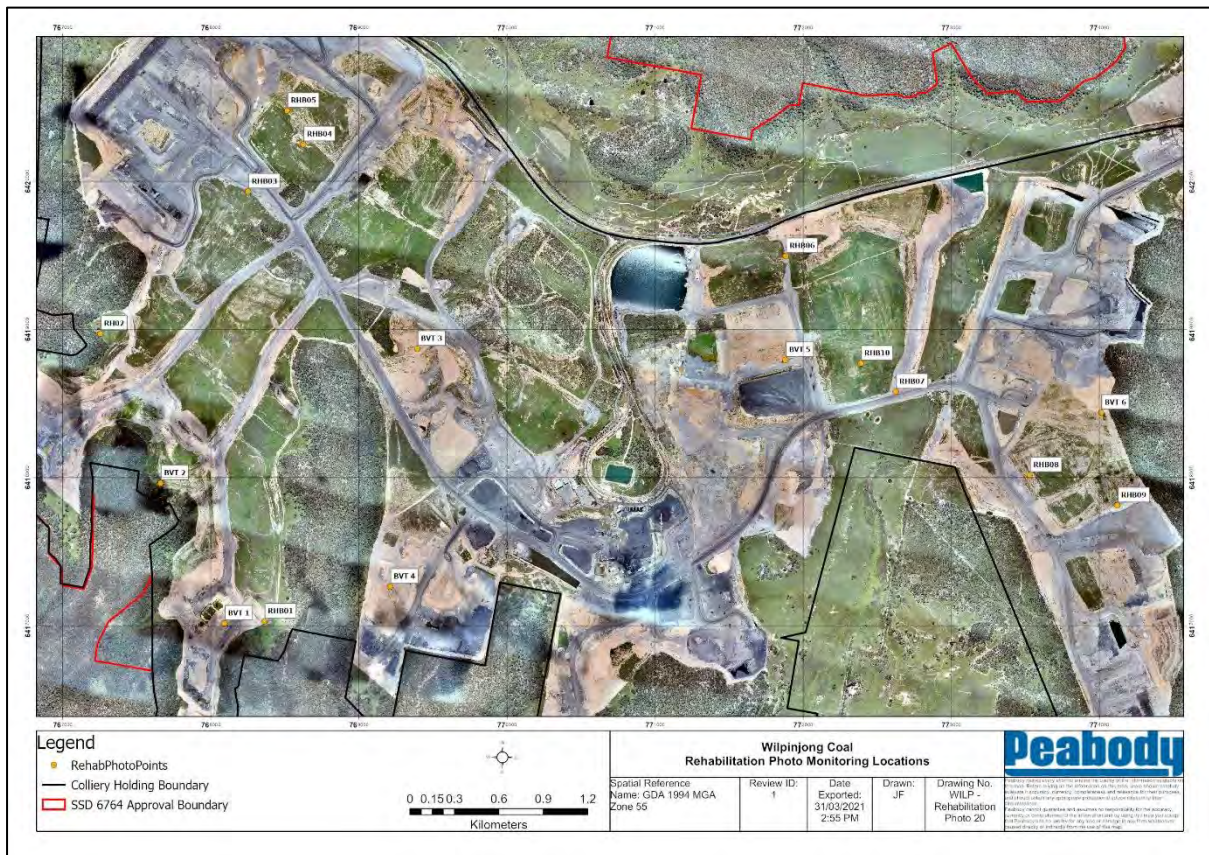


Table A – Rehabilitation Photographic Register

Rehabilitation – Photo Locations

RHB01 (2017)



RHB01 (2019)





Rehabilitation – Photo Locations

RHB01 (2020)

