LakeCoal	Doc Owner: **Environment and Community Coordinator**
	Doc No: ENV 00004

MANNERING COLLIERY

Land Management Plan

ENVIRONMENTAL MANAGEMENT PLAN

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Date:	30 April 2016

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1 Introduction

1.1 Background

Mannering Colliery (MC) is an underground coal mine located on the southern side of Lake Macquaire approximately 60 km south of Newcastle. Development of the mine began in 1960 in conjunction with the construction of Vales Point Power Station known as Wyee Mine and was operated by Powercoal Pty. Ltd. Production commenced in 1961 with extensive mining (first workings and secondary extraction) having taken place in both the Great Northern and Fassifern Seams. Coal operations temporarily ceased on 30 June 2002 when the operation was placed on care and maintenance. Centennial Coal acquired control of Powercoal on 7 August 2002 and the Colliery remained on care and maintenance until reopening as Mannering Colliery. Production was recommenced in December 2005, mining the Fassifern Seam to gain access to greater than 5 million tonnes of recoverable reserves beneath Lake Macquarie and surrounding lands. MC was once again placed on care and maintenance in November 2012 and in 2013 the owners of MC and Chain Valley Colliery entered into an agreement which enabled LakeCoal to operate the MC until 2022. LakeCoal became the operator of MC effective 17 October 2013.

MC was granted Project Approval 06_0311 on 12 March 2008 which has since had three modifications, Modification 1 of 25 October 2012 (Mod 1), Modification 2 of 27 November 2014 (Mod 2) and Modification 3 of 16 December 2015 (Mod 3). The Land Management Plan (LMP) has been developed and reviewed to comply with the requirements of MC Project Approval 06_0311 (Mod 3), Schedule 3, Condition 14 – Land Management Plan.

1.2 Consultation

In accordance with Schedule 3, Condition 14 of project approval 06_0311 the LMP was originally developed and prepared by Mr Paul Williams of Centennial Coal, who was approved by the then Director-General of the Department of Planning on the 24 September 2008.

The original LMP (2008) was prepared in consultation with the Lake Macquarie City Council (LMCC), Wyong Shire Council (WSC), The Department of Primary Industries (now DRE), and the Department of Environment and Climate Change (now OEH). The LMP was submitted to, and subsequently approved by, the Department of Planning (now DP&E) on 20 October 2008. This revision of the LMP has utilised the approved LMP as a basis for the document and updated it to include the new conditional requirements from Project Approval 06_0311 (Mod 3), Schedule 3, Condition 14, specifically the requirement that:

"Prior to the end of April 2016, the Proponent shall revise the Land Management Plan to incorporate the measures required to implement its commitments described in new row 2 of the Terrestrial Ecology section of its Statement of Commitments, and submit it to the Secretary for approval."

As this update of the LMP has only required the inclusion of commitments made as part of the Environmental Assessment that supported Modification 3 of the Project Approval, and that, as a result of the modification process under the EP&A Act, the relevant commitments have already been subject to public exhibition and revision by the relevant stakeholders, no further consultation has been undertaken for the current revision of the LMP.

1.3 Operations

Mannering Colliery is located approximately 60 km south of Newcastle and 80 km north of Sydney. The pit-top is located 3km south of the township of Mannering Park. Development of MC commenced in 1960 in conjunction with the construction of Vales Point Power Station.

MC was originally granted Project Approval MP 06_0311 on 12 March 2008, having previously operated under existing use rights. With the latest modification (Mod 3) of MP 06_0311, mining operations at Mannering Colliery are permitted to take place until 30 June 2022, with a maximum of 1.1 Mtpa produced and a maximum of 1.3 Mtpa transported from the site (the difference being associated with the approved receipt of coal, via underground conveyor, from the adjacent Chain Valley Colliery which is also operated by LakeCoal. All product coal from MC is transported via dedicated overland conveyor to Vales Point Power Station (VPPS) for domestic energy generation.

All coal extracted at Mannering Colliery is transported via a drift conveyor system to the surface and into the on-site coal crushing facility before being conveyed to VPPS.

The MC surface infrastructure comprises:

- Mine entry/exit for personnel and materials (1:3.5 decline) including a winch house
- Coal conveyor drift (1:3.5 decline) including a second egress, man riding winch and winch house
- Limited coal-handling facilities for breaking, crushing, sizing and storing product
- Overland conveyor systems
- Administration and bathroom facilities
- Workshop facilities
- Machinery servicing bay
- Machinery washdown bay
- Pollution control apparatus and structures
- Enclosed and open bulk material and equipment stores facilities
- Mine ventilation fans
- Air compressors
- Internal roads and car parking facilities

1.4 Purpose

The LMP applies to the management of surface operations at MC including pit top facilities and lands where additional infrastructure may be constructed. MC has no rural holdings or control of land other than the land leased from Delta Electricity for the surface operations.

The purpose of the Land Management Plan is to:

- detail the regulatory requirements and commitments made in relation to land management at Mannering Colliery;
- identify measures to minimise visual impacts including off site lighting;
- identify measures to control weeds and feral pests;

- identify measures to control access to the site; and
- identify measures to assist in the management of bush fires;
- detail monitoring and reporting requirements;
- identify the requirements reviews of the document; and
- identify persons responsible for implementation of the requirements.

2 Summary of the Statutory Approval Requirements

2.1 Key Legislation, Policy and Guidelines

A number of legislative requirements, government policies and guidelines relating to land management are applicable, key items of legislation relevant to this LMP are:

- *Protection of the Environment Operations Act 1997 (POEO Act)* - MC has an existing EPL 191 under the POEO Act.
- *Environmental Planning and Assessment Act 1979 (EP&A Act)* – Project Approval MP 06_0311 is issued under the EP&A Act.
- Mining Act 1992 - LakeCoal holds or subleases numerous mining authorities under the Mining Act 1992 associated with the operations at Mannering Colliery.
- *Noxious Weeds Act 1993* and the *Noxious Weeds Regulation 2008.*
- *Game and Feral Animal Control Act 2002* and the *Game and Feral Animal Control Regulation 2012.*
- *Local Land Services Act 2013* established Local Land Services (LLS), repealed the Rural Lands Protection Act 1998, the Rural Lands Protection Amendment Act 2008 and the Catchment Management Authorities Act 2003.
- *Pesticides Act 1999*
- *National Parks and Wildlife Act 1974*
- *Australian Standard AS4282 (INT) 1995 – Control of Outdoor Lighting*
- *Rural Fires Act 1997*

2.2 Project Approval (MP 06_0311)

Condition 14 Schedule 3 of Project Approval 06_0311 details in the requirements of the Land Management Plan and is recreated in **Table 1** below along with identification of where the requirements are addressed in the LMP.

