Banksia sphaerocarpa var. *dolichostyla* Management Plan Earl Grey Lithium Project

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EXECUTIVE SUMMARY

This *Banksia sphaerocarpa* var. *dolichostyla* (Banksia) Management Plan is submitted to support environmental referrals under the *Environmental Protection Act 1986* and *Environment Protection and Biodiversity Conservation Act 1999* for the Earl Grey Lithium Project (the Project) which will be developed by Kidman Resources Limited (Kidman). Table 1 presents the purpose of the Management Plan in the context of Western Australian Environmental Protection Authority (EPA) objectives.

Table 1: Purpose of the Banksia Management Plan

Item	Description
Title of proposal	Earl Grey Lithium Project
Proponent name	Kidman Resources Limited
Ministerial Statement number	Not applicable
Purpose of the management plan	This management plan is submitted to support referrals under the Environmental Protection Act 1986 and the Environment Protection and Biodiversity Conservation Act 1999. It also provides a framework to ensure that impacts on *Banksia sphaerocarpa* var. *dolichostyla* attributable to the Earl Grey Lithium Project are minimised and impacts do not conflict with the EPA objective for flora and vegetation.
Key environmental factor	Flora and Vegetation, notably *Banksia sphaerocarpa* var. *dolichostyla*.
Objective	To protect flora and vegetation so that biological diversity and ecological integrity are maintained.

This Management Plan is designed to be adaptive and will be updated over the life of the Project (approximately 30 to 40 years) with increased knowledge about *Banksia sphaerocarpa* var. *dolichostyla* in the Great Western Woodlands, and the effectiveness of implemented management measures. Prior to commencement of mining Kidman will update this plan in consultation with all relevant departments or agencies, if appropriate. As such this plan remains a working document. Table 2 presents the environmental criteria to measure achievement of environmental objectives through implementation of this Management Plan.

Table 2: Environmental Objectives and Targets

Management Objective	Management Targets
Minimise the potential for clearing to cause damage or death to individuals or populations.	Minimal unauthorised or accidental clearing of significant flora individuals or populations.
Minimise the risk of weed invasion	Minimal new weeds introduced to site.
Minimise the risk of dust impacting flora & vegetation.	Minimal death or decline in health due to dust.
Minimise the risk to flora from unauthorised off road driving.	Minimal damage or death attributable to off-road driving.
Minimise requirements for clearing which causes fragmentation.	No clearing outside approved clearing areas. Progressive rehabilitation undertaken.
Minimise the increase in feral species abundance, particularly herbivores (goats, camels, rabbits, pigs).	Waste and water sources not available to feral herbivores. Feral species control program implemented No increase in feral species abundance.
Minimise the increase in fire frequency or intensity	No fires attributed to mining and associated activities.

Key provisions of the management plan to protect flora and vegetation, including *Banksia sphaerocarpa* var. *dolichostyla* comprise:

- Avoidance:
  - The footprint required for the Project has been minimised as far as practicable.
  - The footprint maximises use of existing disturbed areas, minimising the need for new disturbance.

  - The development envelope has been adequately surveyed for *Banksia sphaerocarpa* var. *dolichostyla* and infrastructure has been sited to avoid disturbance to known populations.
  - Pre-clearance surveys will be completed prior to any clearing activities to further reduce the risk of unauthorised clearing of the species. Newly identified specimens/populations will be avoided wherever possible.

- Demarcation – Prior to commencement of construction or operational activities all known locations of *Banksia sphaerocarpa* var. *dolichostyla* will be demarcated by installing flagging and signage as Threatened Flora Exclusion Zones. Physical barriers may be erected at locations to protect populations at risk of being cleared.
- Access Management – All vehicle movements to be undertaken on designated access tracks i.e. no driving in areas that are not authorised as access or for disturbance. Access to native vegetation areas containing *Banksia sphaerocarpa* var. *dolichostyla* will be prohibited except for monitoring.
- Dust Management – Speed limits will be signed and enforced on Project roads and dust suppression activities will be undertaken on roads and stockpiles.
- Saline Water in Dust Suppression Management – Dust suppression along roads with *Banksia sphaerocarpa* var. *dolichostyla* will utilise dribble bars to prevent saline overspray.
- Weed control – Implementation of hygiene procedures and where required, weed control programs.
- Fire Management – Prevention of large scale wildfires with consideration of the *Banksia sphaerocarpa* var. *dolichostyla* required fire regime.
- Monitoring – *Banksia sphaerocarpa* var. *dolichostyla* populations will be monitored to enable early detection of adverse impacts as a result of construction and mining activities. Monitoring will be undertaken prior to construction, commencement of operations, during operations and post-closure.
- Contingency Planning – If impacts are detected on individual or community health, condition or size, the Registered Manager will advise the relevant agencies. The cause will be investigated to determine if the change is a result of the Project, and operations will be modified to ensure further adverse impacts are avoided. Kidman will liaise with the relevant agencies to determine appropriate remedial actions.
- Seed Collection – Seed and/or cuttings will be collected by a suitably qualified environmental professional in consultation with DPaW and Kings Park and Botanic Garden and stored appropriately for rehabilitation, where appropriate.
- Reporting – Non-compliances with this plan will be reported to the Registered Manager within 24 hours. Kidman will notify the relevant agencies. All records of monitoring kept in accordance with this plan will be summarised in the Annual Environmental Report, which will be submitted to the relevant agencies.
- Progressive rehabilitation will be undertaken, including rehabilitation of existing state liabilities where used by Kidman. This will include trials for the growth and establishment of self-sustaining Banksia populations.
- Pest animal control for the Project and coordination with regional programs.
- Awareness – Staff training and awareness including an induction and regular Toolbox sessions.

A summary of the location of the complete environmental management provisions of this Management Plan are provided in Table 3.

Table 3: Key Provisions of the Banksia Management Plan

Key Provision	Location in Chuditch MP
Rationale for choosing management based provisions.	Section 1.4
Comprehensive list of management actions.	Section 2, Table 5
Comprehensive summary of management targets.	Section 2, Table 5

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1. Context, Scope and Rationale

