



Landscape Management Plan – Kitchener SIS

April 2021

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1 INTRODUCTION

1.1 Background

Austar Coal Mine Pty Ltd (Austar), a subsidiary of Yancoal Australia Limited (Yancoal), owns the Austar Coal Mine, an underground coal mine located approximately 10 kilometres southwest of Cessnock in the Lower Hunter Valley in NSW (refer to **Figure 1**). The Austar Coal Mine incorporates the former Pelton, Ellalong, Cessnock No. 1 (Kalingo) and Bellbird South Collieries and includes coal extraction, handling, processing and rail and road transport facilities (refer to **Figure 1**).

Extensive mining has been undertaken within the Austar Coal Mine since 1916. Historical mining was predominantly via bord and pillar mining and more recently via conventional longwall mining and longwall top coal caving (LTCC) methods. Mining within the Bellbird South areas (Southland, Stage 1, Stage 2 and LWB1-B7, refer to **Figure 1**) was approved by the Minister for Urban Affairs and Planning in 1996 under Development Approval DA 29/95, while mining of Stage 3 was approved by the Minister for Planning in 2009 under Project Approval 08_0111 (PA 08_0111). Longwall mining commenced in the Ellalong Colliery area in 1983 and has subsequently progressed into the Bellbird South and the Stage 3 areas.

Most recently, mining commenced in the Bellbird South LWB1-B7 mining area in 2016 under DA 29/95 (as modified) and was completed in February 2020. Longwall panels B1 and B7 have not been extracted. Austar mining areas are shown in **Figure 1**.

On 30 March 2020, the Austar Coal Mine transitioned to care and maintenance, with cessation of mining and coal processing activities. On 26 February 2021, a decision was made by the Yancoal board to transition the Austar Coal Mine from care and maintenance to closure. Nevertheless, active water management, mine ventilation and mine inertisation remain key activities and this revision of the Landscape Management Plan (LMP) has been prepared to document landscape management and monitoring activities at the Kitchener SIS whilst the site is in closure.

The 2021 review of most Austar environmental management plans has resulted in significant restructure of the documents to improve readability and provide more consistency between plans. Changes to actual content have been limited to any amendments required to reflect the closed status of the site and to align content with the requirements of PA 08_0111 and DA 29/95.

1.1.1 Kitchener Surface Infrastructure Site (SIS)

PA 08_0111 approves the development of new Pit Top facilities at the Kitchener Surface Infrastructure Site (SIS). Approved facilities include a personnel and materials shaft, and ventilation shafts, workshop, services (including power, pipelines, and boreholes to deliver to underground), offices, car parking and amenities. The SIS is located on 16ha of land off Quorrobolong Road, 1.6km south of Kitchener and is bounded by the Werakata State Conservation Area. The SIS is of ecological value due to the presence of three threatened species and two Endangered Ecological Communities (EEC) (Umwelt, 2008).

Development at the SIS commenced in November 2009 with shaft construction and ancillary services. This initial construction phase was completed in 2013, with the site transitioning into an operational phase. As the site is now in closure, Austar is not proposing to develop the remainder of the facilities.

1.1.2 Biodiversity Offset Area

The Biodiversity Offset Area (the Offset Area) was established as part of the approved Stage 3 project to offset impacts from clearing of approximately 10ha of the SIS. The Offset Area location is shown in **Figure 2**. After the Stage 3 project was approved, Austar transferred ownership of the Offset Area to the National Parks Estate as part of the Werakata State Conservation Area. As such, the Offset Area will be managed in perpetuity by the NSW National Parks and Wildlife Service. Based on this transfer of ownership to reserved lands, the long term management of the Offset Area is not addressed in this LMP.

1.2 Purpose, Scope and Rehabilitation Objectives

This LMP outlines the management measures to be implemented during closure at the Kitchener SIS to minimise the potential for ecological impacts.

The purpose of this LMP is to:

- Identify and describe the environmental consequences of the Stage 3 project on land within the SIS.
- Specify the objectives and performance measures to effectively manage the environmental consequences on land within the SIS.
- Identify performance indicators and completion criteria which will be used to judge the effectiveness of land management activities and the environmental performance of the SIS.
- Describe the monitoring methods which will be employed to inform and/or trigger land management activities.
- Provide contingency measures which explicitly provide for adaptive management.
- Describe the process for responding to any incidents, complaints or non-compliances with statutory requirements.
- Describe the review, reporting and continual improvement process.

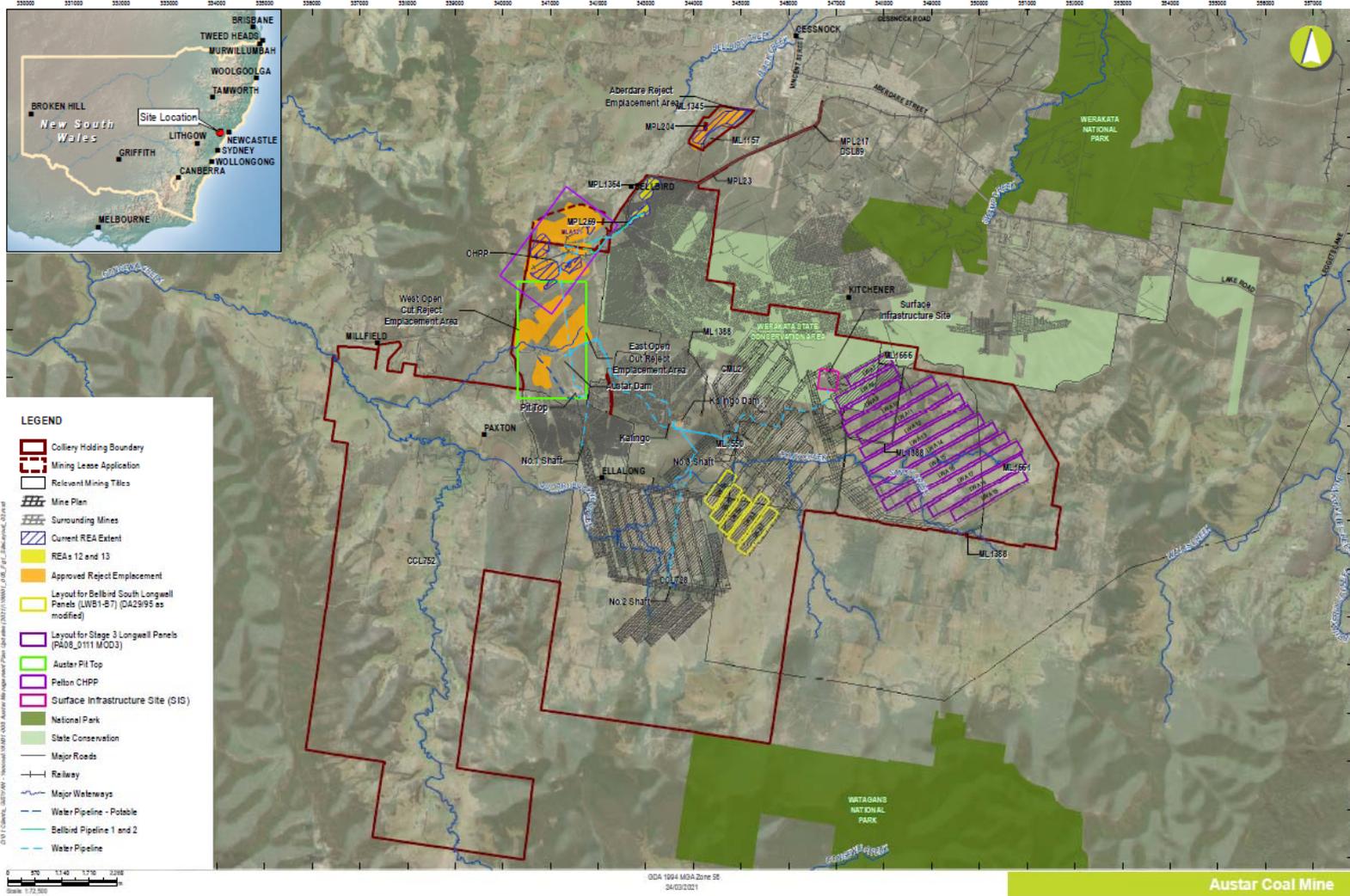
The LMP has been prepared in accordance with the relevant conditions of PA 08_0111 (refer to **Appendix A** for details of conditions).