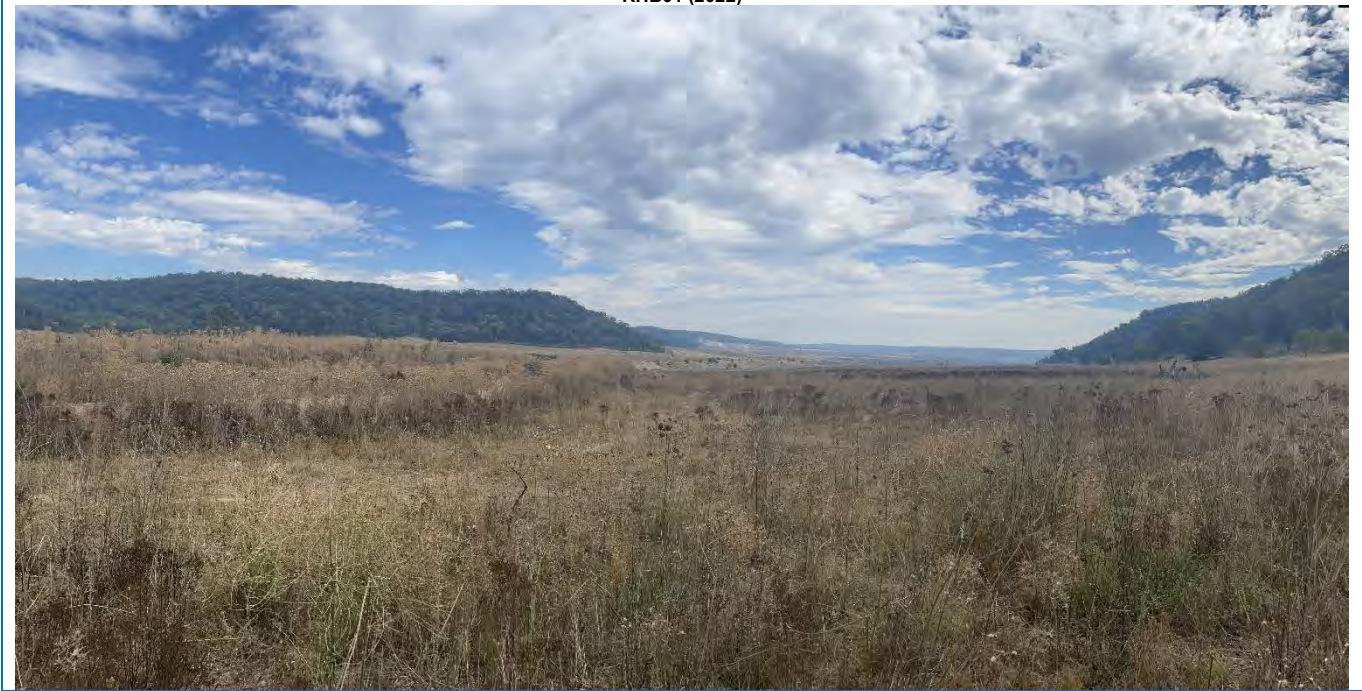


RHB01 (2021)



Rehabilitation – Photo Locations

RHB01 (2022)



Rehabilitation – Photo Locations

RHB02 (2017)



RHB02 (2019)



RHB02 (2020)



RHB02 (2021)



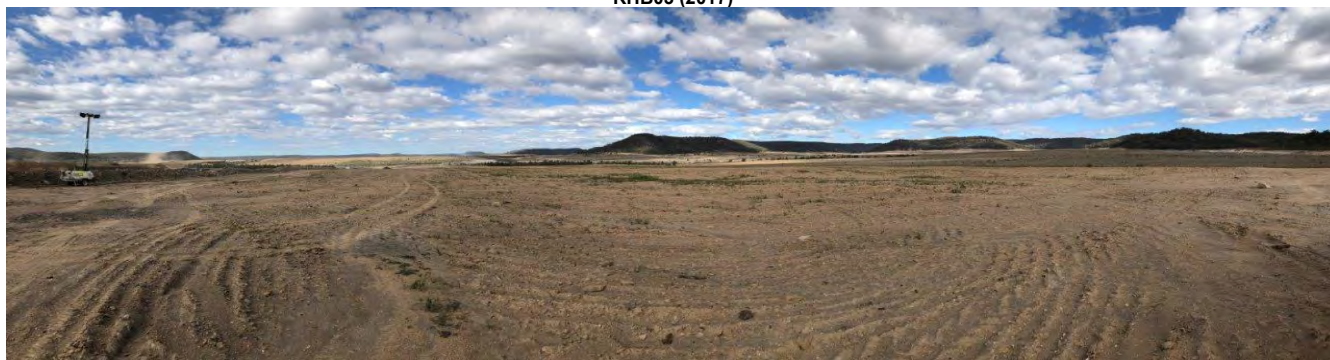
Rehabilitation – Photo Locations

RHB02 (2022)



Rehabilitation – Photo Locations

RHB03 (2017)



RHB03 (2019)



RHB03 (2020)



RHB03 (2021)



Rehabilitation – Photo Locations

RHB03 (2022)



Rehabilitation – Photo Locations

RHB04 (2018)



RHB04 (2019)



RHB04 (2020)



RHB04 (2021)



Rehabilitation – Photo Locations

RHB04 (2022)





Rehabilitation – Photo Locations

RHB05 (2017)



RHB05 (2018)



RHB05 (2019)