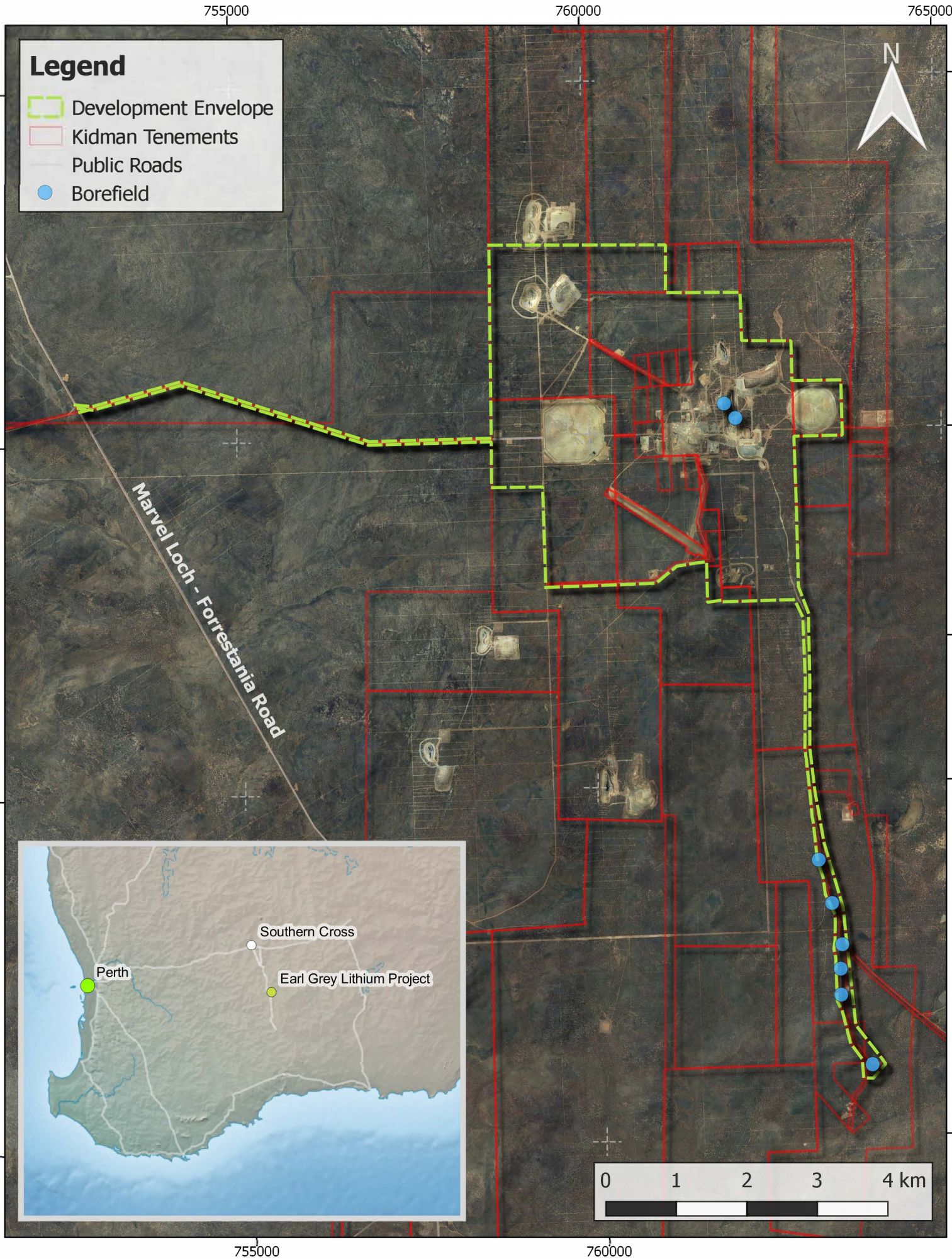
This section includes a summary of the proposal including its key features, information on the key environmental factor Flora and Vegetation with particular focus on *Banksia sphaerocarpa* var. *dolichostyla*, including survey findings, biology and distribution, assumptions and uncertainties, the management approach that will be taken and the rationale for the approach.

1.1 Proposal

The Earl Grey Lithium Project (the Project) is located approximately 105 km south-southeast of Southern Cross, Western Australia (Figure 1). A large, economic pegmatite-hosted lithium deposit was discovered by Kidman Resources Limited (Kidman, the Proponent) in 2016. The deposit and proposed operation is situated at the abandoned Mt Holland Mine Site, which was operated between 1988 and 2001, and comprises a number of open pits, an underground mine, a processing plant, waste rock dumps, tailings storage facilities and other infrastructure that is largely un-rehabilitated and currently a liability of the State of Western Australia. Construction of the project is scheduled to commence in Quarter 3 2017, with mining scheduled for Quarter 1 2018. The Project is located on tenure granted under the *Mining Act 1978*. The development envelope and conceptual Project footprint is shown in Figure 2.

The key components of the Project will comprise:

- Progressive mining of the Earl Grey lithium deposit using conventional open cut drill and blast mining methods, over a potential 30 to 40 year life of mine (LOM).
- Processing of lithium ore at a rate of 3 million tonnes per annum, through a newly constructed gravity separation and floatation plant, largely constructed within the historic disturbance footprint.
- Production of a lithium concentrate that will be stored in a concentrate shed prior to being transported by road trains to an existing Western Australian export facility.
- Production of two chemically benign process waste streams, comprising:
  - A gravel sized reject which will be disposed of in waste rock dumps as well as being used for construction purposes (e.g. road base, fill, rehabilitation armouring).
  - A finer grained tailings stream that will be deposited into the abandoned and unrehabilitated Tailings Storage Facility (TSF) 2 (hereby referred to as TSF Option A) or an expansion to the existing in-pit TSF 3 (hereby referred to as TSF Option B), thereby reducing the project footprint and providing a rehabilitation solution to the State liability landform.
- Disposal of unmineralised waste rock to three locations:
  - Stockpiling of waste rock over the abandoned and unrehabilitated Tailings Storage Facility 1 (TSF 1), thereby reducing the disturbance footprint and providing a rehabilitation solution to the State liability landform (hereby referred to as Waste Rock Dump (WRD) 1).
  - Backfilling of the Earl Grey pit as mining progresses from south to north (hereby referred to as WRD 2), thereby reducing the disturbance footprint and the area of open pit remaining at closure.
  - Construction of a new waste rock dump that has been designed to avoid threatened flora species (hereby referred to as WRD 3).
- Construction of a low-grade ore stockpile to the immediate southeast of the proposed pit for processing towards end of LOM.
- Refurbishment of the existing airstrip.
- Construction of other supporting infrastructure (e.g. accommodation village, power station, landfills, administration, workshops, roads, refurbishment of the borefield) predominantly within the historic footprint, thereby reducing new disturbance and providing a rehabilitation solution to a significant portion of the State rehabilitation liability.
- Utilisation of the existing road network.



Scale: 80,000 Original Size: A4 Aerial Photo Date: 2014 Grid: Australia MGA94 (50)	**Kidman Resources Limited** **Earl Grey Lithium Project**	**Figure 1** **Location Plan**	Blueprint Environmental Strategies info@blueprintstrategies.com.au www.blueprintstrategies.com.au

Scale: 31,000 Original Size: A4 Aerial Photo Date: 2017 Grid: Australia MGA94 (50)	**Kidman Resources Limited** **Earl Grey Lithium Project**	**Figure 2** **Proposed Site Layout**	**Blueprint Environmental Strategies** **www.blueprintstrategies.com.au** **info@blueprintstrategies.com.au**

1.2 Key Environmental Factor: Flora and Vegetation

The EPA's objective for flora and vegetation is to protect flora and vegetation so that biological diversity and ecological integrity are maintained.

Flora baseline assessments of the Project area have shown the *Banksia sphaerocarpa* var. *dolichostyla* and a number of Priority flora species to be present.

Banksia sphaerocarpa var. *dolichostyla* is a species of conservation significance, listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* and Schedule 3 (Flora that are considered likely to become extinct or rare, as Vulnerable flora) under the *Wildlife Conservation Act 1950*. While this Management Plan has been developed specifically for the *Banksia sphaerocarpa* var. *dolichostyla*, impacts and management measures listed herein apply to other species of conservation significance present within the Project area.