Table 1: Requirements from Condition 14, Schedule 3 of MP 06_0311

Requirements	Addressed
14. The Proponent shall prepare and implement a detailed Land Management Plan for the site to the satisfaction of the Secretary and DRE. This plan must:	**This Document**
(a) be submitted to the Secretary by the end of September 2008;	**Submission letter dated 10 September 2008, approval letter dated 20 October 2008.**
(b) be prepared by suitably qualified expert/s whose appointment/s have been endorsed by the Secretary;	**Section 1.2**
(c) be prepared in consultation with DRE, OEH and affected councils; and	**Section 1.2**
(d) include measures to: • *minimise visual impacts;* • *control weeds, feral pests and access; and* • *manage bushfires; and*	**Section 3, 4, 5 & 6**
(e) provide details of who is responsible for monitoring, reviewing and implementing the plan.	**Section 8**
Prior to the end of April 2016, the Proponent shall revise the Land Management Plan to incorporate the measures required to implement its commitments described in new row 2 of the Terrestrial Ecology section of its Statement of Commitments, and submit it to the Secretary for approval. *The Proponent shall implement the approved management plan as approved from time to time by the Secretary.*	**This Document and Section 6.2**

3 Visual Amenity

3.1 Impact Assessment

A visual impact assessment was undertaken as part of the Mannering Colliery Environmental Assessment (2007) to determine the impacts of the surface infrastructure at MC on the surrounding area. The surface infrastructure has remained unchanged since this time and, consistent with subsequent modifications, no major changes are approved that would have a significant impact on the visual amenity. The conceptual mine plan, limited to first workings, will not have any visual impact as it has been designed to not cause any noticeable surface impacts.

The visual impact was determined utilising a combination of visual effect and sensitivity from four potential receptors within 2 kilometres of the product coal bin (highest potential visual point at MC surface facilities). The surrounding topography limits views to the MC surface facilities which are situated at approximately 22 metres Reduced Level.

All potential sensitive viewing locations adjacent to the operation were assessed as located in low lying areas (ranging from 12 to 20 metres Reduced Level). Dense and well developed vegetation provides an effective visual screen between the Project and surrounding neighbours. The dominant height of woodland vegetation in the immediate vicinity is approximately 10 metres, effectively reducing the visual impact to very low.

The visual assessment concluded that there are no locations surrounding MC that will have views of the MC surface facilities. **Plate 1** shows the established vegetative screen located at the mine entrance that will be maintained for the life of the mine.

Plate 1: Vegetation screen at MC mine entrance

3.2 Lighting

The Mannering Surface Facilities have been a part of the local environment for over 50 years. As described in **Section 3.1**, there are no significant changes proposed to the Mannering surface facilities. Consideration of the location of adjacent neighbours and road users will continue to be undertaken when siting any required lighting to ensure orientation away from receivers. Any minor modifications or maintenance to the existing facilities will be designed to blend in with natural colour schemes with no reflective materials utilised.

Consistent with the recommendation from the 2013 Independent Environmental Audit (URS, 2013), following the recommencement of mining operations, an inspection of outdoor lighting will be conducted to document compliance with the requirements of AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting. Given the imminent recommencement of mining activities at the time of reviewing this document, LakeCoal will complete and document this lighting inspection by 31 December 2016 and report on the findings in the 2016 Annual Review.

4 Weed Control

In line with the MC Environmental Management Strategy a program for the control of weeds on all property under MC control is in place. A 'weed' is any plant growing where it is not wanted. Weeds are generally unwanted in any given situation because they threaten agricultural productivity, have detrimental effects on the natural environment or impact on human health. Weeds are often classed into broad groups depending on their characteristics, impacts and the situation in which they grow e.g. noxious weeds, weeds of national significance (WoNS).

There are legal obligations under the *Noxious Weeds Act 1993* to control declared noxious weeds in the Wyong Shire Council (WSC). Several weeds, including declared noxious weeds in the WSC and WoNS have been recorded at MC. **Table 2** lists the declared noxious weeds in the WSC that have been recorded at MC and **Appendix 1** provides additional information on noxious weeds and their control class.

4.1 Recorded Weed Species

With the limited surface operations and surface lease area associated with the operation of MC, the opportunity for weed invasion is low, however weed infestation has potential to occur along road and track verges, creek banks and the disturbed areas of the surface operational area.

The current weed control program extends throughout all MC operational areas throughout the year. Weed species previously identified include, but may not be limited to, the following;

- Bamboo (*Bambusa* species*)*
- Bitou Bush (*Chrysanthemoides monilifera* subsp. *rotundata)*
- Blackberry *(Rubus fruticosus aggregate species)*
- Crofton Weed (*Ageratina adenophora)*
- Fireweed (*Senecio madagascariensis)*
- Lantana (*Lantana camara)*
- Pampas Grass (Cortaderia species)
- Privot (Ligustrum species)
- Scotch Thistle (Onopordum acanthium)

Table 2: Declared Noxious Weeds in WSC recorded at MC

Weed common name (*scientific name*)	WoNS	Control class	Legal requirements
Bitou Bush (*Chrysanthemoides monilifera* subspecies *rotundata*)	Yes	4	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread.
Blackberry (*Rubus fruticosis* aggregate species)	Yes	4	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed. This is an All of NSW declaration
Crofton Weed (*Ageratina adenophora*)	No	3	The plant must be fully and continuously suppressed and destroyed
Fireweed *(Senecio madagascariensis)*	Yes	4	The plant must not be sold propagated or knowingly distributed.

4.2 Weed Control

The MC site has been divided into eight weed management areas based on geographical boundaries (**Appendix 2**). The weed management areas shall be surveyed annually to identify the weed species and quantities present at each location, with that information recorded on the Weed Monitoring Proforma (**Appendix 2).** The effectiveness of the weed control will be determined by the quantities identified and the number of locations for each weed type.

For areas such as exploration sites and rehabilitation areas, the revegetation programs limit initial weed infestations, however the early control of naturally introduced weeds will minimise competition and maximise early growth and survival of desired species. This can and will be achieved by physical removal, mulching and/or chemical control as required.

4.3 Weed Treatment Programs

The MC Environment and Community Coordinator shall contract a licensed contractor to conduct the weed treatment programs. Where the program involves application of chemicals, the contractor will use approved herbicides; Safety Data Sheets (SDS) for the identified chemicals will be provided and required volumes for application will be ascertained from the recommendations of the manufacturer. The weed treatment program as outlined in **Table 3** shall be undertaken with spot spraying at any time (as appropriate for weeds species) to maintain effective control on weed species at MC.

Table 3: Weed Treatment Program

Common name (*Scientific name*)	**Treatment**		
Bamboo (*Bambusa* species*)*	Sep-Mar	Mar-May	Foliar application between 1-2m tall. Cut stems to 20 cm, pour mixture down stem or wet cut.
Bitou Bush (*Chrysanthemoides monilifera* subsp. *rotundata)*	Jun-Sep	Mar-May	Spray to wet foliage. Apply at peak flowering to actively growing bushes during winter. Do not treat under drought conditions.
Blackberry *(Rubus fruticosus aggregate species)*	Oct-Nov	Mar-May	Flowering to leaf fall. Do not apply to bushes with mature fruit.
Crofton Weed (*Ageratina adenophora)*	Oct-Nov	Mar -Jun	Spray all foliage to point of run-off. Actively growing plants.
Fireweed (*Senecio madagascariensis)*	Jun-Sep	Mar-May	Actively growing early stages.
Lantana (*Lantana camara)*	Oct-Nov	Mar-Apr	Thoroughly wet all foliage and stems. Add organosilicone penetrant.
Pampas Grass (*Cortaderia species)*	Sep-Dec	Jan-May	Actively growing plants, before flowering.
Privet (Ligustrum species)	Oct-Dec	Jan-May	Spray to wet foliage. Plants must be actively growing. Do not treat under drought conditions.
Scotch Thistle (*Onopordum acanthium)*	Sep-Mar	Mar-May	Treat actively growing rosettes

4.4 Weed Control Measures

Detailed weed control measures, including chemical application rates and guidance for chemical application locations are contained in **Appendix 3.** The details included in **Appendix 3** have been sourced from the *Noxious and environmental weed control handbook – A guide to weed control in non-crop, aquatic and bushland situations 6th Edition*, DPI.