Rehabilitation objectives for land affected by the Stage 3 project are presented in **Table 1** (adapted from Table 6; PA 08_0111).

TABLE 1 - REHABILITATION OBJECTIVES

Domain	Objectives
Surface Infrastructure Site	Revegetate the cleared portion of the site with a structured native vegetation community similar to that existing pre-mining, or other landuse approved by the Director-General.
	Additional objectives, performance measures, indicators and criteria are detailed within Section 5.
Biodiversity Offset Area	Implement the offset strategy ¹ described in the EA (Umwelt 2008) and shown conceptually in Appendix 5 (of the Project Approval).

¹ Ownership of the land encompassed by the Biodiversity Offset Area has been transferred to National Parks Estate as part of the Werakata State Conservation Area with the land to be managed in perpetuity by NSW National Parks and Wildlife Service. Management of the Biodiversity Offset Area is not discussed further in this Landscape MP.



Site Layout

FIGURE 1

FIGURE 1 - SITE LAYOUT

2 STAKEHOLDER CONSULTATION

2.1 Pre 2021 Consultation

In accordance with Schedule 6 Condition 4(a) of PA 08_0111, consultation occurred during preparation of the original LMP as well as for subsequent updates, as required, and the plan was prepared by a suitably qualified expert endorsed by the Director-General.

2.2 2021 Consultation

In accordance with the requirements of PA 08_0111, the NSW Resources Regulator (as the relevant stakeholder) has been consulted in relation to this revision of the LMP.

As the 2021 updates to the LMP are administrative in nature, subsequent endorsement of an expert from DPIE has not been sought.

The management plan approval letter is provided in **Appendix B**.

3 EXISTING ENVIRONMENT (BASELINE DATA)

Land affected by construction of the SIS is shown in **Figure 2** and the features of this landscape are summarised below.

Detailed environment assessments were prepared to inform the original Stage 3 Project Environmental Assessment (EA) (Umwelt 2008) and Stage 3 Project Modification EA (Umwelt 2011). The key impact associated with the SIS is the clearing of vegetation during construction of the SIS. Austar is approved to clear approximately 10 ha of native vegetation at the SIS by PA 08_0111, with the impacts of this activity mitigated through the offset strategy and clearing procedures identified within the original EA (Umwelt 2008). There has been approximately 8.1 ha of land cleared for SIS construction and operational purposes.

3.1 Land Ownership and Access

Land ownership within the Stage 3 mining area, including surrounding the SIS is shown in **Figure 3**. The SIS is owned by Austar and is surrounded on all sides by the publicly accessible Werakata State Conservation Area and Quorrobolong Road. To minimise the risk of the public being involved in any unsafe activities or incidents on the SIS, a number of controls have been put in place which include:

- A fence has been constructed around the operational area of the SIS with lockable gates;
- A sign has been erected on the SIS access road identifying the SIS as being a mining lease area and being operated by Austar Coal Mine, and stating there is to be no unauthorised access;
- Operational and maintenance personnel may be present on-site 24 hours per day, seven days per week;
- All visitors and members of the public are required to report to the main office prior to entering the SIS;

- Access is limited to defined tracks and where practical restricted in other areas via the use of barriers e.g. large woody debris;
- When public access is required, inductions are undertaken and inspections supervised by colliery personnel; and
- A private security company is employed to patrol the site, particularly after hours.

3.2 General Landform

The SIS is positioned within a 16 hectare parcel of land at the very top of the Black Creek catchment. An upcast ventilation shaft and water management dams are present on the west side of Black Creek, with downcast shaft, boreholes, a water management dam and electrical services on the east side of Black Creek. The SIS is located on the north side of Broken Back Range which is a major landform extending from west of Pokolbin to Mulbring. Broken Back Range has a maximum elevation adjacent to the SIS of RL 140 metres; the closest peak reaches a height of 190 metres to the south east of the SIS. This landform is characterised by steep slopes, narrow ridges and deep gullies. However land within the SIS itself is generally gently sloping, descending in elevation towards the north.

3.3 Hydrology and Drainage

The SIS is located within the Black Creek Catchment which is bounded to the south by Broken Back Range, to the east by the Wallis/Swamp Creek Catchment, and the LGA boundary to the north. Black Creek flows in a northerly direction through Cessnock to Branxton before joining the Hunter River some 32 kilometres downstream. The Black Creek Catchment is generally regarded as a degraded catchment suffering from saline water ingress and subsequent adverse effects due to extraction for irrigation and stock watering (Umwelt 2008). The SIS is positioned at the very top of the Black Creek catchment. The first order ephemeral drainage line which is described as Black Creek originates approximately 200m upslope of the SIS.

Strategies for controlling erosion, sedimentation, and managing water use at the SIS are contained within the Site Water Management Plan (Austar, 2021) and identified in **Figure 4**.

Erosion and sediment management and related control structures are consistent with the specifications contained in Managing urban stormwater – soils and construction, Volume 1, 4th edition (Landcom, 2004), and particularly Volume 2E Mines and Quarries (DECC, 2008a). Monthly environmental inspections are also undertaken to inspect the sediment control structures for capacity, structural integrity and effectiveness.

A component of the Site Water Management Plan (SWMP) (Austar, April 2021) is the Erosion and Sediment Control Plan (ESCP), encompassing works associated with Stage 3. The ESCP was developed to control and mitigate erosion and sediment impacts that may arise from operations at Austar. Measures to minimise future erosion and sediment generation at the SIS include:

- Identification and review of surface activities that may change surface water flows and result in erosion;
- Minimising the clearing of vegetation and where clearing is necessary, chipping of material and reusing on site for rehabilitation of disturbed areas;
- Regular checking of rehabilitated areas;

- Installation of temporary and/or additional permanent controls to manage locations that have been identified as requiring attention;
- Diversion of surface and road runoff away from disturbed areas;
- Regular inspection and cleaning of catch drains and structures following storm events or other activities such as vehicle movements that may result in damage; and
- Clearing of excessive vegetation and weeds along drainage lines.

3.4 Soil Landscapes

Two soil landscapes described below occur within the SIS as shown in **Figure 4**.

- Branxton Soil Landscape

The Branxton Soil Landscape occurs across the majority of the SIS including the banks of Black Creek. The soils of this landscape include yellow podzolic, red podzolic, yellow soloth soils, alluvial sands and siliceous sands. Excluding alluvial soils, the topsoil is moderately erodible.

- Aberdare Soil Landscape

Aberdare Soil Landscape extends along the south west boundary of the SIS. The topsoil and subsoil can be moderately erodible.

3.5 Flora and Fauna

The slopes and ridges within the Stage 3 mining area support an open forest dominated by spotted gum (*Corymbia maculata*) and broad-leaved ironbark (*Eucalyptus fibrosa*) with a sparse to moderately dense shrubby mid-story and grassy ground layer. The Stage 3 Environmental Assessment (Umwelt, 2008) identified the species and ecological communities present within the SIS and recorded the following species on site at the SIS:

- Three threatened flora species (refer **Figure 5**) (including the heath wrinklewort (*Rutidosia heterogama*), the small-flower grevillea (*Grevillea parviflora*), netted bottlebrush (*Callistemon linearifolius*)).
- Two Endangered Ecological Communities (refer **Figure 5**):
 - Hunter Lowland Redgum Forest; and
 - Lower Hunter Spotted Gum – Ironbark Forest
- Four threatened fauna species, the grey-crowned babbler (*Pomatostomus temporalis temporalis*), little bentwing-bat (*Miniopterus australis*), eastern bentwing-bat (*Miniopterus schreibersii oceanensis*) and large-footed myotis (*Myotis adversus*).