The following aspects of the Project have been identified as having the potential to impact *Banksia sphaerocarpa* var. *dolichostyla*:

- Clearing – Mining, exploration and survey may result in unintentional clearing of individual plants or populations during clearing or off-road activities.
- Weed Invasion – Mining activities may increase risk of weed invasion through clearing, new roads and tracks, additional vehicles and lack of vehicle hygiene procedures increasing competition for resources.
- Changed Fire Regimes – Mining activities can cause accidental fires, though the risk is low, unplanned fires can also be caused by road accidents, lightning or arson. Large, unplanned bushfires are undesirable as they substantially change flora and vegetation on a large scale.
- Changed Hydrogeology – The Project will require groundwater abstraction, which can result in degradation of flora and vegetation where species ae dependent on groundwater.
- Changed Hydrology – Operations can result in modified hydrology (e.g. creek diversions or impoundment of flows) resulting in deterioration of plant health through either inundation or reduced water supply.
- Habitat Fragmentation – Fragmentation of individuals and populations from land clearing reduces potential for gene flow. Fragmentation potentially exacerbates other threats like fire, weed invasion and herbivory by feral species by providing access into habitats that were previously dense and difficult to traverse.
- Increased Feral Fauna – Increased human activity can lead to an increase in feral herbivores which thrive in modified landscapes with additional water sources, food from rubbish tips and increased access along tracks and roads. Feral fauna, particularly herbivores such as goats, camels and rabbits, have the potential to negatively impact flora and vegetation, with competition and land degradation by rabbits, unmanaged goats and feral pigs.
- Generation of dust – Earth moving activities (e.g. clearing, loading), vehicle movements on unsealed roads and processing activities have the potential to generate dust which can result in impacts to the health of flora and vegetation through clogging of stomata.
- Dust suppression using hypersaline water – Use of hypersaline water in dust suppression on roads and other surfaces has the potential to impact flora and vegetation if it is not contained and flows to surrounding vegetation.
- Spillages – Spillages of tailings and hypersaline water from pipelines can result in large scale vegetation death without the correct controls in place.

1.3 Condition Requirements

No specific conditions relating to *Banksia sphaerocarpa* var. *dolichostyla* currently apply to the Project. This management plan is submitted with the environmental referrals in order to satisfy the Environmental Protection

Authority (EPA) and the Department of the Environment and Energy (DoEE) that Kidman has taken into consideration the environmental objectives set for flora and vegetation, specifically *Banksia sphaerocarpa* var. *dolichostyla*, and are committed to implementing the Project in a manner that meets these objectives.

1.4 Rationale and Approach

1.4.1 Survey and Results

Three flora surveys targeting *Banksia sphaerocarpa* var. *dolichostyla* and one comprehensive flora and vegetation survey have been completed in the Project area. These are described in the following sub-sections, with a summary provided in Table 4 and the survey are shown in Figure 3.

2014 Targeted Survey

Between 11 and 13 August 2014 Native Vegetation Solutions (NVS) conducted a targeted flora survey for *Banksia sphaerocarpa* var. *dolichostyla* in areas proposed for infrastructure at that time. These areas comprised the existing processing area, TSF1, roads, accommodation village, Razorback pit (south of the Project) a pipeline corridor from Blue Vein pit to Razorback, a powerline corridor and the existing landfill site. The areas were walked and roads were driven.

The survey did not record any Threatened or Priority flora within the proposed infrastructure areas. *Banksia sphaerocarpa* var. *dolichostyla* was recorded outside of the proposed infrastructure areas; alongside the existing rubbish landfill, airstrip, main haul road, camp access road and processing area.

All locations of surveyed *Banksia sphaerocarpa* var. *dolichostyla* are shown on Figure 4.

2016 Targeted Survey

A targeted flora survey for *Banksia sphaerocarpa* var. *dolichostyla* was undertaken by NVS on 14 September 2016, after Kidman site personnel had identified a potential Banksia species within the Earl Grey prospect. The targeted survey was conducted within an area proposed for exploration development. The area was walked and driven by a 4WD vehicle.

No *Banksia sphaerocarpa* var. *dolichostyla* were recorded within the survey area. The potential Banksia species identified by site personnel was positively identified as *Banksia laevigata* subsp. *fuscolutea*, which is not of conservation significance. In addition, NVS reported that the majority of vegetation within the survey area comprised mallee woodland over melaleuca shrubland, which is not considered suitable habitat for *Banksia sphaerocarpa* var. *dolichostyla*.

2016 Flora and Vegetation Survey

A comprehensive flora and vegetation survey of the Earl Grey prospect (and three additional prospects) was completed between 24 - 26 October and 9 - 10 November 2016. The aim of the survey was to identify and record the distribution of any conservation significant flora species and vegetation communities.

The survey was undertaken by two experienced botanists who established 26 quadrats in the Earl Grey prospect. The survey recorded one *Banksia sphaerocarpa* subsp. *dolichostyla*. approximately 200 m from the eastern side of the Earl Grey prospect, in a vegetation community which is bisected by an old haul road. The location of the surveyed *Banksia sphaerocarpa* var. *dolichostyla* is shown on Figure 4.

Banksia sphaerocarpa subsp. *dolichostyla* was not recorded in the Earl Grey prospect and the preferred soils and landforms of the species were absent from this area.

2017 Targeted Survey

A targeted flora survey for *Banksia sphaerocarpa* var. *dolichostyla* was undertaken by Goldfields Landcare Services between 27 and 29 April 2017. The purpose of the survey was to identify *Banksia sphaerocarpa* var. *dolichostyla* in areas where clearing and/or disturbance is proposed within the development envelope for the Earl Grey Lithium Project.

The survey was completed by two Botanists and an assisting Environmental Scientist. The density of the search was based on the surrounding environment and vegetation communities, targeting areas that may support *Banksia sphaerocarpa* var. *dolichostyla*. These areas comprised very sparse scrub of *Allocasuarina acutivalvis* subsp. *acutivalvis* over *Banksia purdieana* and *Hakea scoparia* heath with very sparse *Beaufortia orbifolia* and scattered *Isopogon teretifolius* over mixed open dwarf scrub of *Melaleuca cordata*, *Banksia laevigatum* subsp. *fuscolutea* and *Hemigenia dielsii* on orange silt with a thin mantle of laterite pebbles and minor outcropping laterite. Target areas were covered on foot using a high density search pattern, with the track and Banksia specimens recorded using a handheld GPS.

No new *Banksia sphaerocarpa* var. *dolichostyla* communities were recorded, but a known community located next to the gravel pit, east of the proposed Early Grey pit, was found to contain significantly more specimens than previously identified.

All locations of surveyed *Banksia sphaerocarpa* var. *dolichostyla* are shown on Figure 4.