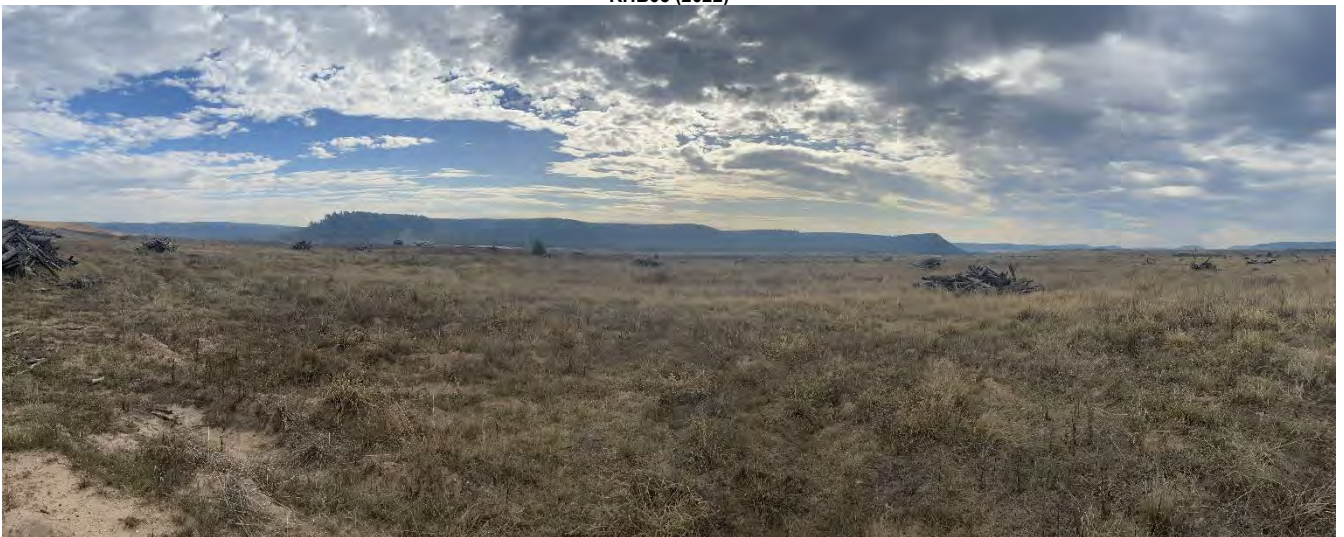
RHB05 (2020)



RHB05 (2021)



RHB05 (2022)



Rehabilitation – Photo Locations

RHB06 (2017)



RHB06 (2019)



RHB06 (2020)



RHB06 (2021)



Rehabilitation – Photo Locations

RHB06 (2022)



Rehabilitation – Photo Locations

RHB07 (2017)



RHB07 (2019)



RHB07 (2020)



RHB07 (2021)



Rehabilitation – Photo Locations

RHB07 (2022)



Rehabilitation – Photo Locations

RHB08 (2017)



RHB08 (2019)



RHB08 (2020)



RHB08 (2021)



Rehabilitation – Photo Locations

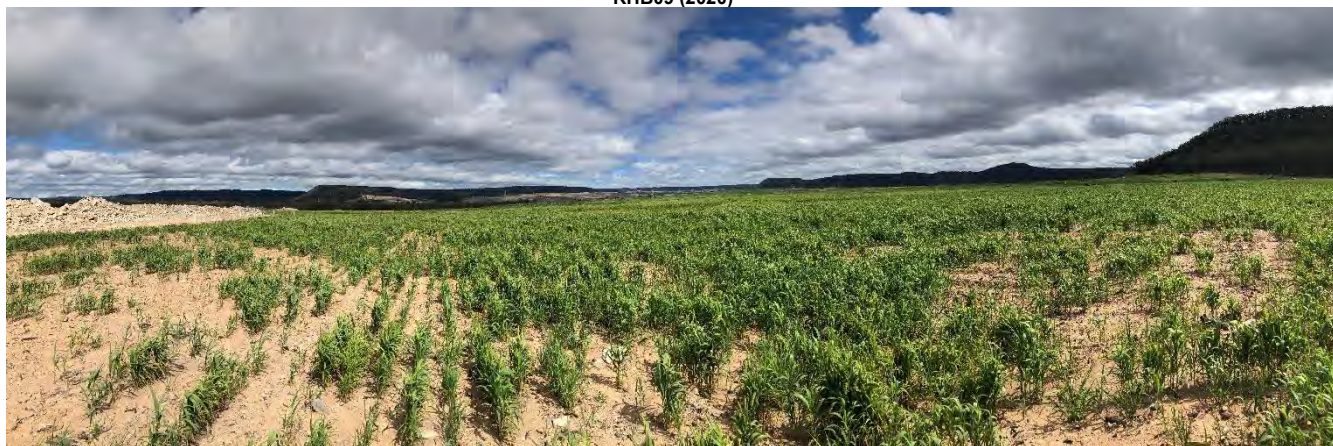
RHB09 (2017)