Management of impacts to flora and fauna from developed activities at the SIS include pre-clearance, vegetation clearing and nest box procedures which are outlined in **Appendix C**. Austar is approved to clear approximately 10 ha of native vegetation (including EECs and threatened species habitat) at the SIS by PA 08_0111.

Impacts to EECs and threatened species are mitigated through the biodiversity offset and site procedures undertaken in compliance with the Stage 3 EA (Umwelt, 2008). No rare or threatened flora or fauna known to occur within the SIS will be significantly impacted (as defined under relevant

legislation) by the development (Umwelt 2008). Strategies for the management of flora and fauna during operation of the SIS include:

- Limiting vehicle speed on access track and roads;
- Use of locally endemic native plant species in revegetation areas where possible;
- Incorporating habitat enhancement features in rehabilitated areas where practical including nest boxes, large woody debris and rock stockpiles;
- Where practical any injured native animals identified on site will be carefully captured by a qualified and experienced person, and taken to a wildlife carer or veterinary clinic;
- Optimising areas of native vegetation as areas of preferred habitat by restricting unauthorised vehicle access; and
- Limiting unauthorised access, in doing so mitigating the risk of weed species and exotic fauna from colonising the site.

Bushfire hazard reduction activities may also require slashing or clearing activities to maintain Asset Protection Zones (APZs) in accordance with the Austar Bushfire Management Plan (BFMP, Eco Logical Australia, 2018). The BFMP ensures the land owned by the mine is managed in a way that minimises the risk of bushfire and to reduce the risk of fire originating on Austar owned land and spreading to adjacent properties. The risks of bushfire to surface infrastructure located at the SIS are proposed to be mitigated by the provision of an APZ in accordance with the BFMP.

Further ameliorative actions include:

- Ensuring mining activities that have the potential to cause ignition such as sparks from vehicles, metal grinding, welding etc. are identified and managed appropriately;
- Ensuring vegetation does not interfere with power lines; and
- Creating firebreaks to ensure that bushfire does not spread from surrounding lands.

3.6 Weeds

The ecological assessment undertaken for the Stage 3 Environmental Assessment (Umwelt 2008) included an assessment of general health and condition of vegetation as well as the presence of weeds. There are very low numbers of invasive species within the SIS, privately owned lands and surrounding Werakata State Conservation Area (Umwelt 2008). Without adequate mitigation, operation of the SIS may result in improved conditions for weed establishment and competition through the introduction of invasive species by vehicle, inappropriate species selection during landscaping activities or unchecked ground disturbance activities. Weeds identified at the SIS will be controlled in accordance with the objectives specified in **Section 5**.