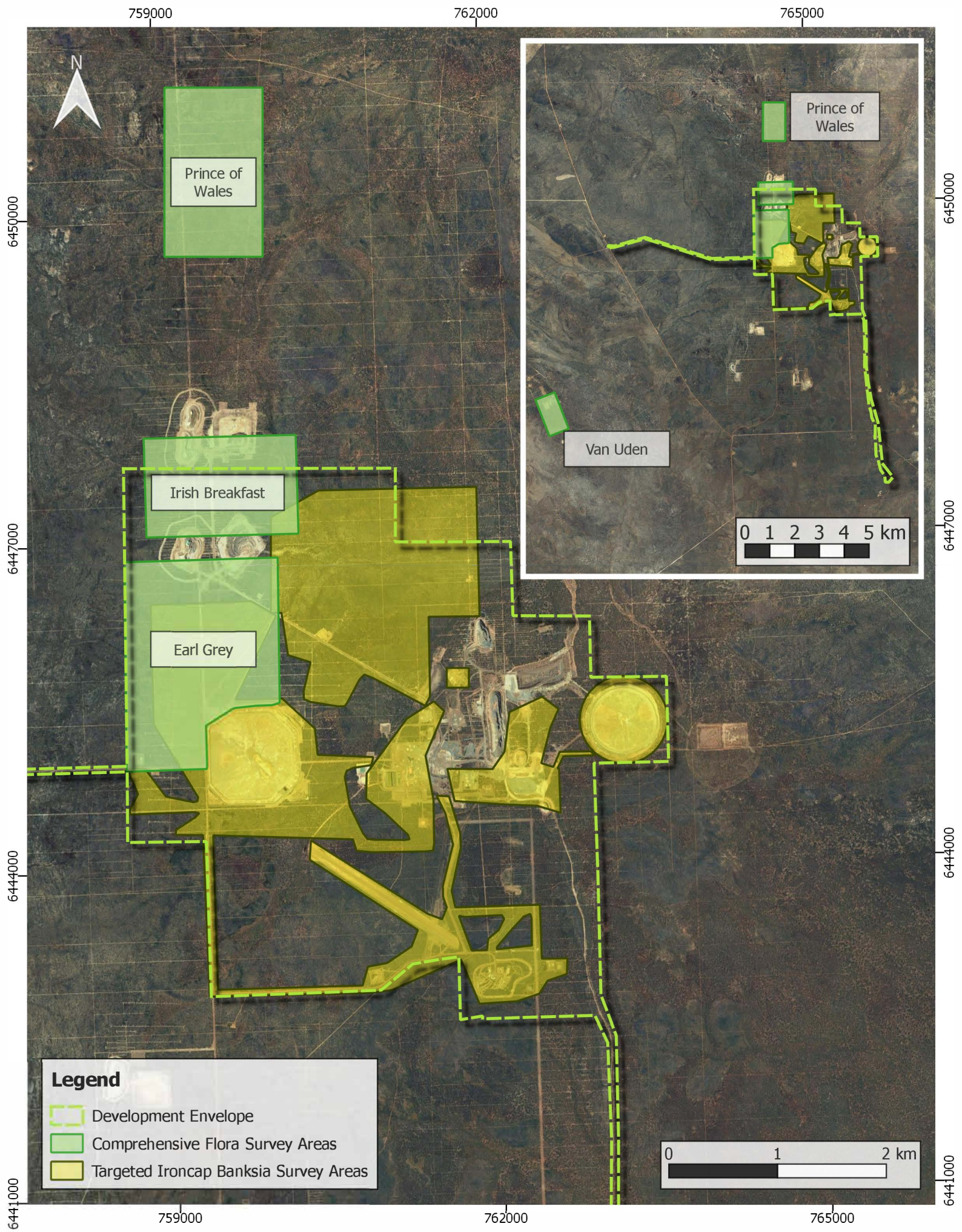
Table 4: Summary of Targeted Flora Surveys

Date	Extent/Area	Results/Findings
11 – 13 August 2014	Proposed infrastructure areas (processing area, TSF1, roads, accommodation village, Razorback pit, a pipeline corridor from Blue Vein pit to Razorback, a powerline corridor and the existing landfill site).	• No Threatened or Priority Flora within infrastructure areas. • *Banksia sphaerocarpa* var. *dolichostyla* was recorded outside infrastructure areas alongside the existing rubbish landfill, haul road and access road.
14 September 2016	Proposed Earl Grey pit and surrounds.	• *Banksia sphaerocarpa* var. *dolichostyla* was not recorded. • Vegetation type was not considered suitable habitat for *Banksia sphaerocarpa* var. *dolichostyla*.
24 - 26 October and 9 - 10 November 2016	Earl Grey prospect, Irish Breakfast prospect, Prince of Wales prospect, Van Uden prospect.	• *Banksia sphaerocarpa* subsp. *dolichostyla* was not recorded in an of the survey areas. • *Banksia sphaerocarpa* subsp. *Dolichostyla* was recorded approximately 200 m from the eastern side of the Earl Grey prospect.
27 - 29 April 2017	Proposed infrastructure areas within the Earl Grey Lithium Project development envelope.	• *Banksia sphaerocarpa* var. *dolichostyla* was not recorded from any new locations, however additional specimens were recorded from a known location east of the proposed Earl Grey pit.

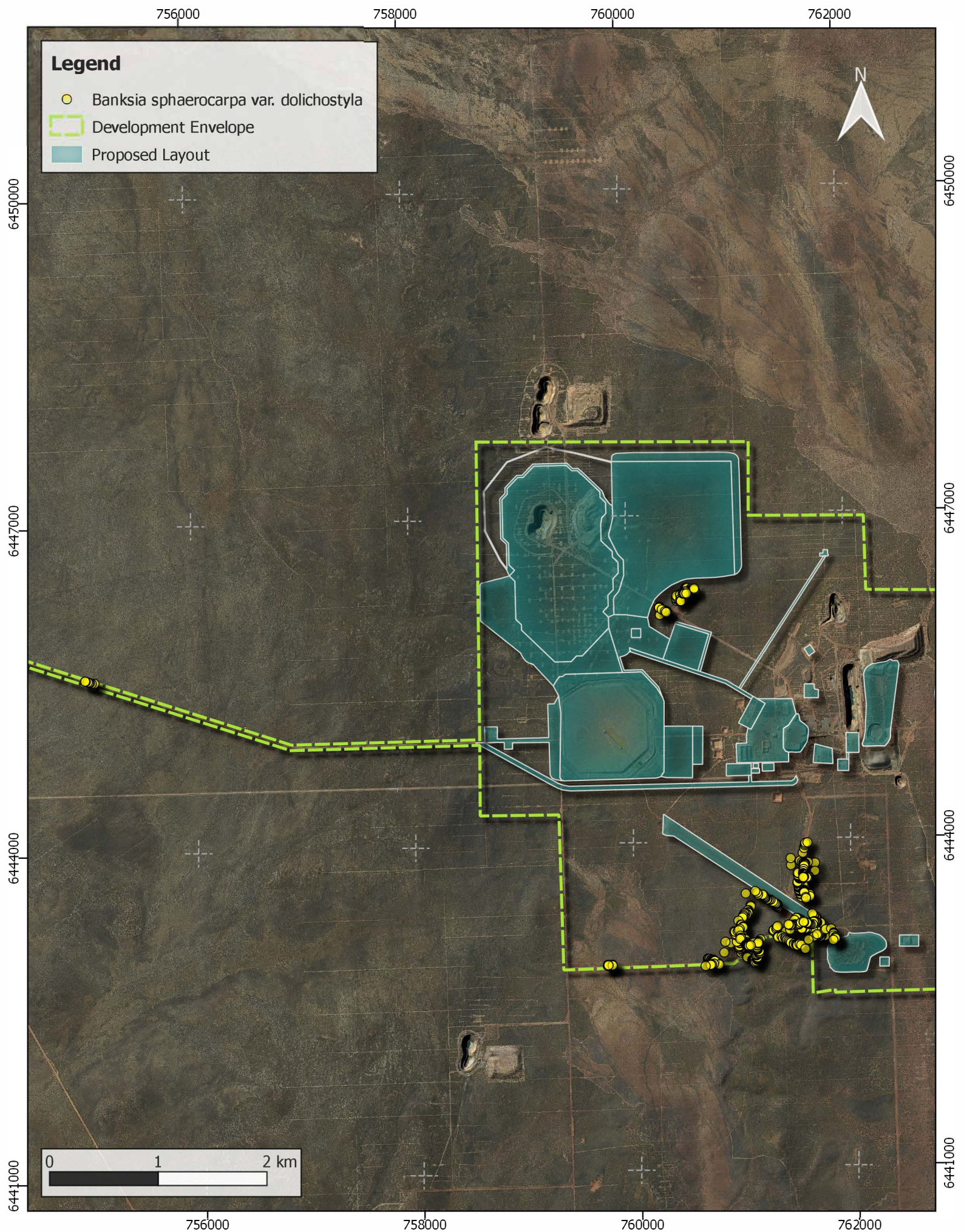
In summary:

- 521 individual *Banksia sphaerocarpa* var. *dolichostyla* were recorded during the targeted flora surveys (Figure 4).
- Separate populations were identified in proximity to the airstrip and haul road (Figure 4).
- The flora surveys showed *Banksia sphaerocarpa* var. *dolichostyla* was relatively common in the Project area and surrounds.