5 Pest Control

A pest control program is conducted at MC continually throughout the year. The program is conducted by a licensed contractor on a quarterly basis or more frequently as required. Pest animals and/or evidence of their presence are monitored regularly by all employees and controlled with continued pest control maintenance, where required. The control method used for pest species may include the use of chemicals and/or trapping. The common pests identified and controlled onsite include but may not be limited to;

- Spider species
- Rodents (rats and mice)
- Cockroaches
- Other invertebrates

Feral animal monitoring will be conducted annually with details recorded on the Feral Animal Monitoring Proforma (**Appendix 2**). Pest animals and/or evidence of their presence will also be monitored informally by sightings or other evidence during regular business activities. MC staff and controlled with continued feral pest maintenance, where required. The control method used for cats, rabbits and pigeon species may include the use of chemicals and/or trapping. The common feral animals identified onsite include but may not be limited to;

- Feral cat (Felis catus);
- Feral rabbit (Oryctolagus cuniculus);
- Feral pigeon (Columba livia)

Species currently declared pests in NSW are:

- Feral rabbit (Oryctolagus cuniculus);
- Wild dog (Canis familiaris);
- Feral pig (Sus scrofa)
- A number of locust species (the Australian Plague, Spur-Throated and Migratory).

Under the *Local Land Services Act 2013* all land managers in NSW, whether on public or private land have an obligation to control declared pest species on their land. Foxes and mice are classed as nuisance animals in NSW and there is no obligation for a landholder to control these species.

As these feral animals do not appear to be abundant or causing adverse impacts at MC, emphasis will be placed upon monitoring the number of individuals and activity levels. Only in the event that these species become an issue, or a clear trend in increasing observations become apparent, would control measures be implemented by an appropriated licenced contractor.

6 Bushfire

As per Condition 14, Schedule 3, of MP 06_0311, the LMP is to include measures to manage bushfires. Accordingly, this section provides some details related to the management of the bushfire risk to the operation, however it should be noted that a specific Bushfire Management Plan is in the process of being developed for Mannering Colliery and should be referred to for relevant details including the management measures, timing and responsibilities.

In summary, the bushfire management plan includes:

- Details of the climate, vegetation and fire season at MC
- Consideration of the assets requiring protection from bushfire (human, economic, environmental and cultural)
- Details of bushfire distribution, causes and history in the Wyong area
- Details on the assessment of bushfire risk on the assets identified
- Risk management measures to be implemented for the following types of risk treatments:
    - ignition management
    - land management zones;
    - property planning; and
    - preparedness.

A severe bushfire during October 2013 triggered a fire management review and the review of the Fire Management Risk Assessment for all of LakeCoal's operations, including MC.

From this review a number of actions arose, which included a formal review and establishment of APZs around MC surface infrastructure. The formal approval for the establishment of these APZs was sought and obtained as part of Modification 3 for MP 06_0311. Details of this proposed APZ improvements are provided in **Section 6.2**.

6.1 Defendable Space

Fire protection zones or defendable space around assets which assist in fire prevention comprise three zones as shown on **Figure 1**, namely:

- 1st Zone - Asset Protection Zone (APZ)
- 2nd Zone - Strategic Fire Advantage Zone (SFAZ)
- 3rd Zone - Land Management Zone (LMZ)

The APZ for MC is shown on **Figure 2** with the SFAZ along with the locations of fire fighting equipment (hydrants and fire extinguishers) shown on **Figure 3**.

The fire protection zones are positioned between a bush fire hazard and the asset and minimise fuel loads via hazard reduction; inhibit a fire path, and reduce the effects of heat, flame, ember and smoke attack, i.e create a defendable space.

The size of the APZs for MC were determined in the bushfire assessment contained within the Environmental Assessment for Modification 3 (EMM, 2015) by comparing the bushfire hazard vegetation classification, bushfire weather and slope classes on bushfire prone land to derive minimum APZs in accordance with Appendix 4 of the NSW Rural Fire Service (RFS) 2006 *Planning for bush fire protection: a guide for councils, planners, fire authorities and developers.*

The total APZ sizes comprise both an inner protection area (IPA) and outer protection area (OPA) for different vegetation and slope classes. For MC these have been determined as identified in **Table 4**.

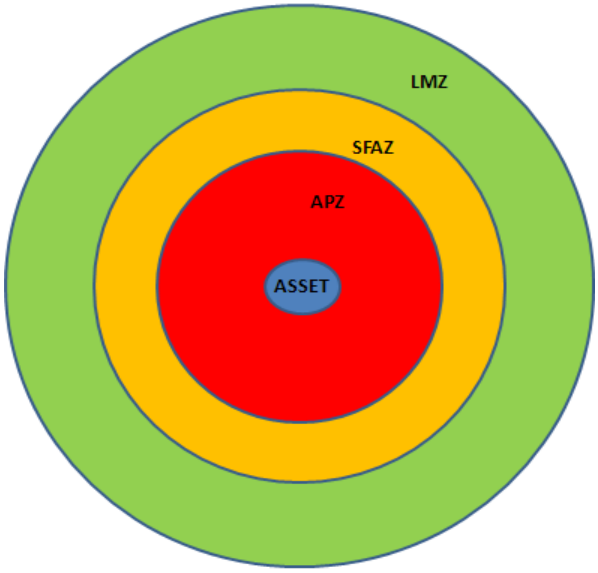

Figure 1: Fire Protection Zones

Table 4: Asset Protection Zones

Predominant bushfire hazard vegetation	Slope class	Total APZ (m)	IPA (m)	OPA (m)
Smooth-barked Apple Red Bloodwood Open Forest (forest)	i	20	10	10
	ii	25	15	10
Scribbly Gum red Bloodwood Heathy Woodland (forest)	ii	25	15	10