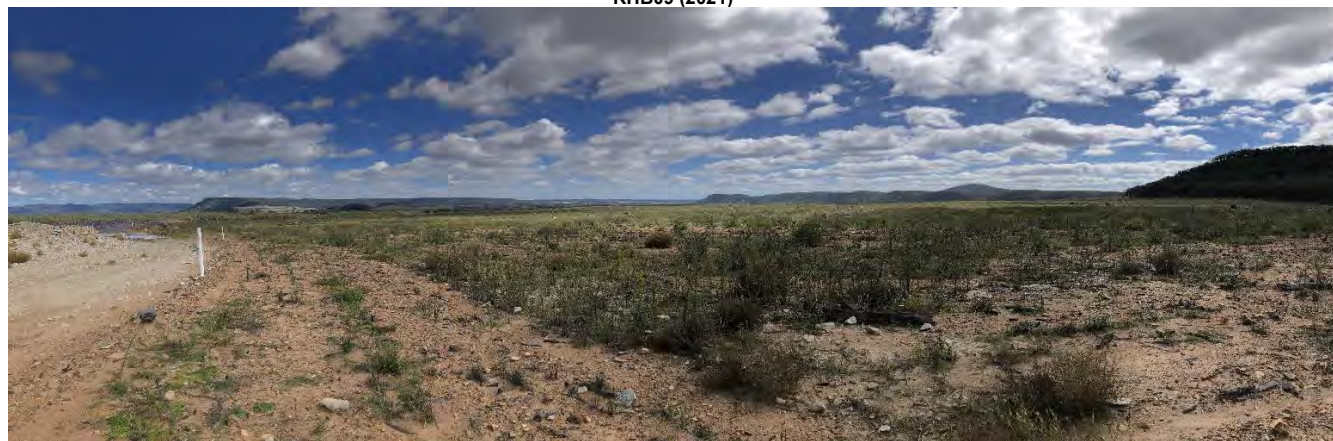
RHB09 (2019)



RHB09 (2020)



RHB09 (2021)





Rehabilitation – Photo Locations

RHB09 (2022)



Rehabilitation – Photo Locations

RHB10 (2017)



RHB10 (2019)



RHB10 (2020)



RHB10 (2021)



Rehabilitation – Photo Locations

RHB10 (2022)



Rehabilitation – Photo Locations

BVT 1 (2021)



BVT 1 (2022)



Rehabilitation – Photo Locations

BVT 2 (2021)



BVT 2 (2022)



Rehabilitation – Photo Locations

BVT 3 (2021)



BVT 3 (2022)



Rehabilitation – Photo Locations

BVT 4 (2021)



BVT 4 (2022)



Rehabilitation – Photo Locations

BVT 5 (2021)



BVT 5 (2022)





Rehabilitation – Photo Locations

BVT 6 (2021)



BVT 6 (2022)



**Project:** Peabody Wilpinjong West 5 rehabilitation trial  
**Project Manager:** Phil Milling

**Date:** 5.12.2022  
**Report by:** Pauline Sykes

**Notes:** Monitoring report – 29<sup>th</sup> November 2022

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### Report:

Monitoring of the direct seeding by UAV trial is currently being undertaken on a quarterly basis. This report covers the twelfth visit, conducted on the 29th of November 2022. Present were Pauline Sykes, Sky Land Management, and James Heesterman, Wilpinjong Coal. This visit marks two years since the initial seeding of the trial plots.

Native species were highly evident across the site on this visit, with new growth on many of the taller trees and shrubs, and a new wave of germinants seen across almost all areas traversed or monitored. Recent warm weather following decent rainfalls will have triggered this wave. Monitoring linked to weather station data has previously confirmed this same pattern of weather and germination. This points towards the coating being able to hold seed in the landscape and generate a staggered germination, hence providing a community that is not all the one age from a single germination event. The benefits of this, as projected in the initial trial planning, is to safeguard the establishment against an adverse event. This could be sudden drought, or bushfire before any plants are mature enough to either reseed naturally or withstand the damage. At the same time, these staggered germination events create a more natural look with plants being differing ages right from initial establishment.

At this stage, conclusions are difficult to draw from the plot parameters due to the impact vertebrate pest herbivory is having across the site, and to a lesser extent weed competition in specific sections. Germination of seeded species has been recorded across all plots; however, growth levels are unable to be gauged due to grazing and browsing across all plots to a greater or lesser extent. Therefore, conclusions as to soil ameliorants and additives to seed coating to enhance germination and subsequent initial establishment of seedlings are unable to be drawn as there can be little to no comparison on growth due to the continuous herbivory affecting establishing plants. This visit showed emerging new germinants of seeded native species across all sites, as well as increasing growth on many

Weed competition from annual species outcompeting desirable natives, as well as worsening infestations of perennial weed species, are showing an impact on establishing the required native vegetation. Annual weed growth will diminish as native vegetation establishes as they can be overcrowded and shaded out by establishing native vegetation where it gets a chance to establish well. Annual weed burdens also alter seasonally and year to year with climatic conditions. While some annual weed species may be concerning, it is more likely the perennial species will impact long term on the desired vegetation community. Infestations of perennial Regional Priority weed species can have an impact on the health of the desired community and may eventually impact relinquishment if not adequately controlled.