Figure 3: Location and Extent of Flora Surveys



Scale: 50,000 Original Size: A4 Aerial Photo Date: 2017 Grid: Australia MGA94 (50)	**Kidman Resources Limited** **Earl Grey Lithium Project**	**Figure 3** **Flora Survey Areas**	**Blueprint Environmental Strategies** **info@blueprintstrategies.com.au** **www.blueprintstrategies.com.au**



Scale: 50,000 Original Size: A4 Aerial Photo Date: 2017 Grid: Australia MGA94 (50)	**Kidman Resources Limited** **Earl Grey Lithium Project**	**Figure 4** **Banksia sphaerocarpa var. dolichostyla Locations**	**Blueprint Environmental Strategies** **info@blueprintstrategies.com.au** **www.blueprintstrategies.com.au**

//Mac/Home/OneDrive/Kidman Resources Limited/Mt Holland/Earl Grey/EPA Referral/GIS/Flora Results.qgs 18/05/2017

1.4.2 Description of Banksia sphaerocarpa var. dolichostyla

Banksia sphaerocarpa var. *dolichostyla* is a lignotuberous shrub or small tree 2-4 metre tall, with long and narrow, bluish green, toothless or lobeless leaves. The flowers are golden. The inflorescences are upright and spherical, opening from the apex down. The styles are hooked just below the apex. The fruiting cone is spherical with up to 60 follicles, often crowded and at first with spreading hairs which may wear off on exposed surfaces. It is known to flower between March and May. Derivation of the name is from the Greek dolichos (long), and stylos (pillar and hence style) in reference to the very long pistil. The flowers and foliage of the plant are shown on Plate 1 (WAHERB, 2014).

Plate 1: Flower and Foliage of *Banksia sphaerocarpa* var. *dolichostyla*

1.4.3 Distribution of Banksia sphaerocarpa var. dolichostyla

Banksia sphaerocarpa var. *dolichostyla* is confined to an area east of the cleared wheatbelt within the Narrogin and Merredin Districts. It occurs on Vacant Crown Land north from Digger Rocks through Forrestania to Mount Holland. This species prefers iron-capped rises on ironstone profiles. It is found in low woodlands to low shrublands with associates which include Dryandra and Allocasuarina species.

1.4.4 Key Assumptions and Uncertainties

Key assumptions:

- The surveys provide sufficient information to confirm *Banksia sphaerocarpa* var. *dolichostyla* presence, and suggest a healthy population exists within the Project area and surrounds.
- Flora surveys were completed in compliance with EPA requirements (EPA 2016a; 2016b).
- The *Banksia sphaerocarpa* var. *dolichostyla* population surveyed indicates a combination of favourable factors for this species; suitable soils, good seasons for recruitment, long unburnt vegetation communities, and low numbers of feral herbivores which may be attributed to feral animal control programs in the area.
- The lack of *Banksia sphaerocarpa* var. *dolichostyla* in some areas surveyed indicate the species is variable in time and space, its absence may be a response to fire or unsuitable soils.
- *Banksia sphaerocarpa* var. *dolichostyla* may extend further to the east, west, south and north of the survey area. It is assumed that by utilising areas of existing disturbance and minimising clearing, as well as progressively rehabilitating the pit, and rehabilitating existing liabilities, the impacts of the Project to the species will be minimised.
- The level of survey was limited to proposed development areas, so it is considered likely there are more individuals and communities in the Project area.

Key uncertainties:

- The extent of the *Banksia sphaerocarpa* var. *dolichostyla* population beyond the areas surveyed in baseline assessments, and in the greater regional area is generally unknown.

1.4.5 Management Approach

The management approach taken in this management plan is risk-based and developed around the mitigation hierarchy of avoid, minimise, rehabilitate and offset to ensure impacts to *Banksia sphaerocarpa* var. *dolichostyla* have been avoided or reduced to as low as reasonably practicable.

Management actions detailed in this *Banksia sphaerocarpa* var. *dolichostyla* Management Plan have been specifically designed to ensure the Project meets its environmental objectives for the key environmental factor. Risks and management actions were identified and prioritised using information gained from baseline surveys and other regional and local information within the public domain.

1.4.6 Rationale for Choice of Provisions

The management approach is informed by results of baseline surveys and the Project parameters. The Project will have a small footprint over a long life of mine with priority use of existing disturbed areas and progressive rehabilitation, including rehabilitation of existing State liabilities.

Management and mitigation measures have been designed for the long term 30 to 40 year life of mine, and as such, may require adaptive solutions in subsequent revisions.

2. Banksia Management Plan Provisions

This section identifies the provisions that Kidman proposes to implement to ensure *Banksia sphaerocarpa* var. *dolichostyla* protection. It states the management objective, identifies management actions that will be implemented to mitigate and manage potential risks to *Banksia sphaerocarpa* var. *dolichostyla*, and management targets that will be used to measure the efficacy and performance of management actions. A monitoring framework for tracking performance against management targets is included in Section 3.

This Management Plan utilises management-based provisions because *Banksia sphaerocarpa* var. *dolichostyla*, as an ecological factor, is difficult to objectively measure and report on. This section details management-based actions, targets, a monitoring framework, trigger levels and reporting requirements to ensure the protection of *Banksia sphaerocarpa* var. *dolichostyla* from the risks associated with the Project.

2.1 Objective

The objective of this Management Plan is to ensure the Project is managed to maintain local flora and vegetation biological diversity and ecological integrity, with a focus on *Banksia sphaerocarpa* var. *dolichostyla*, such that the EPA objective for flora and vegetation is met (EPA 2016a).

2.2 Management Actions

Management objectives have been identified to address potential impacts detailed in Section 1.2 of this management plan. To meet the management objectives, a series of Project specific, risk-based management actions have been developed and prioritised based on risk to minimise potential impacts to flora and vegetation, including to *Banksia sphaerocarpa* var. *dolichostyla*. The management actions focus on proposed activities that have the highest likelihood of causing adverse impacts to the *Banksia sphaerocarpa* var. *dolichostyla*.

Management objectives, targets, actions and reporting are listed in Table 5. Risk assessment tables are provided as Appendix 1.

The risk rating remains Medium for one management objectives related to clearing:

- Habitat loss and fragmentation – although the Project is relatively small and land clearing requirements are low, the species is considered likely to become extinct or rare, so all populations surveyed are considered significant.