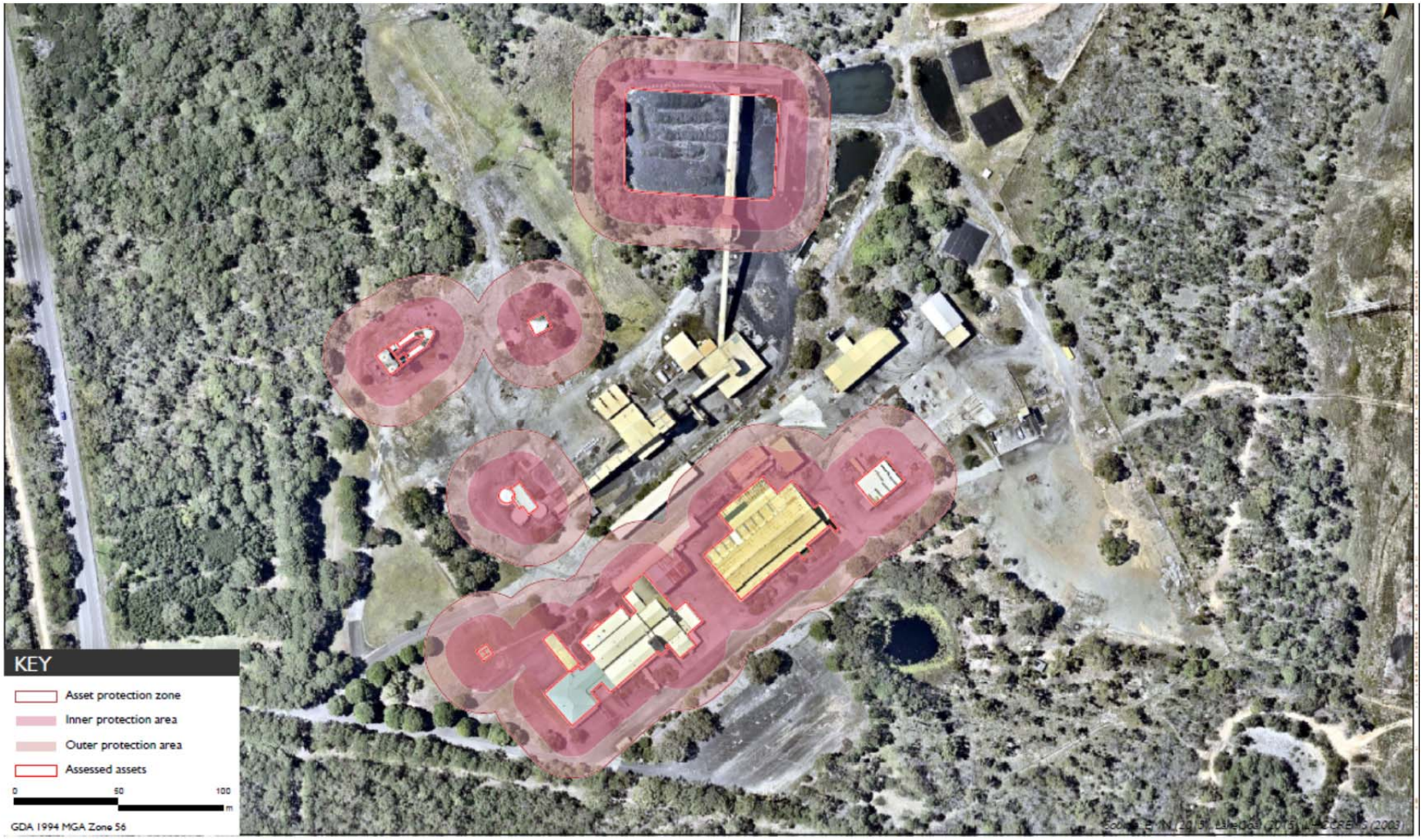

Figure 2: Mannering Colliery Asset Protection Zones

Figure 3: Land Management Zones and Fire Fighting Equipment Locations

6.2 APZ Improvements

Improvements to the existing APZs at MC will be made in accordance with the recommendations from the Environmental Assessment that accompanied Modification 3 of MP 06_0311 as shown on **Figure 2**.

Subsequent to the establishment of the APZs they will be managed in accordance with the Rural Fire Service (RFS) guideline *Planning for Bushfire Protection* (RFS, 2006). The APZs will be maintained in a manner that prevents accumulation of fine flammable debris on the ground so that fuel quantities are reduced, thus lessening flame heights and potential crowning.

General maintenance guidelines are described in Appendix 2 of the *Planning for Bushfire Protection* guideline, which nominates that APZs should be maintained as follows:

- Inner Protection Areas
  - canopy cover kept at less than 15% of total surface area and at least 2 m from the roof line of a building;
  - garden beds and shrubs not to be located under trees and sited at least 10 m from any exposed windows or doors; and
  - lower limbs of trees up to 2 m above the ground are removed.

- Outer Protection Areas
  - canopy cover kept at less than 30% of total surface area; and
  - understorey mowed annually before the fire season (usually September) to remove shrubs and long grasses.

The following measures will be implemented to manage the impacts of vegetation clearing/disturbance associated with proposed improvements to the APZs and ongoing maintenance of the APZs:

- weed management within the APZ areas will be undertaken in accordance with the MC weed control program (as detailed in **Section 4**);
- large trees will be retained as a priority where possible, the areas for priority retention will be identified by an ecologist as part of the pre-disturbance survey to be completed;
- felled trees will be relocated adjacent to the APZs to create additional fauna habitat;
- any injured fauna will be taken to the nearest veterinary hospital for treatment before release; and
- an ecologist will complete a pre-disturbance survey to determine important components of the Swamp Oak Floodplain Forest EEC for retention in the APZs.

The APZ areas will also be inspected prior to the start of the fire season (1st October to 31st March). In the event additional bush fire hazard reduction works are proposed (beyond that of maintaining the APZs), they will be undertaken only after obtaining the requisite Bushfire Hazard Reduction Certificate from the NSW Rural Fire Service.

7 Stakeholder Management and Response

7.1 Complaint Handling

MC has a 24-hour telephone hotline (1800 687 557) for members of the public to lodge complaints, concerns, or to raise issues associated with the operation. This service aims to promptly and effectively address community concerns and environmental matters.

The full details of the complaints line are covered in the Environmental Management Strategy, but in summary, all complaints are recorded and responded to, if for some reason no action is taken then the reason why is recorded. The information recorded in the complaint register includes;

- date and time the complaint was lodged;
- personal details provided by the complainant;
- nature of the complaint;
- action taken or if no action was taken, the reason why; and
- follow up contact with the complainant.

7.2 Dispute Resolution

If any disputes are not adequately addressed by the complaints handling process then they will be handled by the site Environment and Community Coordinator, if the response of Mannering Colliery is not considered to satisfactorily address the concern of the complainant, a meeting will be convened with the Mine Manager together with the Environment and Community Coordinator and complainant to determine any further options to resolve the dispute.

If no agreed outcome is determined or the complainant is still not satisfied by the action taken, then an Independent Review may be requested by the complainant. If determined to be warranted by the Secretary, an Independent Review will be undertaken in accordance with the requirements of the Project Approval to achieve an outcome to the satisfaction of the Secretary.

8 Roles and Responsibilities

All employees and contractors of MC are responsible for environmental management. However, various positions in the organisation have roles, responsibilities and authorities for managing environmental aspects, action plans, programs and controls.