The Trial has yielded valuable results in as far as lessons in Quality Assurance of purchased seed is concerned, leading to an awareness of seed supplied as a bulked batch possibly hiding issues with seed quality and purity. Other lessons already learned from the Trial to date relate to topsoil management, especially in regard to weed burden and the possibility of managing topsoil stockpiles with the view to establishing a seed bank of desirable species, for example native grasses, forbs and short-term pioneer species. Emerging lessons around erosion control measures, from initial land formation on to establishing rehabilitating vegetation communities are also evident.

Measures discussed relating to limiting herbivory in selected trial areas within the establish plots will provide information on the level of impact vertebrate pests are having on establishing vegetation. Monitoring of faunal activity across the site and at individual exclusion zones will enhance the outcomes from establishing these exclusion zones.

A discussion on suggested solutions and recommendations for trialing these has been held on site between James and Pauline, and in an online meeting. Observations from this visit are outlined below, with recommendations listed below these.

### Plot 1

Minimal native species are noted in the monitoring area, the exception being grass species in minimal numbers. Native volunteer species are evident in the monitoring area. Outside of the monitoring areas, volunteer Acacia species are growing well and aiding in stabilising erosion points. Desired native species are growing in other areas within this plot, in some cases well established to over 1m in height, especially evident near the farm storage shed at the top of this plot.

Plot 1 has an erosion channel running through the monitoring transect. This seems to be stabilising itself through vegetative growth, largely Couch grass (*Cynodon dactylon*). Sharp sides and edges have rounded. Silt buildup was noted at points, illustrating the stabilising and self-repair of these erosion channels. Fauna utilising the site was evident through the recording of tracks and scat, as well as noting interactions with sighting posts being rubbed and unstable, and marker posts knocked out of the ground. Trampling and grazing was noted.

Exotic species are evident, with cover crop species of oats (*Avena sativa*) and clover species seen across the site. None of these are growing strongly or lushly. Annual weed species are evident, as are perennial species such as Purple Top (*Verbena bonariensis*) and more problematic species such as St John's Wort (*Hypericum perforatum*) and Blue Heliotrope (*Heliotropium amplexicaule*) are increasing in population. The last two are of concern and a management strategy should be put in place.



Photos above show Plot 1. Left, volunteer Acacia species can be seen as the darker green line of shrubs. These aid in helping to bind an erosion channel as well as providing desirable species diversity and coverage. Right, a healing erosion channel due to increasing ground cover from grass species can be seen to the left of the sighting post.

### Plot 2

Native species seeded are increasingly evident across Plot 2. Several grass species and multiple shrubs are noted in the monitoring transect. Outside the monitoring area, increasing numbers of Eucalypts and other tree species are increasing, although are subject to continual herbivory. It was noted that a recent germination of new seedlings had occurred. This shows that coating the seed to be held safely in the landscape has been a viable strategy, with these

emerging seedlings likely to have taken advantage of a warm period following rainfall. This mimicking of generational germination in the natural world is expected to lead to a more natural community long term.



*Photos above illustrate Plot 2 and clearly show developing native trees and shrubs from the applied seed. Native grasses are extensive in this area too, however are less easily identified to species in these illustrative photographs, outside of grass growth being visible. Note the St John's Wort present.*

While grazing and past herbivory was evident, as were tracks and scats, the recent warm weather has allowed establishing native species to put on a rapid fresh flush of new growth. This is evidence of their ability to reshoot after browsing by herbivores (deer, wallaby) and show promise if this pressure can be managed.

Again, weeds as discussed for Plot 1 were noted, especially the spreading of St John's Wort across the site and especially along the access track. Animals are known to utilise established tracks, so this could be spreading due to animal activity or from vehicle usage. A weed management strategy would best begin with a focus on these areas, along animal tracks and vehicle tracks and work out from there.



*Photos above and below (over page) show signs of animal usage across the whole site. Animal sign is noted on every monitoring visit. This is noted from recording of tracks, scat, stem damage, trunk rubbings on large woody debris (LWD), or interaction with marker posts.*



### Plots 3 and 4

The monitoring area for these plots is one in which a difference in topsoil has allowed extreme competition from introduced species, both weeds and cover crop plants. Few if any native seeded species have been noted here previously. This competition has been thought to have shaded out the majority of potential native species seeded. The thick sheltering cover provided by the weed growth and weed seed load providing a food source here during the mouse plague could also potentially have led to predation of the desired seed. The prevalence of mice was noted during previous monitoring visits. This visit, however, saw the first seeded species noted in this area, being two grasses and three shrubs, albeit only one individual of each species. This indicates the potential that the applied seed is possibly still held in the landscape, although the presumption that it is fully available is not necessarily sensible, given the level of potential predation in this area from mice numbers noted during the mouse plague. Outside the area of “better” topsoil that allows this excessive weed species growth, native species are growing at similar stages to all other plots.