Although some impacts may be experienced through clearing, the Project offers an opportunity to rehabilitate historic disturbed areas that are currently a State liability, resulting in a potential net gain of *Banksia sphaerocarpa* var. *dolichostyla* in the long term.

2.3 Management Targets

Measureable management targets have been developed to ensure management actions are effective. If management targets are met, then impacts on the local *Banksia sphaerocarpa* var. *dolichostyla* population will be minimised and the EPA's environmental objective for flora and vegetation will be achieved.

Habitat loss and fragmentation resulting from clearing is identified as the greatest potential to impact on *Banksia sphaerocarpa* var. *dolichostyla* through the potential for direct loss of individuals and communities. This impact is anticipated to be minimised by limiting the amount of clearing and implementing progressive rehabilitation.

Management objectives, targets, actions and reporting are listed in Table 5.

Table 5: Objectives, Targets, Actions, Timeframe and Reporting

Management Objective	Management Targets	Management Actions	Timeframe/ Phase	Records and Reports
Minimise the potential for clearing to cause damage or death to individuals or populations.	Minimal unauthorised or accidental clearing of significant flora individuals or populations.	• Avoid accidental clearing of *Banksia sphaerocarpa* var. *dolichostyla* though implementation of an internal clearing permit procedure. • Complete further comprehensive pre-clearance flora surveys to validate known locations of *Banksia sphaerocarpa* var. *dolichostyla*. • Where *Banksia sphaerocarpa* var. *dolichostyla* has been recorded the following actions will be undertaken: – It will be avoided as far as practicable. – All plants and a 50 m buffer will be demarcated and signed as Threatened Flora Exclusion Zones, with physical barriers installed in areas of high risk. – It will be recorded in the Significant Flora Register which will include date, observer, status (flowering, poor health etc.) and a GPS/location description. – It will be incorporated into the mine plan. • In the unlikely event where *Banksia sphaerocarpa* var. *dolichostyla* is expectantly recorded in essential infrastructure areas, clearing will not be undertaken until: – A permit to take Declared Rare Flora is granted by DPaW (if it has not been given during the approvals process). – Seed and/or cuttings collected by a suitably qualified environmental professional, in consultation with DPaW and Kings Park and Botanical Gardens and stored appropriately for rehabilitation (where seed is present). • If areas containing *Banksia sphaerocarpa* var. *dolichostyla* are cleared, the following actions will be undertaken to maximise rehabilitation: – Vegetation will be stockpiled separately and signed. – Topsoil will be stockpiled ad preserved for rehabilitation.	Planning, Construction,Operations - anytime clearing is undertaken.	Pre-clearance surveys. Incident reporting. Internal clearing permits. Clearing register. Banksia Register. Annual Environmental Report.
Minimise the risk of weed invasion	Minimal new weeds introduced to site.	• Minimise the risk of introduction of invasive species through implementation of a Vehicle Hygiene Procedure (to include vehicles to be washed down prior to deployment to site, washdown bays on site, frequent use of washdowns). • Implementation of feral species control.	Construction, Operation, Rehabilitation and Closure	Washdown/vehicle hygiene certificates. Feral species control reports. Annual Environmental Report.

Management Objective	Management Targets	Management Actions	Timeframe/ Phase	Records and Reports
Minimise the risk of dust impacting flora & vegetation.	Minimal death or decline in health due to dust.	• Dust will be reduced on site through stabilisation of topsoil stockpiles, implementation of speed limits on unsealed roads and application of dust suppression methods along roads and on stockiles. • Training and awareness to provide information on *Banksia sphaerocarpa* var. *dolichostyla* (e.g. how to identify it, conservation status, the importance of minimising impacts on the species, requirements of personnel including adherence to speed limits and staying on roads as well as locations and incidents, reporting to Environment Department).	Construction, Operation, Rehabilitation / Closure	Incident reports of speeding. Visual dust monitoring. Annual Environmental Report. Incident report of significant dust plumes. Quarterly and annual vegetation monitoring.
Minimise the risk to flora from unauthorised off road driving.	Minimal damage or death attributable to off-road driving.	• Avoid accidental disturbance to conservation significant flora by enforcing strict traffic management rules (e.g. keeping to designated tracks, reduced speed limits, prohibiting access to native vegetation areas containing *Banksia sphaerocarpa* var. *dolichostyla* except for monitoring purposes, signage installation warning personnel of the presence of Threatened Flora).	Construction, Operation, Rehabilitation / Closure	Incident reports of speeding, un-authorised off-road driving. Incident reports of accidental damage/clearing of vegetation. Internal audits and inspections of vehicle speeds. Annual Environmental Report Quarterly and annual vegetation monitoring.

Management Objective	Management Targets	Management Actions	Timeframe/ Phase	Records and Reports
Minimise requirements for clearing which causes fragmentation.	No clearing outside approved clearing areas. Progressive rehabilitation undertaken.	• Design infrastructure to avoid disturbance to *Banksia sphaerocarpa* var. *dolichostyla*. • Maximise use of the Mt Holland abandoned infrastructure and disturbed areas to minimise the Project footprint. • Internal clearing permit procedure to be developed and implemented (to include flagging of clearing areas, supervision of clearing by a suitably qualified environmental professional, reporting of unauthorised clearing). • Progressive land clearing with the amount of active disturbance minimised. • Progressive rehabilitation will be undertaken in accordance with a Mine Closure Plan • The Mine Closure Plan will include provisions for undertaking a *Banksia sphaerocarpa* var. *dolichostyla* propagation program as part of rehabilitation trials. • Where possible, direct placement of topsoil and vegetation will be respread over rehabilitated areas.	Planning, Construction, Operation	Clearing Register. Internal clearing permits. Survey data. Annual Environmental Report.
Minimise the increase in feral species abundance, particularly herbivores (goats, camels, rabbits, pigs).	Waste and water sources not available to feral herbivores. Feral species control program implemented No increase in feral species abundance.	• Avoid attraction of feral species to the Project footprint by implementing domestic waste management procedures (e.g. fencing of landfills, regularly covering putrescible waste, secure lids on bins). • Kidman will undertake pest animal control on site in cooperation with regional control programs. • Staff training and awareness to include information on feral species (e.g. impact on *Banksia sphaerocarpa* var. *dolichostyla*, no feeding of feral species and all sightings of feral species to be reported).	Operations, Rehabilitation and Closure.	Internal audits and inspections. Feral species control. Annual monitoring report. Incident Reporting.
Minimise the increase in fire frequency or intensity	No fires attributed to mining and associated activities.	• Avoid increases in fire frequency through maintenance of fire breaks and implementation of fire management procedures (e.g. Hot Work Permit system, fire-fighting training, Emergency Response Plan). • Firefighting equipment will be located on site and in vehicles. • Lightning protection equipment will be installed as part of Project design where necessary. • Vehicles will not be permitted to leave access tracks or cleared areas. • Kidman will work with DPaW and DFES to undertake prescribed burns. • Kidman will contribute to fire management in the region. • Staff training and awareness to include information on the prevention and management of fires.	Construction, Rehabilitation/ Closure.	Aerial photos. Incident reports.