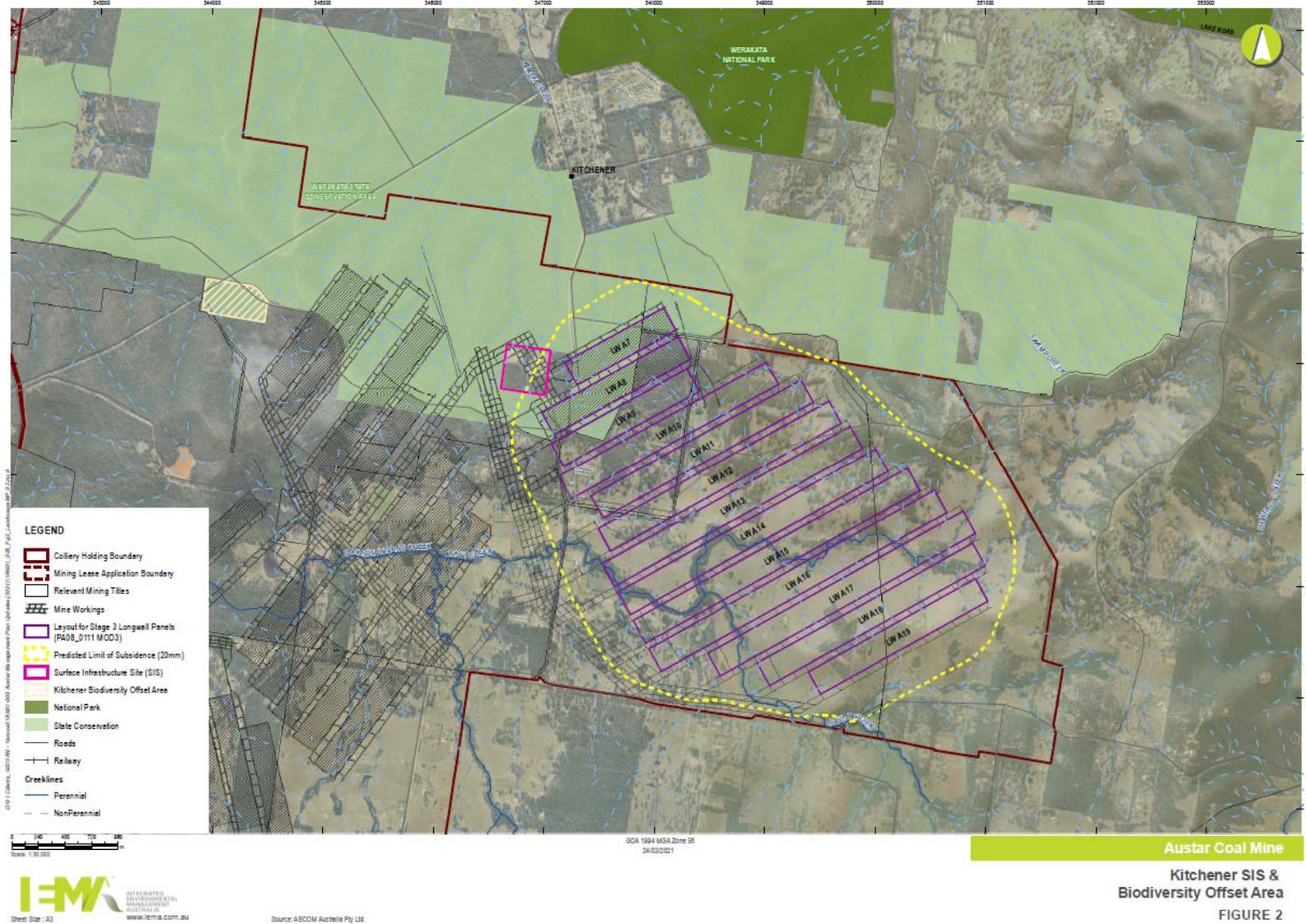


FIGURE 2 - KITCHENER SIS & BIODIVERSITY OFFSET AREA

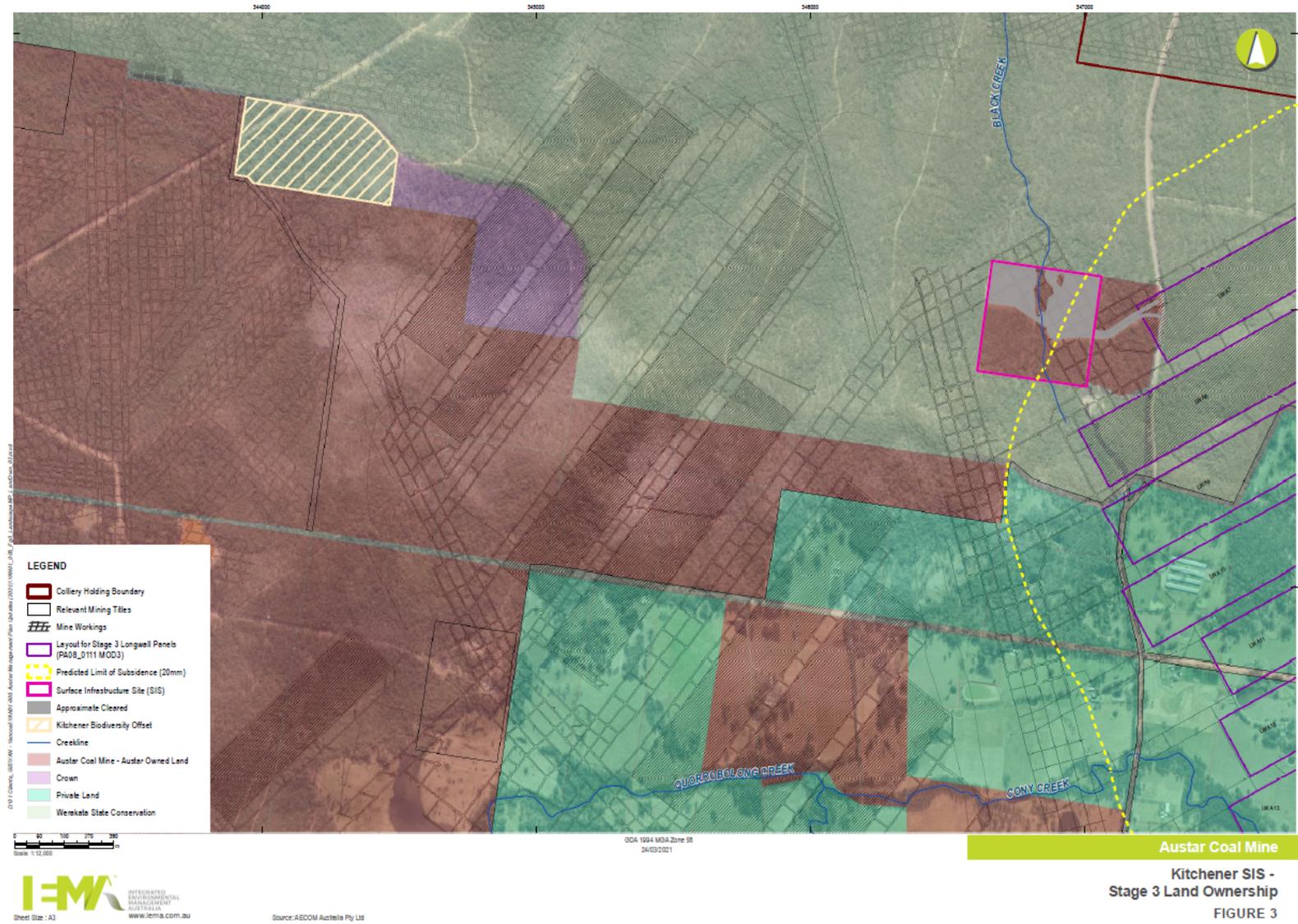


FIGURE 3 - STAGE 3 LAND OWNERSHIP

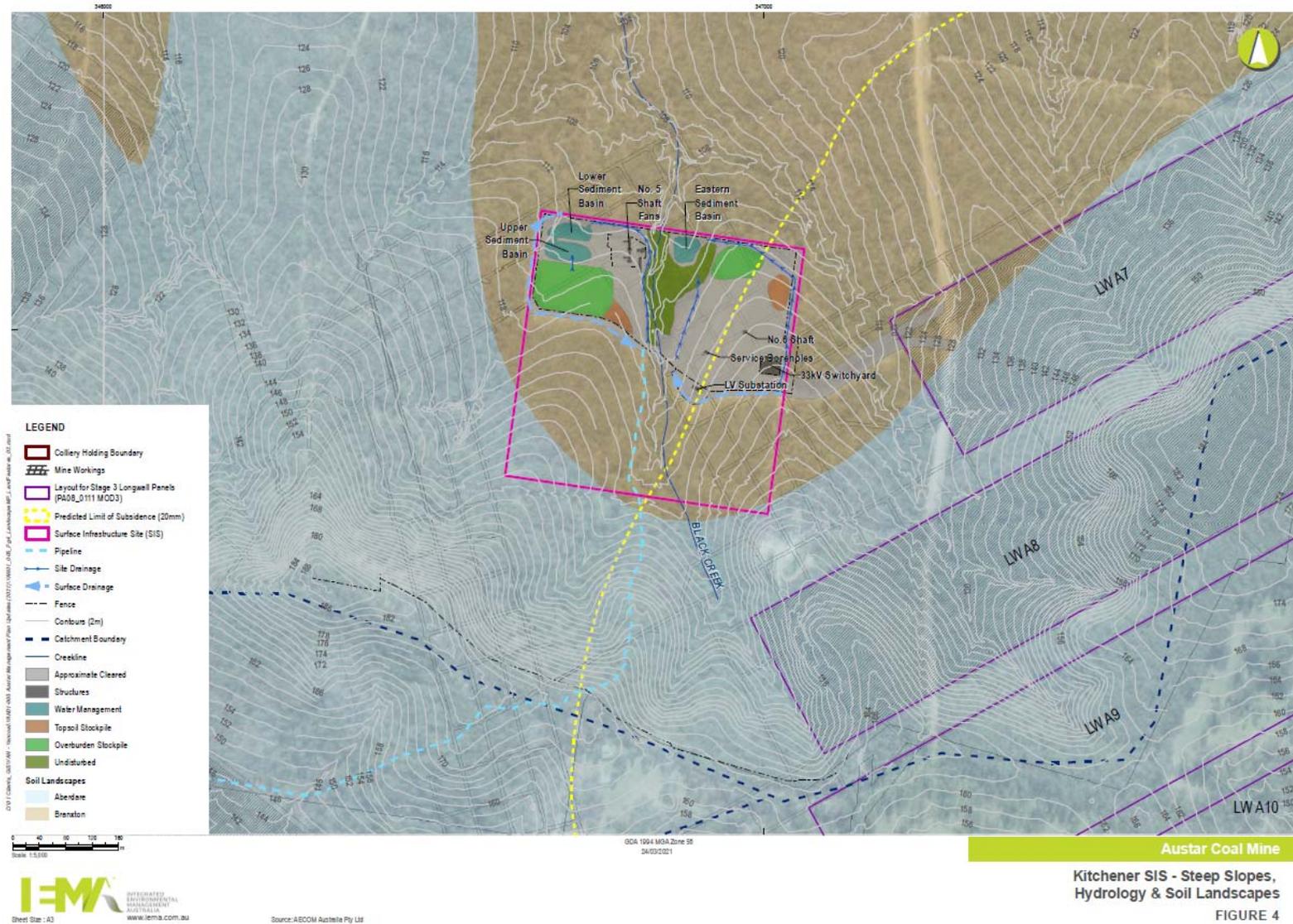


FIGURE 4 - STEEP SLOPES, HYDROLOGY & SOIL LANDSCAPES



FIGURE 5 – THREATENED FLORA & ENDANGERED ECOLOGICAL COMMUNITIES

4 STATUTORY REQUIREMENTS

Relevant conditions from PA 08_0111 and PA 08_0111 Statement of Commitments and where these are addressed in this Plan are provided in **Appendix A**.

Other statutory requirements that may be applicable to the management of landscape related matters at the SIS include, but are not limited to:

- NSW *Biodiversity Conservation Act 2016*;
- NSW *Biosecurity Act 2015*; and
- Cessnock Local Environmental Plan 2011.

5 OBJECTIVES, PERFORMANCE MEASURES, INDICATORS AND CRITERIA

Detailed objectives, performance measures, indicators and criteria for the management of land have been developed for the SIS and are presented in **Table 2** and detailed land management procedures are provided in **Appendix C**.

The following timeframes have been specified, where relevant, to guide management activities undertaken in accordance with this Landscape MP. These timeframes are based on SIS construction, operation and decommissioning activities:

- Short term measures – are typically relevant to short term rehabilitation or mitigation measures associated with construction activities at the SIS. It is anticipated that these activities will occur in the first year following construction.
- Medium term measures – are focussed on the ongoing management activities undertaken to meet the rehabilitation objectives of the SIS up to the period of decommissioning. It is anticipated that these activities will occur during the first three years following construction and will continue on an ongoing basis for the life of the project.
- Long term measures – are focussed on final rehabilitation of the site following decommissioning activities. PA 08_0111 (as modified) allows mining operations to take place until 31 December 2030, with the approval continuing to operate until the site is properly rehabilitated.