Weed species here are largely annual, with the perennial species less evident. Animal usage of this area is high, with many tracks and trampling evident, so seed carried in of St John’s Wort and Blue heliotrope is likely. As in Plot 3, the monitoring area of this plot is one with “better” topsoil and consequent strong competition from exotic annual weed species. Two native grass species were noted in the monitoring area. Other comments regarding native growth outside this section, native usage and weed species are all similar to that of Plot 3.



*Photos above show, left, Plot 3 with dense weed cover; and right, Plot 4 with a well-used animal track through the dense weed cover.*

### Plot 5

Plot 5 is one which has been noted as having a rocky harder topsoil and having struggled to gain good ground cover. Much of the increasing ground cover noted is couch grass (*Cynodon dactylon*), which is highly useful in binding the soil through its growth habit. Plot 5 has some large erosion channels running through it, and these are, in several cases, showing signs of stabilising through the action of sediment trapping and vegetative growth, not least of which is Couch. At the same time, native grass species are strongly present, and many have already seeded. Small shrub and forb species have grown, seeded, and cycled more than once already, and larger shrub species are emerging.

Native volunteer species have been evident in this plot from the beginning, including some forbs and many *Acacia* species. Notable also are the volunteer Eucalypts seeded naturally from the fresh woody debris placed on site. These are growing strongly and show less signs of damage, possibly due to some level of protection afforded by the logs placed as large woody debris (LWD), there being other easier accessed plants to thrash with antlers or otherwise interact with. The strong growth from these could also be due to the protection offered by the mulching effect of the LWD, as these particular areas had leaves and smaller twigs from the heads of the trees still intact, which then fell and added instant mulch, protecting from the elements and helping maintain moisture. Seed held in this material would also have been fresher than commercially provided seed would likely be and so more readily germinated.

Plot 5 was one of two initially seeded with only grasses and pioneer species. There is good variety of native grasses establishing in this plot. Trees and shrub species were overseeded in September 2021, after the earlier seeded pioneer species began to establish.



*Photos above illustrate Plot 5 and the volunteer species noted within the swathe of LWD, visible in both photos, as well as, right, the Acacia linearifolia seeded from the adjacent National Park right next to the sighter post. Grass and forb species ground cover is establishing well and has great diversity in this plot.*

#### **Plot 6**

Plot 6 has extensive couch grass coverage for soil binding. In the monitoring zone and areas easily accessed adjacent to this, there is little evidence of the extensive erosion channels as noted on most other plots. This early establishment of ground cover is quite likely the reason behind this. The couch grass was not planted but would have come from either seed bank or vegetative propagules in the topsoil. Plot 6 is showing signs of emerging tree and shrub species after the overseeding. Other grass and forb species have been noted in all life cycle stages in this plot.

Native volunteer species have been evident in this plot from the beginning, including some forbs and many *Acacias*, particularly *Acacia linearifolia*, which is growing naturally in the adjacent natural bushland.

As with Plot 5, Plot 6 was one of two initially seeded with only grasses and pioneer species. Trees and shrub species were overseeded after the early species began to establish.



*Photos above illustrate repeated damage from deer thrashing tree stems with antlers, in these cases repeated after regrowth. Some plants can tolerate this while others are likely to be killed by either the repeated damage or by pathogens entering the extensive wounds. Whether killed outright or able to regenerate, repeated damage of this nature inhibits the establishment of a strong healthy plant and on a larger basis, a healthy vegetation community.*

#### **Plot 7**

Plot 7 has excellent variety in all seeded species, particularly noting the Eucalypts. This plot is also very heavily grazed, with grass species regularly cropped short and trees and shrubs usually browsed heavily. This visit the tree species were in a growth stage, with less browsing evident and many evidencing new growth. This site is almost always one where kangaroo and wallabies are sighted, and this recent visit was no exception. It is hoped that the plants can get a spurt of growth and outgrow some of the browsing, although this will be monitored through the actions recommended below.

Plot 7 continues to experience heavy erosion, always in the same place.



*Photos above illustrate Plot 7. Left shows good ground cover overall. Knee-height trees are evident across much of this site, with new germinants noted on this visit as well. Right, note the erosion channel. This has been repaired multiple times; however the natural drainage line repeatedly causes the same channel to wash out after each major weather event. Limited natural repair is noted. The weed St John's Wort in full (yellow) flower can be noted extensively in both photographs.*



Photos above show two eucalypts in Plot 7. The one on the left has been damaged and is regrowing from the lignotuber already formed at its base. The one on the right has only recently been browsed back to its main stem and is showing emerging new growth.