3. Monitoring

Banksia sphaerocarpa var. *dolichostyla* populations will be monitored prior to commencement of operations, during operations and post-closure to enable early detection of adverse impacts as a result of construction and mining activities:

- Prior to Commencement:
    - **Pre-clearance survey**: A targeted site pre-clearance survey will be undertaken across the site footprint to accurately delineate Threatened Flora population boundaries.
    - **Transects**: Establish permanent 100 m transects for annual plant health monitoring.
    - **Baseline Monitoring**: Undertake a pre-operation baseline monitoring assessment of *Banksia sphaerocarpa* var. *dolichostyla* population health on transects. Plant condition for each individual that intersects the transect will be assessed using a rating method that assigns a score based on species health/vigour (e.g. 0 = dead, 1 = poor health (i.e. extensive crown decline), 2 = moderate health (i.e. some evidence of crown decline) and 3 = very healthy (i.e. no evidence of crown decline).
- During Construction and Operation Phases:
    - **Quarterly Observations**: Undertake quarterly visual observations of *Banksia sphaerocarpa* var. *dolichostyla* populations in close proximity to the access roads and operations. Written and photographic records will be kept of the visual inspections of plant conditions.
    - **Annual Monitoring**: Undertake annual transect monitoring of all populations. Transect monitoring will address plant health and recruitment of *Banksia sphaerocarpa* var. *dolichostyla* populations. Plant condition for each individual that intersects the transect will be assessed using a rating method that assigns a score based on species health/vigour (e.g. 0= dead, 1 = poor health (i.e. extensive crown decline), 2 = moderate health (i.e. some evidence of crow decline) and 3 = very healthy (i.e. no evidence of crown decline).
- Post Closure Monitoring:
    - **Annual Monitoring**: Monitoring will continue until completion of rehabilitation activities.

Additional records that will be monitored include:

- Internal audit and inspection of areas of clearing.
- Monitoring of incident reports impacting *Banksia sphaerocarpa* var. *dolichostyla* relating to damage, death, unauthorised clearing and fire.
- Monitoring of increases in herbivore species through feral control reports.
- Monitoring of clearing through the clearing register, survey data and aerial photography.
- Where there is evidence of management targets not being met, or a trigger value being breached – for instance unauthorised clearing of *Banksia sphaerocarpa* var. *dolichostyla* management measures will be reviewed to ensure further impacts do not occur.

4. Reporting

The *Banksia sphaerocarpa* var. *dolichostyla* Management Plan sets out the reporting requirements relating to the implementation of the Plan. Reporting includes:

- Preparation of an Annual Environmental Report (AER) to be submitted to the appropriate regulatory authorities. The AER will include monitoring results and trends as compared to trigger and threshold criteria.
- Provision of data (annually) from monitoring programs to relevant regulatory authorities.
- In the event that a management target is exceeded (or not met), the relevant regulatory authorities will be notified within 7 days of identification of the exceedance, including threshold contingency actions which have been implemented due the exceedance of threshold criteria.

5. Adaptive Management and Review of the Management Plan

This Management Plan has defined the issue (Section 1.2), outlined management and mitigation measures to address the issue (Section 2), and introduced monitoring and evaluation of these measures (Section 3).

The management approach for the *Banksia sphaerocarpa* var. *dolichostyla* at the Project will be adaptive. The *Banksia sphaerocarpa* var. *dolichostyla* EMP will be formally reviewed annually by a suitably qualified experienced person (SQEP). In addition to annual formal review, the *Banksia sphaerocarpa* var. *dolichostyla* Management Plan will be reviewed if:

- New information is learned from monitoring, or monitoring indicates that management targets are not being achieved.
- New information becomes available about Banksia sphaerocarpa var. dolichostyla, for instance a change in conservation status.
- There is a change in the project description, for instance an increase in the size of the disturbance.

6. Stakeholder Consultation

Stakeholder consultation that is relevant to this management plan is summarised in Table 6.

Table 6: Stakeholder Consultation

Stakeholder	Date	Type of Consultation	Persons Involved	Summary of Communication	Comments Received
Department of Mines and Petroleum (DMP)	16/02/2017	Meeting	**DMP**: Ian Mitchell (Team Leader – Operations, Environment), Richard Smetana (Environmental Officer). **Kidman**: Chris Williams (General Manager), Siobhan Pelliccia (Environmental Advisor, Blueprint Environmental Strategies).	Overview of project presented to DMP, focusing on proposed operations, environmental setting, baseline study results, presence of Chuditch, Malleefowl and threatened flora, opportunities for rehabilitation of abandoned mine site.	DMP commented on the potential positive outcomes associated with rehabilitation of historic disturbances. DMP suggested a pre-referral meeting be held with the Office of the Environmental Protection Authority to discuss conservation significant species.
Office of the Environmental Protection Authority (OEPA) and DMP	9/03/2017	Meeting	**OEPA**: Robert Hughes (Manager, Mining and Industrial South Branch) Helen Butterworth (Acting Principal Environmental Officer, Mining and Industrial South Branch). **DMP**: Ian Mitchell **Kidman**: Chris Williams, Siobhan Pelliccia and James Cumming (Environmental Advisor, Blueprint Environmental Strategies).	Kidman delivered a presentation that provided details on: the Project (location, access, history); the abandoned mine status of the project; the proposed mining operation; the environmental setting, completed baseline studies and preliminary impact assessment; potential impacts on threatened species, focusing on the Chuditch, Malleefowl and Banksia; consultation that has occurred to date; the approvals pathway.	The OEPA recommended that Kidman consult with the Department of Parks and Wildlife the Commonwealth Department of the Environment and Energy, due to the presence of conservation significant species. DMP reaffirmed that any Mining Proposal would be referred to DPaW and/or the OEPA for advice due to the presence of conservation significant species.
DPaW – Environmental Management Branch	9/03/2017	Phone Call	**Kidman**: Siobhan Pelliccia (Blueprint) to **DPaW:** Daniel Coffey.	Informed DPaW of meeting with the OEPA and DMP and requested a meeting to discuss the conservation significant species in the Project area.	DPaW communicated that although the Project was of interest, DPaW could not meet with proponents unless their project was located in DPaW managed land, or a formal request was made by DMP or the OEPA through a formal process.

Stakeholder	Date	Type of Consultation	Persons Involved	Summary of Communication	Comments Received
Department of the Environment and Energy (DoEE)	20/03/2017	Meeting in Canberra	**DoEE:** Dionne Cassanell (Senior Assessment Officer, Project Assessments West Section), Angela Gillman (Assistant Director, Project Assessments West Section), Karen Mexon (Assessment Officer), Cassandra Elliott (Assessment Officer). **Kidman**: Chris Williams, Michael Green (Exploration Manager), Siobhan Pelliccia, James Cumming	Summary of project presented to DoEE (as described above for the OEPA) with a focus on matters of national significance, including the Chuditch, Malleefowl and *Banksia sphaerocarpa var. dolichostyla*	Discussed possible approval pathways. DoEE commented that provision of fauna management plans would assist in the assessment process. DoEE would want to have a clear understanding of impacts and measures to avoid or minimise impacts and any residual impact remaining after implementation of management measures.
DPAW – Western Shield Group	5/05/2017	Meeting	**DPAW**: Ashley Millar **Kidman**: Chris Williams, Siobhan Pelliccia, Jill Woodhouse (Environmental Advisor) and Jenny Wilcox (Western Wildlife – Lead Zoologist)	Overview of Project presented with focus on findings of fauna survey, in particular, occurrence of Malleefowl and Chuditch.	Information on the Western Shield Program and ways in which Kidman can assist in the program through sponsorship and provision of survey results.
Non-Government Organisations	17/05/2017	Letters	**Conservation Council of WA**: Piers Verstegen (Director) **National Malleefowl Recovery Team**: Tim Burnard (National Coordinator) **Wilderness Society:** Peter Robertson (State Coordinator)	Introduction to Kidman and the Project. Recognition of stakeholder status. Invitation to meet to discuss the Project.	No comments received at time of submission.