Short and Medium measures have been largely completed at the Kitchener SIS, and are currently monitored through monthly inspections and maintained as necessary. Long term measures are currently being refined through detailed closure planning studies. It is envisaged that this Plan may require updates following the detailed closure planning phase.

Short, medium and long term measures for the Stage 3 project addressing the following issues are discussed in **Section 5**:

- Rehabilitation of the SIS;
- Implementation of the Offset Strategy; and
- Management of the remnant vegetation and habitat at the SIS.

Monitoring will be used to assess the impact of the operations against these performance measures and indicators as detailed in **Section 5**.

TABLE 2 – OBJECTIVES, PERFORMANCE MEASURES, INDICATORS AND CRITERIA

Objectives	Performance Measure	Performance Indicator	Criteria
Surface Infrastructure Site - Rehabilitation Activities			
Rehabilitate the SIS (Short Term)	Control and mitigate erosion and sediment impacts during construction and operation.	Sediment control structures installed appropriately.	No erosion and sediment control incidents.
		Erosion and sediment control measures undertaken as per the Site Water Management Plan and Erosion and Sediment Control Plan.	
	Potential impacts to visual amenity are mitigated through strategic placement of lighting and the use of appropriate building materials.	Use of non-reflective building materials for the construction of surface facilities.	Visual amenity is maintained.
		Construction of light shields on any large fixed equipment such as ventilation fans.	
		Placement of lighting only where required, focused on the subject area and directed downwards where practical to do so.	
	Stabilise cleared parts of the SIS no longer required for construction.	Flood lighting to be faced inwards to avoid light spilling on to public roads.	Areas that may be stabilised are completed.
		SIS is regularly (at least monthly) audited for areas being used and those that may be stabilised.	
	Topsoil is conserved during site preparation works and reused in vegetation establishment.	Stockpiles are managed in the context of weed control and topsoil viability.	Topsoil is conserved and used for vegetation establishment
		Topsoil is re-spread directly onto reshaped landforms where possible or stockpiled and stabilised where this cannot occur.	
		Topsoil is spread appropriately in a way that will ensure optimum ecosystem establishment.	

Objectives	Performance Measure	Performance Indicator	Criteria
Rehabilitate the SIS (Medium Term)	Constructed SIS is rehabilitated / landscaped to stable form during site use.	Cohesive ground cover established (e.g. no exposed soils).	Operational SIS is stable with landscaping: -providing effective visual screens -using only non-invasive species.
		Surface water quality consistent up and downstream of the SIS site.	
Rehabilitate the SIS (Medium Term)	Seeds collected from native vegetation for end site rehabilitation purposes	Seed bank is increasing on an annual basis.	Sufficient seed is collected / obtained suitable for final rehabilitation of the SIS.
Rehabilitate the SIS – (Long Term)	A final landuse plan is developed to ensure the final landform is safe, stable, non-polluting and fit for purpose.	A final landuse plan is completed and approved by the Secretary if different from revegetation outcome.	Final landuse is approved.
		The approved Mining Operations Plan (MOP) will detail the final landform. In general terms:	Rehabilitation activities for closure are undertaken in compliance with an approved MOP.
		- All buildings and workshops and associated hardstand and sealed areas will be removed and revegetated excluding those that may be utilised as part of the final landuse of the site	
		- Upon decommissioning all access and ventilation shafts to the underground workings will be backfilled with soil from the acoustic bunds and sealed.	
- Landforms will be constructed to match surrounding landforms in accordance with the approved MOP.			

Objectives	Performance Measure	Performance Indicator	Criteria
		<ul style="list-style-type: none"> - Elements such as drainage paths, contour drains, ridgelines, and emplacements will be shaped, where possible, in undulating informal profiles in keeping with natural landforms of the surrounding environment. 	
		<ul style="list-style-type: none"> - Contamination and hazardous materials assessments undertaken. Remediation action plan implemented if required. 	
		<ul style="list-style-type: none"> - Sediment control features are installed in accordance with the relevant management plan. 	
	<p>Cleared portions of the site are revegetated with a structured community similar to that existing pre-mining.</p>	<p>LFA Stability index is comparable to or trending towards that of analogue sites (%).</p>	<p>The vegetation is developing in structure and complexity comparable to that of the local remnant vegetation.</p>
		<p>LFA Infiltration Index is comparable to or trending towards that of analogue sites (%).</p>	
	<p>LFA Nutrient Recycling Index is comparable to or trending towards that of analogue sites (%).</p>		
	<p>Landscape Organisation Index is comparable to or trending towards that of analogue sites (%).</p>		
<p>Species specific habitat and/or nesting features are incorporated where relevant in areas across the site.</p>	<p>Nesting Boxes and /or other species suited habitat are correctly installed and maintained.</p>	<p>Nesting boxes and / or other species suited habitat provide nesting/habitat opportunities which are comparable to analogue sites.</p>	
Surface Infrastructure Site – Implement the Offset Strategy			
<p>Implement the offset strategy (short, medium and long term)</p>	<p>Biodiversity offset area is managed in perpetuity.</p>	<p>The long term conservation of the offset area is secured.</p>	<p>Formal mechanism in place to ensure long term conservation of the offset area is completed within two years of project approval. This has been achieved by Austar transferring the offset area to NPWS estate.</p>

Objectives	Performance Measure	Performance Indicator	Criteria
Surface Infrastructure Site - Remnant Vegetation Management Activities			
Clearing activities are undertaken only as necessary and in accordance with the Project Approval.	Restrict the clearing of vegetation to the minimum area necessary to construct infrastructure and provide adequate bushfire protection.	Cleared area is not excessive for site requirements. Vegetation clearing is undertaken in accordance with the Vegetation Clearing Procedure.	Cleared area does not exceed the end project approved clearing of approximately 10 ha.
		Security fencing is erected around the working areas of the SIS to limit disturbance outside the defined area.	
Adequate baseline fauna habitat information is obtained prior to impacts from clearing activities.	Pre-clearance survey undertaken prior to clearing by a suitably qualified person.	Pre-clearance survey undertaken in accordance with Pre-Clearance Procedure.	The number and quality of habitat features are identified by ecology survey prior to clearance activities.
The impacts of clearing do not lead to a reduction in nesting/roosting opportunities.	No reduction in nesting/roosting opportunities through replacement of tree hollows with nest boxes.	Nest boxes are correctly installed and maintained in accordance with Nest Box Procedure.	The number and quality of nesting/roosting opportunities for target species are maintained or improved
Cleared vegetation is re-used on site where appropriate.	Cleared native vegetation is mulched or kept as brush matting to allow re use on site.	Mulching and brush matting activities.	Cleared native vegetation is re-used on site as resources permit as either mulch or brush matting.
Revegetation	Native plant species compatible with the surrounding environment are used in revegetation (refer Appendix D).	Revegetation activities.	Areas of exposed soils are revegetated to achieve cohesive ground cover using a native plant species mix compatible with the surrounding environment.
Ground disturbance is minimised where practical.	Restricting unauthorised vehicle access and limiting vehicle speed limits on access track and roads.	Unauthorised vehicle access is restricted and vehicle speed limits enforced on access track and roads.	Vehicular ground disturbance is restricted to designated access tracks and roads.
Weeds and pest animal species are actively managed and controlled.	Weed audits conducted on a regular basis.	No increase in weed population.	Monitoring indicates the absence of or decline in weed and pest species numbers and / or impact.
	Weeds identified on site are actively controlled and/or removed using appropriate weed control techniques.		