## RECOMMENDATIONS

### Weed Management

Of most concern of all weeds on site are the perennial species St John's Wort and Blue heliotrope, as these have the potential to colonise large areas and are extremely difficult to contain. While most annual species are noted as not of any urgent concern, regionally the species Fireweed and African Marigold have objectives for control. These four weeds noted on site hold Regional Priority Weed status (current to 2022).

The information below is taken from the Central Tablelands Regional Strategic Weed Management Plan 2017-2022 (linked). These will have altered, even if only slightly, with the new plan due to be published early 2023.

#### Regional Priority Weeds objective – CONTAINMENT:

These weeds are widely distributed in parts of the region. While broad scale elimination is not practicable, minimisation of the biosecurity risk posed by these weeds is reasonably practicable.

#### Fireweed – *Senecio madagascariensis*

Within Exclusion zone (**NB Wollar/Wilpinjong is within the area designated the regional Exclusion Zone**):

- The plant is eradicated from the land and the land is kept free of the plant.
- Land managers mitigate the risk of the plant being introduced to their land.
- Establish agreed quarantine and/or hygiene protocols.
- Surveillance and mapping to locate all infested properties and maintain currency of exclusion zone and objectives.
- Monitor change in current distribution to ensure containment of spread.
- High level analysis of pathways to identify potential introduction areas and preventative options.

#### Regional Priority Weeds objective – ASSET PROTECTION:

These weeds are widely distributed in the Central Tablelands region. While broad scale elimination is not practicable, minimisation of the biosecurity risk posed to certain assets is reasonably practicable.

St John's wort *Hypericum perforatum* (Protect grazing land free of St John's wort)

### COMMUNITY CONCERN LIST FOR THE CENTRAL TABLELANDS LOCAL LAND SERVICES REGION

African marigold *Cineraria lyratiformis*



Blue heliotrope *Heliotropium amplexicaule*

[https://www.ils.nsw.gov.au/data/assets/pdf\\_file/0009/722727/Central-Tablelands-Regional-Strategic-Weed-Management-Plan-June-2017.pdf](https://www.ils.nsw.gov.au/data/assets/pdf_file/0009/722727/Central-Tablelands-Regional-Strategic-Weed-Management-Plan-June-2017.pdf)



Photographs illustrate *Cineraria lyratiformis*, Mexican Marigold.

#### Plots 3 and 4 Reseeding

The monitoring zone for these two plots, as discussed, has extensive overgrowth of annual weed species and little evidenced native species establishment. It is proposed to mark out the extent of this area, control the weed growth in here and then seed this area again with native species, trialing the use of a heavier than usual load of short-term pioneer *Acacia* species.

It is reasoned that utilising wattles in this manner will have the effect of a faster establishing species, rapid growth to 1-2m which will quickly shade the annual weeds. This will generate a boost in soil microbial activity and nutrition through the known action of *Acacia* species and their effect on the rhizosphere. Utilising their shorter lifespan (3-5 years for the bulk of the germinants), these will fall and add to the leaf litter and small woody debris layer more rapidly than longer term canopy species. The theory here is to replicate a natural regeneration process as seen after bushfire. In this scenario, the *Acacias* germinate rapidly, providing cover and added soil nitrogen to slower establishing species such as *Eucalypts*.

All work can be undertaken using the UAV, thus eliminating the need for equipment to traverse the site, which would otherwise result in increasing compaction, damaging other desirable species adjacent and being hindered by the placement of large woody debris already on site.

#### Vertebrate Pest Management

Long term, Vertebrate Pest Management Strategies do need to be in place for good establishment of a viable Native Vegetation Community. Pest species of note on site which are already impacting native species establishment are deer and pig, as well as native herbivory by kangaroo (grazing) and wallabies (browsing). In the short term, it is proposed to trial exclusion areas by the means of physical and chemical exclusion. Long term, pest management will be an ongoing issue and is a noted threat to native vegetation. The neighbouring Munghorn Gap National Park harbours the pest animals, so full control will remain a difficult issue.

It is proposed to establish targeted fenced areas to determine the extent of damage on the growing trees by deer and other pest animals. Fenced areas must be deer and pig proof, so tall enough and strong enough to withstand animal interactions, and anchored well to eliminate pushing under the fencing. Small areas would be adequate for trialing the concept for larger installation. A larger compound could be trialed instead and would negate the need for two areas in each plot. Access for monitoring should be considered.