7. References

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APPENDICES

APPENDIX 1: RISK ASSESSMENT TABLES

Table A1-1: Risk Consequence and Likelihood Definitions

Consequence Ranking			Likelihood Ranking		
1	Insignificant	No detectable impact on population: *Loss of an individual due to clearing*	A	Almost Certain	The incident is expected to occur most of the time/every time.
2	Minor	Short-term or local impact to population: *Removal of several individuals within a larger population in an area that will be rehabilitated*	B	Likely	The incident will probably occur in most circumstances/ regularly/ weekly.
3	Moderate	Long-term detrimental, but recoverable, impact on population: *Removal of a large population that will be rehabilitated in the short term using local seedbank, topsoil and vegetation.*	C	Moderate	The incident should occur at some time/ quarterly.
4	Major	Long-term detrimental impact on the population, which may not be recoverable, and the population is threatened with extinction: *Removal of several populations to the threshold required to maintain the species.*	D	Unlikely	The incident could occur at some time in the life of the project.
5	Catastrophic	Non-recoverable population decline leading to extinction: R*emoval of most known populations beyond the threshold required to maintain the species.*	E	Rare	The incident may occur only in exceptional circumstances and may never happen.

Table A1-2: Risk Assessment Categories

		Consequences				
		1	2	3	4	5
Likelihood		***INSIGNIFICANT***	***MINOR***	***MODERATE***	***MAJOR***	***CATASTROPHIC***
A	***ALMOST CERTAIN***	*M*	*H*	*H*	*H*	*H*
B	***LIKELY***	*M*	*M*	*H*	*H*	*H*
C	***MODERATE***	*L*	*M*	*H*	*H*	*H*
D	***UNLIKELY***	*L*	*M*	*M*	*H*	*H*
E	***RARE***	*L*	*M*	*M*	*M*	*H*

Table A1-3: Management Plan Risk Assessment

Management Objective	Inherent Risk	Management Actions	Residual Risk	Timeframe/ Phase
Minimise the potential for clearing activities to cause injury or death to Malleefowl	**HIGH** 3A	• Avoid accidental clearing of *Banksia sphaerocarpa* var. *dolichostyla* though implementation of an internal clearing permit procedure. • Complete further comprehensive pre-clearance flora surveys to validate known locations of *Banksia sphaerocarpa* var. *dolichostyla*. • Where *Banksia sphaerocarpa* var. *dolichostyla* has been recorded the following actions will be undertaken: – It will be avoided as far as practicable. – All plants and a 50 m buffer will be demarcated and signed as Threatened Flora Exclusion Zones, with physical barriers installed in areas of high risk. – It will be recorded in the Significant Flora Register which will include date, observer, status (flowering, poor health etc.) and a GPS/location description. – It will be incorporated into the mine plan. • In the unlikely event where *Banksia sphaerocarpa* var. *dolichostyla* is expectantly recorded in essential infrastructure areas, clearing will not be undertaken until: – A permit to take Declared Rare Flora is granted by DPaW (if it has not been given during the approvals process). – Seed and/or cuttings collected by a suitably qualified environmental professional, in consultation with DPaW and Kings Park and Botanical Gardens and stored appropriately for rehabilitation (where seed is present). • If areas containing *Banksia sphaerocarpa* var. *dolichostyla* are cleared, the following actions will be undertaken to maximise rehabilitation: – Vegetation will be stockpiled separately and signed. – Topsoil will be stockpiled ad preserved for rehabilitation.	**LOW** 1D	Construction phase: Anytime clearing is during Operations
Minimise the potential of vehicle strike causing injury or death to Malleefowl	**MEDIUM** 2B	• Minimise the risk of introduction of invasive species through implementation of a Vehicle Hygiene Procedure (to include vehicles to be washed down prior to deployment to site, washdown bays on site, frequent use of washdowns). • Implementation of feral species control.	**LOW** 1D	All phases
Minimise entrapment leading to injury or death of Malleefowl	**MEDIUM** 2B	• Dust will be reduced on site through stabilisation of topsoil stockpiles, implementation of speed limits on unsealed roads and application of dust suppression methods along roads and on stockiles. • Training and awareness to provide information on *Banksia sphaerocarpa* var. *dolichostyla* (e.g. how to identify it, conservation status, the importance of minimising impacts on the species, requirements of personnel including adherence to speed limits and staying on roads as well as locations and incidents, reporting to Environment Department).	**LOW** 1C	All phases

Management Objective	Inherent Risk	Management Actions	Residual Risk	Timeframe/ Phase
Minimise requirements for clearing which results in habitat loss and fragmentation	**HIGH** 4A	• Avoid accidental disturbance to conservation significant flora by enforcing strict traffic management rules (e.g. keeping to designated tracks, reduced speed limits, prohibiting access to native vegetation areas containing *Banksia sphaerocarpa* var. *dolichostyla* except for monitoring purposes, signage installation warning personnel of the presence of Threatened Flora).	**MEDIUM** 2C	Planning Construction Operation
Minimise pollution from light and noise	**MEDIUM** 1A	• Design infrastructure to avoid disturbance to *Banksia sphaerocarpa* var. *dolichostyla*. • Maximise use of the Mt Holland abandoned infrastructure and disturbed areas to minimise the Project footprint. • Internal clearing permit procedure to be developed and implemented (to include flagging of clearing areas, supervision of clearing by a suitably qualified environmental professional, reporting of unauthorised clearing). • Progressive land clearing with the amount of active disturbance minimised. • Progressive rehabilitation will be undertaken in accordance with a Mine Closure Plan • The Mine Closure Plan will include provisions for undertaking a *Banksia sphaerocarpa* var. *dolichostyla* propagation program as part of rehabilitation trials. • Where possible, direct placement of topsoil and vegetation will be respread over rehabilitated areas.	**LOW** 1C	All phases
Minimise increases to feral predator abundance (cat, dog, fox) and herbivorous competitors	**HIGH** 3B	• Avoid attraction of feral species to the Project footprint by implementing domestic waste management procedures (e.g. fencing of landfills, regularly covering putrescible waste, secure lids on bins). • Kidman will undertake pest animal control on site in cooperation with regional control programs. • Staff training and awareness to include information on feral species (e.g. impact on *Banksia sphaerocarpa* var. *dolichostyla*, no feeding of feral species and all sightings of feral species to be reported).	**LOW** 1D	All phases
No increase in fire frequency or intensity	**MEDIUM** 2B	• Avoid increases in fire frequency through maintenance of fire breaks and implementation of fire management procedures (e.g. Hot Work Permit system, fire-fighting training, Emergency Response Plan). • Firefighting equipment will be located on site and in vehicles. • Lightning protection equipment will be installed as part of Project design where necessary. • Vehicles will not be permitted to leave access tracks or cleared areas. • Kidman will work with DPaW and DFES to undertake prescribed burns. • Kidman will contribute to fire management in the region. • Staff training and awareness to include information on the prevention and management of fires.	**LOW** 1D	All phases