Roles and responsibilities specific to completing the requirements of this LMP are identified in **Table 5**

Table 5: Land Management Roles and Responsibilities

Role	Responsibilities
Managing Director	• Ensure that adequate financial and personnel resources are made available for the implementation of the LMP.
Manager of Mining Engineering (Mine Manager)	• Overall responsibility for environmental compliance with Mining Lease, EPL, Project Approval and other mining approvals as they pertain to land management. • Support the implementation of the LMP through coordination site resources and planning processes.
Environment and Community Coordinator	• Coordinate the completion of an outdoor lighting inspection against the requirements of *AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting*, by the 31 December 2016 and report on the findings in the 2016 Annual Review. • Coordinate the annual weed monitoring, with data to be recorded on the Weed Monitoring Proforma (**Appendix 2**). • Engage a licensed contractor to conduct the weed treatment programs based on the findings of the annual weed monitoring. • Coordinate the quarterly pest control program through a licensed contractor. • Organise for feral animal control programs as required based on the results of the annual feral animal monitoring. • Finalise and implement the Bushfire Management Plan • Coordinate the establishment of APZs, including implementation of measures to manage the impacts associated with the APZ establishment. • Undertake or coordinate the annual inspection of APZs prior to commencement of the bushfire season (1st October – 31 March) • Record and respond to any complaints associated with land management. • Review and revise the LMP as required by **Section 9.1**; • Coordinate the audits required under **Section 9.2** and **Section 9.3**; • Ensure adequate records are kept in accordance with **Section 10**. • Providing adequate training to employees and contractors regarding their requirements under this site LMP.

8.1 Training, Awareness and Competence

Training is an essential component of the implementation phase of this LMP.

The Environment and Community Coordinator will ensure that training and awareness processes are implemented to manage, identify and minimise potential land management impacts of MC and to ensure personnel are aware of their roles and responsibilities in terms of land management.

MC recognises that training and awareness is an integral part of the Environmental Management System. This is the means by which personnel are informed about the components of the LMP and how it is implemented on the site. The training also includes detail on people's specific responsibilities with respect to the management of land on the mining lease.

Generally training at MC consists of induction training for new starters and contractors along with environmental awareness training at two year intervals and ongoing "toolbox" training for all permanent employees as required.

As the document owner, the Environment and Community Coordinator is the contact point for any person that does not understand this document or their specific requirements, and will provide guidance and training to any person that requires additional training regarding this management plan.

9 Audit and Review

9.1 Overview

This document shall be reviewed, and if necessary revised, within 3 months of the following:

- The submission of an Annual Review;
- The submission of an incident report related to matters of land management in accordance with Condition 6, Schedule 5 of MP 06_0311;
- The submission of an independent environmental audit; and
- Following any modification to the project approval.

Internal and external audits of this document will be carried out as described below. Internal and external audits shall be objective and if possible be conducted by a person or organisation independent of the document being audited.

Audits shall be carried out by personnel who have the necessary qualifications and experience to make an objective assessment of the issues. The extent of the audit, although pre-determined, may be extended if a potentially serious deviation from this document is detected.

Any audit non-conformances and/or improvement opportunities will have corrective and preventative actions implemented to avoid recurrence, these actions will then be loaded into the site incident database to ensure the actions are assigned to the relevant people and completed.

9.2 Internal Audits

Internal audits of this document and all other Environmental Management System documents are to be undertaken every three years. Improvements from the audit are to be incorporated in the site action database to ensure the actions are assigned to the relevant people and completed.

9.3 External Audits

External audits will be conducted utilising external specialists and will consider the document and related documents. External auditors shall be determined based on skills and experience and upon what is to be accomplished. External audits will be periodically at a frequency determined by the site General Manager, or in response to significant environmental incidents for which a systems failure has been determined as a contributor to the incident.

An Independent Environmental Audit will be undertaken every three years (or as otherwise required by the Department of Planning and Environment) by an audit team whose appointment has been endorsed by the Secretary of the Department of Planning and Environment.

Any actions arising from external audits will be loaded into the site actions database to ensure the actions are assigned to the relevant people and completed.

10 Records

Generally the Environment and Community Coordinator will maintain all Environmental Management System records, which are not of a confidential nature. Records that are maintained will include:

- monitoring data and equipment calibration;
- environmental inspections and auditing results;
- environmental incident reports;
- complaints management; and
- licences and permits.

All records are stored so that they are legible, readily retrievable and protected against damage, deterioration and loss. Records will be maintained for a minimum of four years or as otherwise required under any legislation, licence, lease, permit or approval.

11 Document Control

This document and all others associated with the Environmental Management System shall be maintained in a document control system which is in compliance with the site Document Control Standard and available to all personnel.

Any proposed change to this document will be via the document control administrator who is the only person able to access the controlled documents.

12 References and Associated Documents

AS/NZS ISO 14001:2004	Environmental management systems – Requirements with guidance for use
AS/NZS ISO 14004:2004	Environmental management systems – General guidelines on principles, systems and support techniques
EPL 191	Environment Protection Licence 191 issued 13 May 2015
MP 06_0311	Project Approval MP 06_0311 (as modified)

Department of Primary Industries 2014, *Noxious and environmental weed control handbook – A guide to weed control in non-crop, aquatic and bushland situations* 6th Edition

Department of Primary Industries (Biosecurity) 2015, *Weed species information, www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds*, viewed 28/01/2015

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URS 2013, *Report Mannering Mine Independent Environmental Audit*

Weeds Australia 2015, *Weeds of National Significance,* www.weeds.org.au/WoNS, viewed 28/01/2015

EMGA Mitchell McLennan, 2015, *Mannering Colliery – Modification 3 Environmental Assessment: Section 75W Modification to MP06_0311*.

NSW Rural Fire Service (RFS) 2006 *Planning for bush fire protection: a guide for councils, planners, fire authorities and developers.* NSW Government.

NSW Rural Fire Service, 2006, *Planning for Bushfire Protection.*

13 Acronyms

DP&E Department of Planning and Environment

DPI Department of Primary Industries

EA Environmental Assessment

EPL Environmental Protection License

LMP Land Management Plan

MC Mannering Colliery

SDS Material Safety Data Sheet

NSW New South Wales

OEH NSW Office of Environment and Heritage

VPPS Vales Point Power Station

WoNS Weeds of National Significance

WSC Wyong Shire Council

Appendix 1 Noxious Weeds

Information on this page is sourced from: http://www.dpi.nsw.gov.au/aboutus/about/legislation-acts/noxious-weeds

In New South Wales the administration of the *Noxious Weeds Act 1993* is the responsibility of the Minister of Primary Industries. The *Act* is implemented and enforced by the Local Control Authority (LCA) for an area, often local government. The *Act* imposes obligations on occupiers of land to control noxious weeds declared for their area.