Objectives	Performance Measure	Performance Indicator	Criteria
	A range of appropriate pest control measures (e.g. the destruction of habitat, trapping, targeted shooting programmes and baiting) are employed as determined in consultation with the Livestock Health and Pest Authority and adjoining landholders.	Follow-up inspections to assess the effectiveness of control measures implemented and the requirement for any additional control measures. Distribution and density of feral animals – in terms of numbers and damage.	
Risk of bushfire is minimised and managed in accordance with the BFMP.	Appropriate firebreaks are created to ensure a bushfire does not spread to adjoining properties.	Appropriate Asset Protection Zones (APZs) are in place.	The risks of bushfires occurring on site are managed appropriately.
	Vegetation is maintained to reduce bushfire risk.	APZs are maintained appropriately.	
	Fire fighting equipment, training, and communication strategies are provided and in place for site staff.	Training and equipment maintenance is recorded.	

6 MONITORING

6.1 Monitoring Methodology

General landform condition inspections are undertaken on a monthly basis by Austar personnel to inform land management activities in accordance with the Austar Environmental Monitoring Program (EM Program) through the Monthly Environmental Inspection.

The general condition monitoring activities identify:

- The presence of weed species and/or weed outbreaks;
- Evidence of feral animal activity;
- The effect and success of any weed control activities undertaken in the previous inspection period;
- Locations of exposed soils or sources of soil erosion which may require remediation;
- General condition and correct operation of sediment control devices, catch drains and drainage structures and;
- General vegetation condition and percentage ground cover in areas undergoing rehabilitation.

Where remedial works are required to manage weeds, monthly general landform condition inspections will continue to identify the progress of revegetation activities and confirm the success and adequacy of remediation and repair works. The timing and degree of monitoring activities will be dependent on the nature of remediation works required.

Where sensitive environmental features are identified (e.g. threatened species or habitats), or impacts resulting from feral animal activity are identified, additional monitoring requirements may be established.

In the context of land management, the Annual Review will report, review and summarise the findings of monitoring.

6.2 Landscape Function Analysis

Following decommissioning of the SIS where cleared portions of the site are to be revegetated with a structured community similar to that existing pre-mining, a monitoring program will be developed. This program will be in accordance with the Landscape Function Analysis (LFA) methodology as developed by CSIRO (Tongway *et al.* 2005) or similar and will be employed to ascertain whether vegetation is developing in structure and complexity comparable to that of the local remnant vegetation.

LFA is a methodology used to assess key indicators of ecosystem function as measures of how well the landscape retains and uses vital resources. Key indicators include landscape organisation and soil surface condition and these are assessed to quantify the utilisation of vital landscape resources (e.g. water, topsoil, organic matter and perennial vegetation) in space and time.

LFA methodology employed at the SIS may include:

- Establishment of transects and nested quadrats
- Landscape organisation assessment – to characterise and map the monitored sites in terms of the spatial pattern of resource loss or accumulation (Tongway & Hindley, 2004).
- Soil Surface Assessment - to establish soil surface condition indices (SSCI) which may include:
 - **Stability Index:** indicates the ability of the soil to withstand erosive forces, and to reform following disturbance.
 - **Infiltration Index:** defines how the soil partitions rainfall into soil-water (water available for plant use, and runoff water which is lost from the local system, or may also transport materials (soil, nutrients and seeds) away.
 - **Nutrient Cycling Index:** indicates how efficiently organic matter is cycled back into the soil.
 - The SSCI are then used to determine the “strength” and “weaknesses” of the monitoring site and directly compare the soil condition with vegetation data to obtain an overall site condition.
- Photographic monitoring may be used to compliment LFA monitoring activities.

6.3 Analogue Sites

An analogue site is an ecosystem that serves as a model for restoring another ecosystem. The use of analogue sites to set the benchmark for rehabilitation is considered an appropriate way to track rehabilitation progress and outcomes (Nichols, 2005). This data can also be used to establish or refine target values for key biophysical parameters and indicators related to vegetation diversity/structure and habitat complexity, and provide data on the long-term goal for the rehabilitation areas.

Austar has chosen long term monitoring sites for biodiversity monitoring outside of the Stage 3 Mining Area that are used to monitor areas which are not subject to subsidence impacts. One site is located within the SIS, and one on Austar owned land to the south of the SIS. Monitoring on these sites commenced in 2013. Data from these sites is intended to be used as the analogue sites for SIS rehabilitation.

7 CONTINGENCY PLAN FOR UNPREDICTED IMPACTS

In the event the performance measures provided in **Section 5** are considered to have been exceeded, or are likely to be exceeded, the site will undertake the following:

- Report the likely exceedance of the performance indicator to the relevant agencies as required under the project approval or legislation after becoming aware of the exceedance;
- Identify an appropriate course of action with respect to the identified impact in consultation with appropriate specialists and relevant agencies;
- Submit the proposed course of action to any relevant government agencies for consultation/approval (if required);
- Implement the approved course of action, consistent with other relevant management plans to the satisfaction of the appropriate agencies (if required); and

- Review the effectiveness of this Landscape MP to adequately manage potential impacts within the limits of the project approval.

7.1 Trigger Action Response Plan

The following Trigger Action Response Plan (TARP) identifies the proposed contingencies strategies in the event of unexpected variations or impacts to rehabilitation outcomes. A risk-based approach has been used to assess the potential consequences and mitigation measures. **Table 3** outlines the key identified risks, triggers and proposed mitigation measures.

TABLE 3 - PROPOSED MEASURES TO REDUCE KEY RISKS

Risk	Trigger	Proposed Mitigation Measure
Wind and water erosion.	Visual monitoring indicates sites of persistent wind or water erosion.	Erosion and sedimentation controls will be employed, monitored and maintained during rehabilitation activities. Where persistent issues are identified additional controls may be employed including planting of windbreaks and/or minor re-contouring of the landform to improve local drainage characteristics.
Poor vegetation establishment success.	Monitoring data indicates non-compliance with performance criteria in terms the desired revegetation outcome.	Review species mix used to ensure alignment with the seasonal conditions of the site. Where possible, use native species associated with the target vegetation communities. Seed collection / obtainment program undertaken to ensure adequate resources of seed are available during the life of the project. Undertake follow up maintenance and/or replanting activities where required.
Major storm event resulting in geotechnical instability, major erosion and/or widespread damage to rehabilitated areas.	Weather warnings relate to severe storms and localised flooding. Monitoring program indicates lack of adequate ground cover.	Design final landforms, structures and revegetation to be sympathetic to existing landform to cope with major storm events. Review maintenance procedures on sediment structures and undertake repairs / maintenance where required. Undertake follow up maintenance and/or replanting activities where required.
Severe and/or prolonged drought leading to widespread failure of revegetation.	Monitoring and vegetation assessments highlight inadequate ground cover and or paucity in species diversity / distribution.	Selection of drought-tolerant species for revegetation. Selection of species aligned to desired vegetation community. Time plantings to take advantage of suitable weather conditions. Undertake follow up maintenance and/or replanting activities where required. Ensure use of appropriate soil ameliorants, ground cover and maintenance activities during any further revegetation efforts.
Asset Protection Zone is not maintained in context of bushfire risk	Site assessment of APZ shows unacceptable fuel loads.	Review control and maintenance measures identified within the BFMP.

Risk	Trigger	Proposed Mitigation Measure
		Control and maintain a suitable APZ surrounding rehabilitation areas by slashing or controlled grazing in accordance with the BFMP. Allocate additional resources to maintenance activities, if required, to ensure acceptable fuel loads.

8 CONTINUAL IMPROVEMENT

Austar will implement reasonable and feasible best practice landscape management measures at the Kitchener SIS appropriate for a closed site. The basis for continuous improvement of landscape management will be through ongoing monitoring and the contingency response and adaptive management process outlined in **Section 7**.

9 COMPLAINTS, INCIDENTS AND REPORTING

9.1 Community Complaints and Independent Review

Community complaints are to be managed in accordance with the requirements of the Environmental Management Strategy.

A complaints register will be published on the Austar Coal Mine website, which will be updated monthly, and a summary of complaints will be provided in the Annual Review.

9.2 Incident Reporting

Schedule 7 Condition 6 of PA 08_0111 specifies the requirements for incident reporting. An incident is defined as a set of circumstances that causes or threatens to cause material harm to the environment, and/or breaches or exceeds the limits or performance measures/criteria in the approval.