Siting will need to be targeted at the areas where most animal activity is noted: Plot 1 near to the shed. Plot 2 both high near the tree line and lower on the slope towards the bottom edge of the trial plot. Plot 3 near the tree line adjacent to

the existing large rock. Plot 6 near to the monitoring zone where deer damage has been extensively noted would also be an ideal site. Plot 7 high up close to the tree line and again further downslope where it is less sheltered would be beneficial, as this plot is heavily frequented by the local wildlife. All enclosures should be specifically sited to include previously browsed or antler-damaged tree species.

All sighting posts for monitoring need to be re-secured after any have suffered from animal interactions.

It is further proposed to establish trial areas utilising a chemical animal deterrent (recommending Deter™) to investigate the possibility of utilising this across larger areas on site. This would take the form of a designated and mapped area, unfenced, with monitoring cameras in place. This would be sited where previous browsing and grazing has been noted. Plot 7 in particular would be a good candidate. The product can be utilised on larger areas by spraying a perimeter border with strips every 2m within. Recommend creating at least a 10m x 10m area for this. Application using the UAV for this is recommended.

### Erosion Control

Most plots have at least some erosion channels noted, with some extensive. There are natural repair mechanisms developing in some of these. Plot 7 in particular, however, continues to be problematic. The major issue with this is that repair works, although undertaken repeatedly, simply replace the material in the same place with no change in management in place to eliminate these points repeatedly eroding.

As repair work is undertaken, structures such as sediment traps need to be established to trap sediment, build up soil rather than continually eroding it, and slow the flow of water across the landscape.

Care should be undertaken to maintain the drainage lines and utilise them with said structures, and not to simply transfer the problem to another area within the site. These drainage lines are established and known, and are a result of the shape of the landform. Wetland species which act as sediment binders could also be established, such as *Juncus spp*, to increase the capacity within the landscape to trap and slow run-off and so slow the repeat occurrence of this erosion.

### Topsoil Management

Previous reports have indicated the benefits of better topsoil management for reducing weed seed burden and increasing a native seed bank in topsoil stockpiles. Anecdotally, Wilpinjong Coal staff have indicated this practice is being investigated with grass and cover crop species.

It is proposed that consideration be given to managing topsoil dumps by establishing them with native grass and pioneer forb and shrub species, even including the shorter-term *Acacia* species, as will be utilised in the re-seeding of Plots 3 and 4. This can lead to the building of a healthy microbial population within the soil, as well as a seed bank of desirable native species. Weed management to reduce or eliminate weed seed from this seed bank should be a priority, which will have a large benefit long term to the health of a rehabilitated native vegetation community and the weed management issues within it.

### Soil testing

Monitoring has shown the presence of fungal fruiting bodies across the site at varying times. The trial overall included the addition of soil microbial agents in the differing parameters for each plot, as well as differing fertiliser and other soil ameliorants.

It is recommended that new soil tests be undertaken, to investigate the microbial activity and compare any changes to the nutrient profile from the addition of (nitrogen fixing) plants, soil microbes, organic matter, and other fertilisers.

Photo point and quadrat photos are recorded each visit from a fixed point and with a fixed focal point. These, over time, indicate the increasing growth and seasonal cycling as we monitor the growth stages for each Plot. This report continues illustration of Plots 4 and 6 with photo point images from each monitoring visit to date.

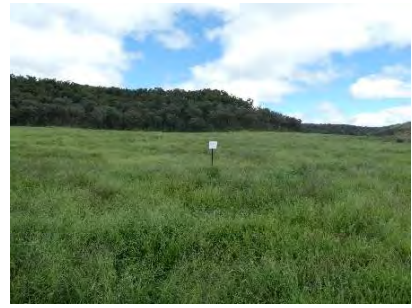
*Plot 4 photo point photo series*



*Plot 4, December 2020*



*Plot 4, January 2021*



*Plot 4, February 2021*



*Plot 4, March 2021*



*Plot 4, April 2021*



*Plot 4, May 2021*



*Plot 4, June 2021*



*Plot 4, September 2021*



*Plot 4, December 2021*



*Plot 4, April 2022*



*Plot 4, August 2022*



*Plot 4, September 2022*



*Plot 4, November 2022*

*Plot 6 photo point photo series*



*Plot 6, December 2020*



*Plot 6, January 2021*



*Plot 6, February 2021*



*Plot 6, March 2021*



*Plot 6, April 2021*



*Plot 6, May 2021*



*Plot 6, June 2021*



*Plot 6, September 2021*



*Plot 6, December 2021*



*Plot 6, April 2022*



*Plot 6, August 2022*



*Plot 6, September 2022*



*Plot 6, November 2022*

Next quarterly monitoring visit due: 22<sup>nd</sup> March 2023.

Pauline Sykes  
Project Consultant  
Adv. Cert. Hort.

MOB: 0438233386  
PH: 02 65473644  
E: [pauline@skylandmanagement.com.au](mailto:pauline@skylandmanagement.com.au)