Weed control classes and control measures

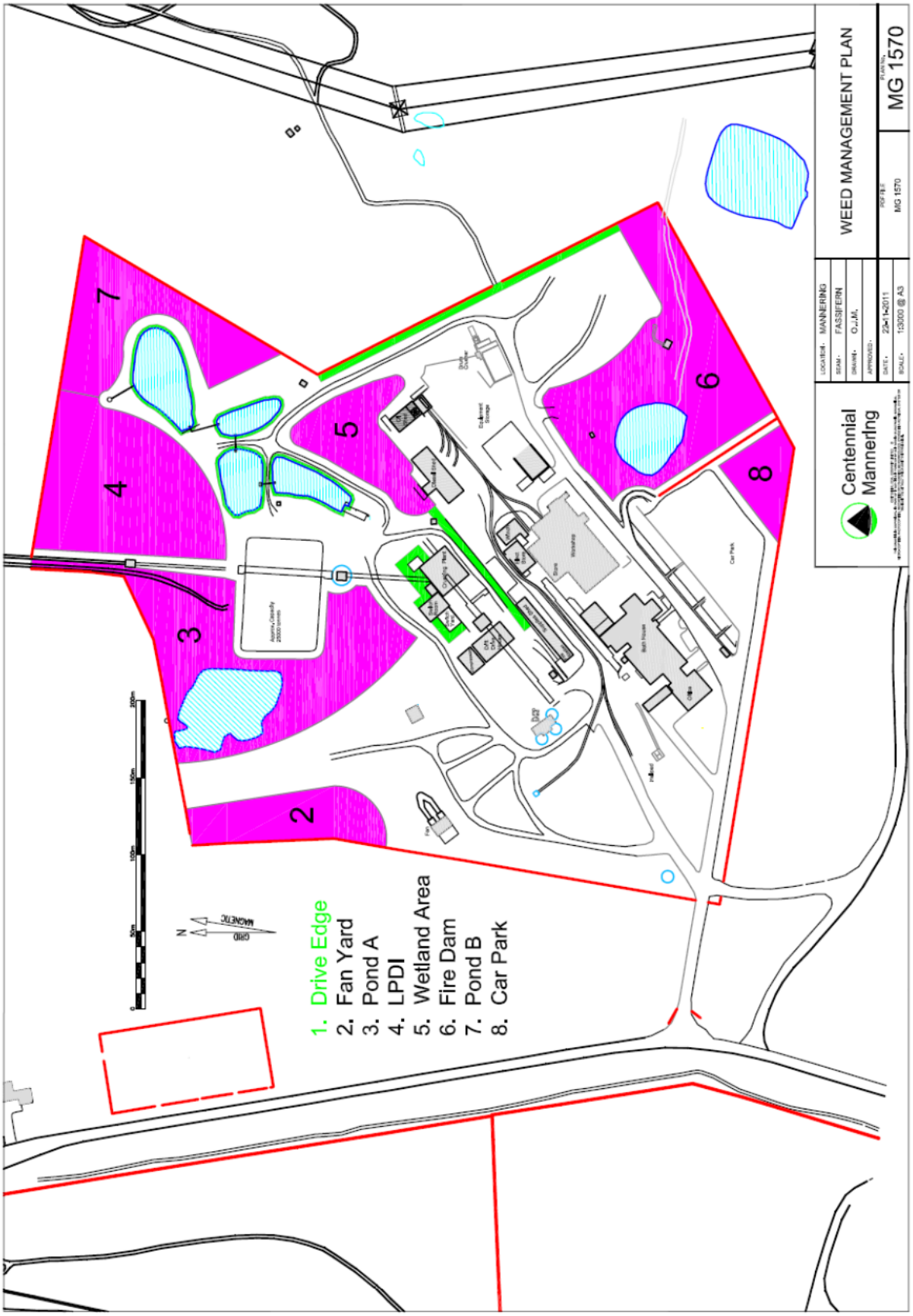
Control Class	Weed Type	Example control requirements
Class 1	Plants that pose a potentially serious threat to primary production or the environment and are not present in the State or are present only to a limited extent.	The plant must be eradicated from the land and must be kept free of the plant. The weeds are also “notifiable” and a range of restrictions on their sale and movement exist.
Class 2	Plants that pose a potentially serious threat to primary production or the environment of a region to which the order applies and are not present in the region or are present only to a limited extent.	The plant must be eradicated from the land and the land must be kept free of the plant. The weeds are also “notifiable” and a range of restrictions on their sale and movement exist.
Class 3	Plants that pose a potentially serious threat to primary production or the environment of a region to which the order applies, are not widely distributed in the area and are likely to spread in the area or to another area.	The plant must be fully and continuously suppressed and destroyed.*
Class 4	Plants that pose a potentially serious threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area.	The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction.*
Class 5	Plants that are likely, by their sale or the sale of their seeds or movement within the State or an area of the State, to spread in the State or outside the state.	There are no requirements to control existing plants of Class 5 weeds. However, the weeds are “notifiable” and a range of restrictions on their sale and movement exist.

* In some cases the following wording has also been inserted “the plant may not be sold, propagated or knowingly distributed.”

All Class 1, 2 and 5 weeds are prohibited from sale in NSW. Some Class 3 and 4 weeds are also prohibited from sale in NSW.

Prohibition from sale includes any barter, offer or attempt to sell, receive for sale, have in possession for sale, expose for sale, send, forward or deliver for sale or cause or permit to be sold or offered for sale, or sell for resale.

Appendix 2: Proformas


WEED MANAGEMENT PLAN
MG 1570
Centennial Mannering
1. Drive Edge
2. Fan Yard
3. Pond A
4. LPDI
5. Wetland Area
6. Fire Dam
7. Pond B
8. Car Park

Weed Monitoring Proforma

Date:	Data collectors:
Management zone:	

Weed species	Location (MGA 94) Easting	Northing	# plants	Area (m^2)	Recommended control measures

Feral animal

Date:	Data collectors:

Management zone:

Activity level 1 (no signs) to 5 (frequent signs)

Feral animal species	Location (MGA 94)		Activity level	Recommended control measures
	Easting	Northing		

Appendix 3: Detailed Weed Control Measures

Bamboo – *Bambusa* species

Non-chemical options: Physical removal will give best results.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	10 mL per 1 L of water.	Foliar application between 1 and 2 m tall.
	Glyphosate 360 g/L Roundup®	1 part glyphosate to 6 parts water	Cut stump method. Cut stems to 20 cm. Pour mixture down stem or wet cut.
PER9907	**Glyphosate** 360 g/L Roundup®	1 part glyphosate to 50 parts water	Spot spray. Spray regrowth up to 0.5 m only.
PER9907	**Glyphosate** 360 g/L Roundup®	1 part glyphosate to 1.5 parts water	Cut stump. Retreatment necessary.
PER14302	**Flupropanate** 745 g/L Tussock®	1 L in 100 L of water	Hand gun application

Bitou bush – *Chrysanthemoides monilifera* subsp. *rotundata*

Bitou bush is a Class 2 Regionally Prohibited Weed that must be reported to your local council weeds officer or to the NSW Invasive Plants & Animals Enquiry Line 1800 680 244. For more information see www.dpi.nsw.gov.au/weeds

Non-chemical options: Hand removal of young plants, encourage native regeneration and integrate the use of biological control agents. Fire can be effective, where practical.