Austar will notify the Department and any other relevant agencies, of any incident associated with the mine complex as soon as practicable after Austar becomes aware of the incident.

Within 7 days of the date of the incident, Austar will provide a detailed report on the incident to the Department and any other relevant agencies. The report will include the following details:

- The date, time and nature of the exceedance/incident;
- Identify the cause (or likely cause) of the exceedance/incident;
- Describe what action has been taken to date; and
- Describe the proposed measures to address the exceedance/incident.

Further investigation may be required beyond the 7 days depending on the nature of the incident.

The EPL should be referred to for notification requirements relating to incidents causing or threatening material harm to the environment.

9.3 Information Dissemination

A summary of monitoring results will be presented at Austar Community Consultative Committee (CCC) meetings.

Information will also be made available on the Austar website in accordance with the requirements of Schedule 7 Condition 9 of PA 08_0111.

9.4 Annual Review

In accordance with Schedule 7 Condition 3 of PA 08_0111, Austar will prepare an Annual Review for submission to the Department.

10 DOCUMENT REVIEW AND REVISION

Schedule 7 Condition 4 of PA 08_0111 specifies the requirements for revision of strategies plans and programs, as follows:

Within 3 months of:

- (a) the submission of an annual review under Condition 3 above;*
- (b) the submission of an incident report under Condition 6 below;*
- (c) the submission of an audit report under Condition 7 below; or*
- (d) any modification to the conditions of this approval, (unless the conditions require otherwise),*

the Proponent shall review the strategies, plans, and programs required under this approval, to the satisfaction of the Director-General. Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted for the approval of the Director-General.

Note: The purpose of this condition is to ensure that strategies, plans and programs are regularly updated to incorporate any measures recommended to improve environmental performance of the project.

11 REFERENCES

Austar Coal Mine Pty Ltd (2018), *Bushfire Management Plan*

Austar Coal Mine Pty Ltd (2021), *Site Water Management Plan*

Department of Environment and Climate Change (DECC), (2008), *Managing Urban Stormwater: Soils and Construction, Volume 2E Mines and Quarries, June 2008*

Eco Logical Australia (2018), *Austar Coal Mine Bushfire Management Plan*

Landcom (2004), *Managing Urban Stormwater: Soils and Construction Volume 1 "Blue Book"*.

Nichols, O.G. (2005), *Development of rehabilitation completion criteria for native ecosystem establishment on mineral mines in the Hunter Valley*, Australian Centre for Minerals Extension and Research. ACARP Project No. C13048, Queensland.

Tongway, D.L., Hindley, N.L. (2005), *Landscape Function Analysis: Procedures for Monitoring and Assessing Landscapes, with special reference to Minesites and Rangelands, CSIRO, February 2005*

Umwelt (2008), *Austar Coal Mine Project – Stage 3 Environmental Assessment*, Prepared by Umwelt (Australia) Pty Limited on behalf of Austar Coal Mine Pty Ltd, October 2008

Umwelt (2011), *Austar Coal Mine Project – Stage 3 Modification Environmental Assessment*, Prepared by Umwelt (Australia) Pty Limited on behalf of Austar Coal Mine Pty Ltd, September 2011

Appendix A: Approval Requirements

Schedule	Project Approval Condition	Section of this Plan
6	4(b) ii. A description of the short, medium, and long term measures that would be implemented to: <ul style="list-style-type: none"> • Rehabilitate the site; • Implement the offset strategy; and • Manage the remnant vegetation and habitat on the site and in the offset area. 	5
6	4(b) iii. Performance and completion criteria for the rehabilitation of the site and implementation of the offset strategy;	5
6	4(b) iv. A detailed description of the measures that would be implemented over the next 3 years, including the procedures to be implemented for: <ul style="list-style-type: none"> • Minimising and rehabilitating disturbed areas; • Implementing the offset strategy; • Protecting vegetation and soil outside the disturbance areas; • Undertaking pre-clearance surveys; • Managing impacts on fauna; • Landscaping the site to minimise visual impacts; • Conserving and reusing topsoil; • Collecting and propagating seed for rehabilitation works; • Salvaging and reusing material from the site for habitat - enhancement; • Controlling weeds and feral pests; • Controlling access; and • Bushfire management. 	5
7	ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING	
7	Management Plan Requirements 2. The proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:	
7	(a) Detailed baseline data;	3
7	(b) A description of: <ul style="list-style-type: none"> • The relevant statutory requirements (including any relevant approval, licence, or lease conditions); 	4
	<ul style="list-style-type: none"> • Any relevant limits or performance measures/criteria; 	5
	<ul style="list-style-type: none"> • The specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures; 	5
7	(c) A description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	5
7	(d) A program to monitor and report on the: <ul style="list-style-type: none"> • Impacts and environmental performance of the project; • Effectiveness of any management measures; 	6

Schedule	Project Approval Condition	Section of this Plan
7	(e) A contingency plan to manage any unpredicted impacts and their consequences;	7
7	(f) A program to investigate and implement ways to continually improve the environmental performance of the project over time;	8
7	(g) A protocol for managing and reporting any: <ul style="list-style-type: none"> • Incidents; • Complains; • Non-compliances with statutory requirements; and • Exceedences of the impact assessment criteria and/or performance criteria; and 	9
7	(h) A protocol for periodic review of the plan.	10
7	<p>Annual Review</p> <p>Each year, the Proponent shall review the environmental performance of the mine complex to the satisfaction of the Director-General. This review must:</p> <p>(a) describe the works that were carried out in the past year, and the works that are proposed to be carried out over the next year;</p> <p>(b) include a comprehensive review of the monitoring results and complaints records of the mine complex over the past year, which includes a comparison of these results against the</p> <ul style="list-style-type: none"> · the relevant statutory requirements, limits or performance measures/criteria; · the monitoring results of previous years; and · the relevant predictions in the EA and Extraction Plan; <p>(c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;</p> <p>(d) identify any trends in the monitoring data over the life of the mine complex;</p> <p>(e) identify any discrepancies between the predicted and actual impacts of the mine complex, and analyse the potential cause of any significant discrepancies; and</p> <p>(f) describe what measure will be implemented over the next year to improve the environmental performance of the mine complex.</p>	9.4
7	<p>Revision of Strategies, Plans and Programs</p> <p>4. Within 3 months of:</p> <ul style="list-style-type: none"> (a) The submission of an annual review under Condition 3 above; (b) The submission of an incident report under condition 6 below; (c) The submission of an audit report under Condition 7 below; or (d) Any modification to the conditions of this approval, (unless the conditions require otherwise), the Proponent shall review the strategies, plans, and programs required under this approval, to the satisfaction of the Director-General. Where this review leads to revisions in any such document, then within 4 weeks of this review the revised 	10

Schedule	Project Approval Condition	Section of this Plan
	<p>document must be submitted for the approval of the Director-General.</p> <p><i>Note: The purpose of this condition is to ensure that strategies, plans and programs are regularly updated to incorporate any measures recommended to improve environmental performance of the project.</i></p>	
7	<p>Incident Reporting</p> <p>6. The Proponent shall notify the Director-General and any other relevant agencies of any incident associated with the mine complex as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Director-General and any relevant agencies with a detailed report on the incident.</p>	9.2
7	<p>Access to Information</p> <p>9. From the end of 2009, the Proponent shall make the following information publicly available on its website:</p> <p>(a) a copy of all current statutory approvals for the mine complex;</p> <p>(b) a copy of the current environmental management strategy and associated plans and programs;</p> <p>(c) a summary of the monitoring results of the mine complex, which have been reported in accordance with the various plans and programs approved under the conditions of this approval;</p> <p>(d) a complaints register, which is to be updated on a monthly basis;</p> <p>(e) a copy of the minutes of CCC meetings;</p> <p>(f) a copy of any Annual Reviews (over the last 5 years);</p> <p>(g) a copy of any Independent Environmental Audit, and the Proponent's response to the recommendations in any audit; and</p> <p>(h) any other matter required by the Director-General.</p>	9.3

STATEMENT OF COMMITMENTS

A list of the Statement of Commitments from PA 08_0111 which are relevant to landscape management and where these commitments are addressed in this Plan are listed in the table below.