	Chemical and Concentration	Rate	Comments
	Glyphosate 360 g/L Roundup®	5 or 10 mL per 1 L of water	Handgun or knapsack. Spray to wet all foliage. Apply at peak flowering to actively growing bushes during winter. Do not apply during periods of drought stress. Use the higher rate for plants over 1.5 m.
	Metsulfuron-methyl 600 g/kg Brush-off®	1 g/L + organosilicone penetrant	Gas gun/Splatter gun application. Apply as close as possible to the flowering stage.
	Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L of water	Spray to wet all foliage thoroughly.
	Glyphosate 360 g/L Roundup®	1 part per 29 parts water or 1 part per 19 parts water	Gas gun/Splatter gun application. Use the higher rate on bushes over 1.5 m
	Metsulfuron-methyl 63.2 g/kg + **Glyphosate** 760.5 g/kg Cut-out®	1 measured pack (95 g) per 100 L of water	Spray to wet all foliage thoroughly.
	2,4-D 300 g/L + **Picloram** 75 g/L Tordon® 75-D	650 mL per 100 L of water	Spray to wet all foliage thoroughly. Treat at flowering to fruiting stage.
	Picloram 44.7 g/L + **Aminopyralid** 4.47 g/L Vigilant II®	Undiluted	Cut stump application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .
	Metsulfuron-methyl 300 g/kg + **Aminopyralid** 375 g/kg Stinger™	20 g per 100 L of water	Spray to thoroughly wet all foliage.
PER12251	**Glyphosate** 360 g/L Roundup®	2 L /ha	Aerial boom spray applications. Refer to the critical use comments in the permit.
PER12251	**Metsulfuron-methyl** 600 g/kg Brush-off®	20–30g /ha	Aerial boom spray applications. Refer to the critical use comments in the permit.

Blackberry – *Rubus fruticosus* species aggregate

Non-chemical options: Slashing of juvenile bushes and the use of goats will give some control. Biological control agents are also available. Improve pastures with a vigorous perennial species. For more information visit www.dpi.nsw.gov.au/weeds

Chemical and Concentration	Rate	Comments
Triclopyr 200 g/L + **Picloram** 100 g/L Tordon® DSH	500 mL per 100 L of water	Late spring to autumn treatment. Use an adjuvant.
Glyphosate 360 g/L Roundup®	10–13 mL per 1 L of water	Flowering to leaf fall. Use higher rate on old, dense infestations.
Glyphosate 835 g/kg + **Metsulfuron-methyl** 10 g/kg Trounce®	1 measured pack (173 g) per 100 L of water	Apply from flowering until before leaf yellowing. Do not apply to bushes with mature fruit.
Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L of water	Apply when bushes are actively growing. Thoroughly wet all foliage and canes at commencement of flowering.
Metsulfuron-methyl 600 g/kg Brush-off®	1 g/L + organosilicone penetrant	Gas gun/Splatter gun application. Thoroughly wet all foliage and canes. Commence application at flowering as this indicates good growing conditions.
Picloram 44.7 g/L + **Aminopyralid** 4.47 g/L Vigilant II®	Undiluted	Cut stump application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .
Picloram 100 g/L + **Triclopyr** 300 g/L + **Aminopyralid** 8 g/L Grazon Extra®	350 or 500 mL per 100 L water	Treat in late spring to autumn. Use an adjuvant.
Metsulfuron-methyl 300 g/kg + **Aminopyralid** 375 g/kg Stinger™	20 g per 100 L of water	Spray to thoroughly wet all foliage, Uptake spray oil or Pulse pentrant should be added.
Hexazinone 250 g/L Velpar® L	Undiluted (4 mL per spot)	Bushes up to 1 m in height.
Picloram 20 g/kg Tordon® Granules	35–45 g /m^2	Apply granules over an area extending from main stem to 30 cm outside the drip line.
Triclopyr 600 g/L Garlon® 600	170 mL per 100 L of water	Late spring to early autumn. Actively growing bushes. Do not use under dry conditions.
Triclopyr 600 g/L Garlon® 600	280 L per 10 L of water	Gas gun/Splatter gun application. Good control will be achieved, similar to high volume application, where bush size enables good coverage of entire bush. The use of marking agent is recommended.
Triclopyr 300 g/L + **Picloram** 100 g/L Grazon® DS	350 or 500 mL per 100 L of water	Late spring to early autumn when bushes are actively growing. Use the higher rate on plants which have been damaged by grazing stock or insects.
Triclopyr 300 g/L + **Picloram** 100 g/L Grazon® DS	335 mL per 10 L of water	Gas gun/Splatter gun application. Apply to actively growing bushes.

Crofton weed – *Ageratina adenophora*

Non-chemical options: Well-managed and improved pastures will assist control.

Chemical and Concentration	Rate	Comments
Picloram 100 g/L + **Triclopyr** 300 g/L + **Aminopyralid** 8 g/L Grazon Extra®	350 mL in 100 L of water	Spring to autumn. Spray all foliage to point of run-off. Actively growing plants.
Triclopyr 300 g/L + **Picloram** 100 g/L Grazon® DS	350 mL per 100 L of water	Spring to autumn. Spray all foliage to point of run-off. Actively growing plants.
Fluroxypyr 333 g/L Starane™ Advanced	300 mL in 100 L of water	Apply to actively growing seedlings and young plants up to flowering.
Fluroxypyr 200 g/L Starane™	500 mL per 100 L of water	Apply to actively growing seedlings and young plants up to flowering.
Fluroxypyr 140 g/L + **Aminopyralid** 10 g/L Hot Shot™	700 mL in 100 L of water	Spot spray application. Apply to actively growing plants from October to April
Fluroxypyr 140 g/L + **Aminopyralid** 10 g/L Hot Shot™	1.5 L/ha	Boom spray application. Apply to actively growing plants from October to April
Metsulfuron-methyl 300 g/kg + **Aminopyralid** 375 g/kg Stinger™	30 g per 100 L of water	Folia spray to thoroughly wet the plants.
MCPA 340 g/L + **Dicamba** 80 g/L Kamba® M	190–270 mL per 100 L of water	Spray during active growth. For use in grass pastures.
MCPA 340 g/L + **Dicamba** 80 g/L Kamba® M	2.8–4.0 L/ha	Spray during active growth. For use in grass pastures.
2,4-D 300 g/L + **Picloram** 75 g/L Tordon® 75-D	650 mL per 100 L of water	For use in grass pasture when weed is actively growing.
Glyphosate 360 g/L Roundup®	500 mL per 100 L of water	Actively growing plants with full foliage.
Metsulfuron-methyl 600 g/kg Brush-off®	15 g per 100 L of water	Add surfactant. Thoroughly wet all foliage to point of run-off up to bud stage to prevent seed set.
Triclopyr 300 g/L + **Picloram** 100 g/L Grazon® DS	500 mL per 10 L of water	Gas gun/Splatter gun application. Apply to actively growing bushes.