PROJECT APPROVAL STATEMENT OF COMMITMENTS (08_0111)

Appendix	Statement of Commitments	Section of this Plan
3	Ecology	
	1.4.1 Austar Coal Mine will establish and manage the proposed Biodiversity Offset Area (refer to Figure 7.1 of the EA) to protect and enhance its ecological values in perpetuity, to the satisfaction of the Director-General.	1.1.2
	1.4.2 A Weed Management Plan will be developed for the Surface Infrastructure Site.	Internal Weed Action Plan
	1.4.3 The Austar bushfire management strategy will be revised to include the specific requirements of the Surface Infrastructure Site during the construction and operation phases.	Bushfire Management Plan

Appendix	Statement of Commitments	Section of this Plan
	1.4.4 Prior to the commencement of construction of the Surface Infrastructure Site (other than for those works identified in the Shaft Construction Management Plan), an Austar Mine Complex Ecological Management Plan which integrates management of ecological issues associated with construction of the Surface Infrastructure Site, Stage 3 underground mining and with the remainder of Austar Coal Mine operations will be submitted to the Director-General for approval. This will include: <ul style="list-style-type: none"> · clearing procedures for establishment of the Surface Infrastructure Site and associated access road/services easement; · replacement of arboreal habitat within surrounding areas or within the Biodiversity Offset Area, should the removal of any hollow-bearing trees be required; and · extension of the existing Austar Coal Mine ecological monitoring program to include monitoring of vegetation condition within subsidence affected areas. 	This document (for Kitchener SIS)
	1.4.5 Clearing of vegetation will be restricted to the minimum area necessary to construct the proposed infrastructure and provide adequate fire protection and will be undertaken in accordance with the tree felling procedure outlined in Section 7.5.3 of the EA.	5
	1.4.6 An appropriate speed limit on access roads will be implemented to minimise the risk of vehicle collision with ground-dwelling fauna dispersing between adjacent habitats.	5
	1.4.7 An appropriately designed nest box will be erected (either within remaining bushland areas or within the Biodiversity Offset Area) for the compensation of each tree hollow removed as a result of clearing required for construction of the proposed Surface Infrastructure Site.	3.5 5
	1.4.8 Any outbreaks of invasive weeds observed on the property boundary will be appropriately controlled to avoid their escape into the surrounding Werakata State Conservation Area and subsequently competing with threatened flora species. Early detection will ensure the management required is not extensively onerous.	5
	1.4.9 Any landscaping undertaken around infrastructure areas will use only locally occurring native plant species to reduce the risk of invasive plant species escaping into the adjacent reserve and competing with threatened flora species. Particular care will be taken to avoid planting species which are known to escape and naturalise into native bushland.	5

Appendix B:

Management Plan Approval

(Note to be deleted: To be added once this version is approved)

Appendix C: Land Management Procedures

PRE-CLEARANCE PROCEDURE

Pre-clearing requirements involve the completion of adequate pre-clearing inspections by a suitably qualified and experienced person (e.g. ecologist). The requirements for the pre-clearing inspections are provided below:

- The area to be cleared must be appropriately identified in the field, prior to the pre-clearing inspections.
- A pre-clearance inspection will be undertaken prior to the scheduled clearing by a suitably qualified and experienced person. All hollow-bearing trees and habitat trees within the area to be cleared will be identified and marked using spray paint or flagging tape.
- A suitably qualified and experienced person will recommend any specific activities that are deemed necessary as a result of any findings of the pre-clearance inspection.

VEGETATION CLEARING PROCEDURE

After the pre-clearance inspection has been completed, the clearing of vegetation will incorporate the following:

- Prior to clearing, the Environmental Coordinator will contact the local wildlife rescue organisation and have them on standby should the need arise to recover any fauna from the felled habitat trees.
- All non-habitat trees will be cleared first, taking care to avoid all marked habitat trees. Providing that pre-clearing inspections have been completed, it is not necessary for an ecologist to be present while clearing non-habitat trees.
- Within one to two days following the clearing of non-habitat trees, habitat trees will be cleared in the presence of a suitably qualified and experienced person. Before clearing, the trunk of the hollow-bearing tree will be shaken vigorously with heavy machinery. The machinery operator will then push the tree over as slowly as possible, so as to minimise the intensity of impact when hitting the ground.
- Once the tree has been felled, the qualified and experienced person will inspect the tree (particularly tree hollows) for signs of any trapped or injured fauna. Where necessary, a spotlight will be used to inspect deep hollows. Any resultant fauna will be left on site to allow it to move to areas of surrounding vegetation. All hollows where fauna is recorded will be checked prior to the tree being moved.
- Any injured fauna will be carefully captured by the qualified and experienced person, and taken to a wildlife carer or veterinary clinic.
- Cleared vegetation is proposed to be mulched with large timber being used as site barriers to allow re-use either at the SIS, or on other Austar rehabilitation projects.

NEST BOX PROCEDURE

The erection of nest boxes as compensatory habitat for tree hollows removed is required. Once habitat trees have been felled they are to be inspected and nest boxes erected for each hollow removed as follows:

- The number of hollows present in each tree will be recorded, as will the size class of each hollow.

- The total number of hollows in each tree cleared will define the number of nest boxes that are required to compensate for the clearing. Nest boxes will be erected in nearby secure habitats within the SIS land holding.
- The nest boxes will be will be appropriate for native fauna species known from the area.
- All nest boxes will be mounted using an appropriate method to allow for growth of the trunk without damage to the tree, or nest box.

Appendix D:

Species to be used for

Revegetation in the Surface

Infrastructure Site

The table below outlines the species that may be used in the revegetation component of the rehabilitation program within the Surface Infrastructure Site (SIS).

SPECIES THAT MAY BE USED IN REVEGETATION PROGRAM WITHIN THE SIS

Common Name	Taxonomic Name
Canopy	
Spotted gum	<i>Corymbia maculata</i>
Cabbage gum	<i>Eucalyptus amplifolia subsp. amplifolia</i>
Large-fruited grey gum	<i>Eucalyptus canaliculata</i>
Narrow-leaved ironbark	<i>Eucalyptus crebra</i>
Thin-leaved stringybark	<i>Eucalyptus eugenioides</i>
Broad-leaved ironbark	<i>Eucalyptus fibrosa</i>
Grey box	<i>Eucalyptus moluccana</i>
Grey gum	<i>Eucalyptus punctata</i>
Forest red gum	<i>Eucalyptus tereticornis</i>
Turpentine	<i>Syncarpia glomulifera subsp. glomulifera</i>
Shrub Stratum	
Silver-stemmed wattle	<i>Acacia parvipinnula</i>
Coffee bush	<i>Breynia oblongifolia</i>
Blackthorn	<i>Bursaria spinosa subsp. spinosa</i>
Broom bitter pea	<i>Daviesia genistifolia</i>
Gorse Bitter Pea	<i>Daviesia ulicifolia</i>
Healthy Parrot Pea	<i>Dillwynia retorta</i>
Ground Stratum	
Threeawn speargrass	<i>Aristida vagans</i>
Blue flax lily	<i>Dianella caerulea</i>
Wiry panic	<i>Entolasia stricta</i>
Love creeper	<i>Glycine tabacina</i>
Star Goodenia	<i>Goodenia rotundifolia</i>
Purple Coral Pea; Waraburra	<i>Hardenbergia violacea</i>
Blady grass	<i>Imperata cylindrica var. major</i>
Wattle Mat-rush	<i>Lomandra filiformis</i>
Many-flowered mat-rush	<i>Lomandra multiflora subsp. multiflora</i>
Kangaroo grass	<i>Themeda australis</i>