Fireweed – *Senecio madagascariensis*

Non-chemical options: Pasture improvement and proper grazing management will assist with control.
For more information visit www.dpi.nsw.gov.au/weeds

	Chemical and Concentration	Rate	Comments
	Bromoxynil 200 g/L Bromicide®	1.4 L/ha	Boom spray. Seedling application. In pastures apply with low volume boom spray during autumn/winter when weeds are young and actively growing. Observe withholding period.
	Bromoxynil 200 g/L Bromicide®	2.8 L/ha	Boom spray. Early flowering application. In pastures apply with low volume boom spray during autumn/winter when weeds are young and actively growing. Observe withholding period.
	Picloram 100 g/L + **Triclopyr** 300 g/L + **Aminopyralid** 8 g/L Grazon Extra®	350 mL in 100 L of water	Apply as a thorough foliar spray
	Fluroxypyr 140 g/L + **Aminopyralid** 10 g/L Hot Shot™	500 mL in 100 L of water	Apply to flowering plants up to 30 cm tall
	Fluroxypyr 140 g/L + **Aminopyralid** 10 g/L Hot Shot™	1.5 L/ha	Treat seedling plants up to flowering
PER10462	**2,4-D amine** 625 g/L Amicide® 625	2–2.5 L/ha	Boom spray application
PER100146	**Metsulfuron-methyl** 600 g/kg Brush-off®	10 g in 100 L of water	Spot spray application
PER100146	**Metsulfuron-methyl** 600 g/kg Brush-off®	40 g/ha	Boom spray

Lantana – *Lantana* species

Lantana is a Class 2 Regionally Prohibited Weed that must be reported to your local council weeds officer or to the NSW Invasive Plants & Animals Enquiry Line 1800 680 244. For more information see www.dpi.nsw.gov.au/weeds

Non-chemical options: Manual control can be effective by slashing, burning or manual removal, integrated together with pasture improvement. Biological control research is continuing.

Chemical and Concentration	Rate	Comments
Picloram 100 g/L + **Triclopyr** 300 g/L + **Aminopyralid** 8 g/L Grazon Extra®	350 mL or 500 mL in 100 L of water	Wet thoroughly, use higher rate on large bushes, 1–2 m tall. Low rates for bushes up to 1 m tall. Apply from summer to autumn.
Triclopyr 300 g/L + **Picloram** 100 g/L Grazon® DS	350 or 500 mL per 100 L of water	Wet thoroughly, use higher rate on large bushes, 1–2 m tall. Low rates for bushes up to 1 m tall. Apply from summer to autumn.
Fluroxypyr 333 g/L Starane™ Advanced	300–600 mL per 100 L of water	Apply to actively growing bushes from October to April. Use lower rate on seedlings or bushes to 1.2 m high, higher rate on bushes over 1.2 m.
Fluroxypyr 200 g/L Starane™	500 mL or 1.0 L per 100 L of water	Apply to actively growing bushes from October to April. Use lower rate on seedlings or bushes to 1.2 m high, higher rate on bushes over 1.2 m.
Fluroxypyr 140 g/L + **Aminopyralid** 10 g/L Hot Shot™	500 mL per 100 L of water	Seedlings and regrowth 0.5–1.2 m height. Apply to actively growing plants.
Fluroxypyr 140 g/L + **Aminopyralid** 10 g/L Hot Shot™	700 mL per 100 L of water	Mature plants and regrowth 1.2–2.0 m. Apply to actively growing plants.
Metsulfuron-methyl 300 g/kg + **Aminopyralid** 375 g/kg Stinger™	20 g in 100 L of water	Hand gun application.
Triclopyr 600 g/L Garlon® 600	1.0 L per 60 L of diesel	Basal bark application for basal diameter less than 5 cm or cut stump application above 5 cm.
Glyphosate 360 g/L Roundup®	10 g metsulfuron-methyl plus 200 mL glyphosate per 100 L of water	Apply to bushes up to 2 m high. Thoroughly wet all foliage and stems. Add organosilicone penetrant.
Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L of water	Apply to bushes up to two metres tall. Spray to wet all foliage and stems. Re-treatment will be necessary.
2,4-D amine 625 g/L Amicide® 625	320 mL in a 100 L of water	Apply to actively growing bushes.
Picloram 44.7 g/L + **Aminopyralid** 4.47 g/L Vigilant II®	Undiluted	Cut stump application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .
Glyphosate 360 g/L Roundup®	1 part per 9 parts water	Gas gun/Splatter gun application. Apply 2 x 2 mL doses per 0.5 m of bush height
Triclopyr 240 g/L + **Picloram** 120 g/L Access™	1.0 L per 60 L of diesel	Basal bark or cut stump application.
Glyphosate 835 g/kg + **Metsulfuron-methyl** 10 g/kg Trounce®	1 measured pack (173 g) per 100 L of water	Apply when actively growing, thoroughly wet all foliage and stems. Do not apply during stress periods.
Glyphosate 360 g/L Roundup®	1.0 L per 100 L of water	Actively growing with full foliage. Avoid summer stress.
2,4-D 300 g/L + **Picloram** 75 g/L Tordon® 75-D	650 mL per 100 L of water	High volume spot spray. Thoroughly wet foliage and soil around the base of plant during March to May.
Dichlorprop 600 g/L Lantana 600®	1.0 L per 200 L of water	Spot spray application, completely wet all leaves and stems.

Pampas grass – *Cortaderia* species

Non-chemical options: Mechanical removal, wherever possible, is best.

Chemical and Concentration	Rate	Comments
Glyphosate 360 g/L Roundup®	1.0 or 1.3 L per 100 L of water	Actively growing plants, before flowering, spring to autumn. Use higher rate on plants over 1 m high.

Privet – broad-leaf – *Ligustrum lucidum*

Privet – broad-leaf is a Class 2 Regionally Prohibited Weed that must be reported to your local council weeds officer or to the NSW Invasive Plants & Animals Enquiry Line 1800 680 244. For more information see www.dpi.nsw.gov.au/weeds

Non-chemical options: Small plants and seedlings can be manually controlled.

Chemical and Concentration	Rate	Comments
Metsulfuron-methyl 600 g/kg Brush-off®	10 g per 100 L of water	Apply to bushes up to 3 m high; complete coverage is essential.
Metsulfuron-methyl 600 g/kg Brush-off®	1 g/L + organosilicone penetrant	Gas gun/Splatter gun application. Apply only to bushes up to 3 m high when in full leaf and actively growing. Thorough coverage is essential.
Metsulfuron-methyl 63.2 g/kg + **Glyphosate** 760.5 g/kg Cut-out®	1 measured pack (95 g) per 100 L of water	Apply to bushes up to 3 m high, in full leaf and actively growing; complete coverage is essential.
Triclopyr 600 g/L Garlon® 600	1.0 L per 12 L of diesel	Basal bark/cut stump application.
Triclopyr 240 g/L + **Picloram** 120 g/L Access™	1.0 L per 30 L of diesel	Basal bark/cut stump application.
Glyphosate 360 g/L Roundup®	Undiluted (1–2 mL per cut)	Stem injection technique, as per label.
Picloram 44.7 g/L + **Aminopyralid** 4.47 g/L Vigilant II®	Undiluted	Cut stump application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm .
Metsulfuron-methyl 300 g/kg + **Aminopyralid** 375 g/kg Stinger™	20 g per 100 L of water	Hand gun application.

Scotch thistle – *Onopordum acanthium*

Non-chemical options: Establish a strong, perennial, grass-based pasture. Grub single plants, removing at least 50 mm of root. There are also biological control agents available.

Chemical and Concentration	Rate	Comments
Clopyralid 300 g/L Lontrel®	250 mL in 100 L of water	Handgun application
Dicamba 500 g/L Kamba®	80 mL in 100 L of water	Handgun application