



WE CARE. WE DELIVER.

Environmental Management System

Rix's Creek Mine

Rix's Creek North

GLENNIES AND STATION CREEK RIPARIAN MONITORING and MANAGEMENT PROGRAM RIX'S CREEK NORTH

Doc No: Glennies and Station Creek Rehabilitation Management Strategy

Doc Owner: Environment Manager – the Bloomfield Group

Approval: Group Environmental Manager – The Bloomfield Group

Signed: C Knight

Date: 14/07/2020

Revision	Issue Date	Description	Originator	Reviewed	Approved
1.0	14/7/2020	Draft	Chris Knight	Chris Quinn	Chris Knight

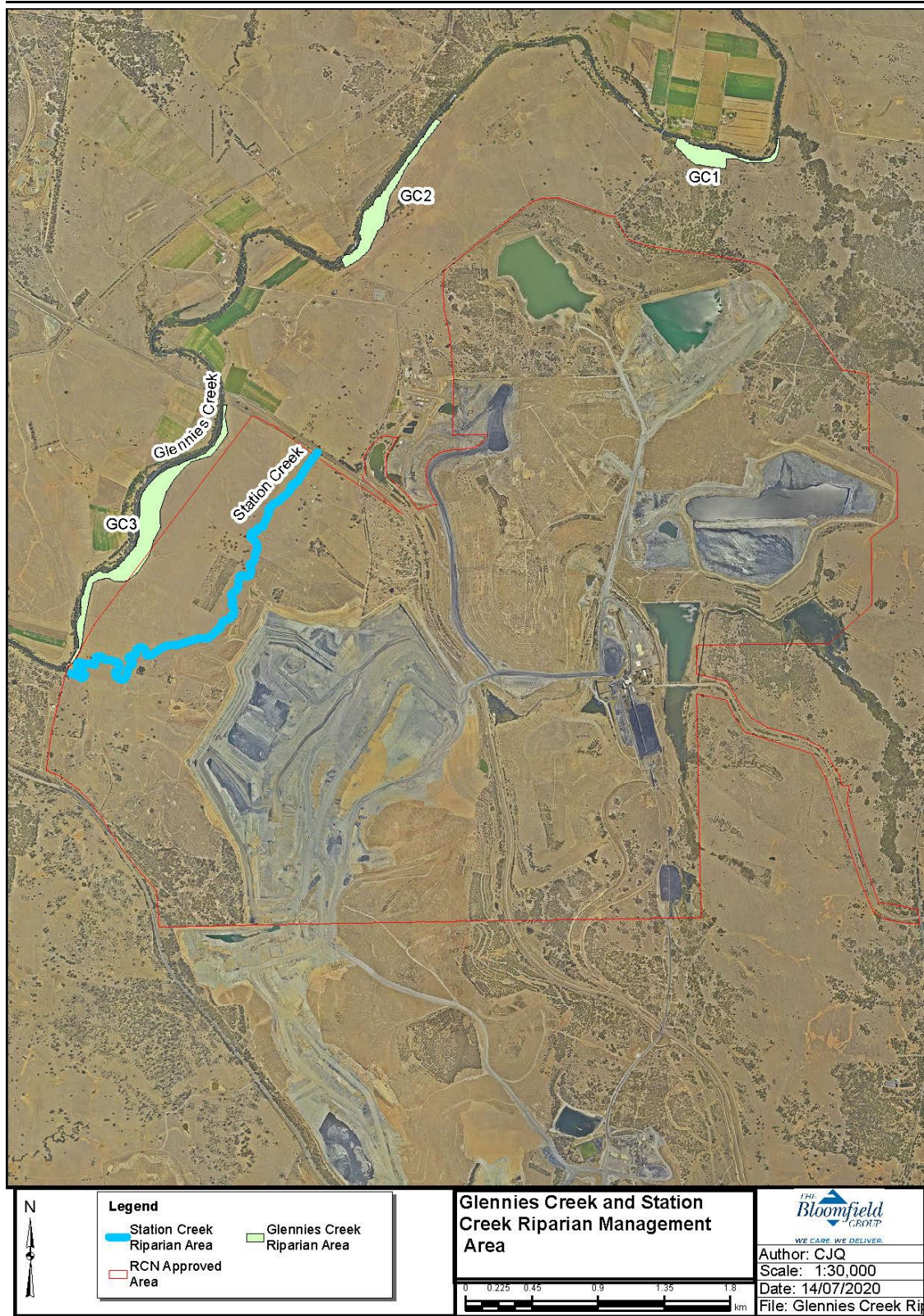
1. Introduction

Rix's Creek Mine is owned and operated by Bloomfield Collieries Pty Limited (Bloomfield). It is an open cut coal mine situated within the Singleton local government area, approximately 5 km north-west of Singleton in the Hunter Valley Coalfields of NSW. The Mine comprises the original Rix's Creek Mine, now known as Rix's Creek South (RCS) and the former Integra Open Cut Project Mine now known as Rix's Creek North (RCN). RCN was purchased by Bloomfield in 2015. RCS has been in continuous operation by Bloomfield since project commencement in 1990.

Glennies and Station Creeks are located to the North, North West and West of current mining operations at Rix's Creek North (Plan 1). The areas of Glennies and Station Creek have been highly modified since European settlement. The intent of this monitoring and management program is to assist in the repair of the riparian habitat area providing enhancement through rehabilitation with complementary planting, exclusion of grazing stock where appropriate and identifying and managing noxious weed infestations. This plan has been developed with the understanding that Glennies Creek is an actively migrating and meandering creek line with constant flows from the Glennies Creek Dam, and that Station Creek is an ephemeral stream only flowing during high rainfall periods.

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2. Legislative Requirements

The operations at Rix's Creek North are subject to the conditions contained in the Project Approval PA 08_0102 as modified. PA 08_0102 is granted under the Environmental Planning & Assessment Act 1979 (EP&A Act). This riparian monitoring and management program is required under Statement of Commitment E9 of the Project Approval. This commitment is shown in Table 1.

Table 1 – Riparian Monitoring Statement of Commitment

Rix's Creek North (PA 08_0102)	Condition	Relevant Section
SOC E9	<p>Subject to the receipt of all necessary approvals/permits, a creek rehabilitation program will be undertaken along Station and Glennies Creeks and will include</p> <ul style="list-style-type: none"> • erosion control, rubbish removal, complementary planting, weed control, habitat enhancement and exclusion of grazing stock from riparian zones; and • a monitoring and management program to identify and manage noxious weed infestations. 	This Program

In addition to the above on 10 June 2020 Rix's Creek Mine received a further direction from the NSW Department of Planning, Industry and Environment under Schedule 2, Condition 5 of PA 08_0102 requesting that the *"monitoring and management program also include measures to achieve riparian habitat enhancement and rehabilitation in relation to complementary planting and exclusion of grazing stock."*

This program has been developed to meet the requirements of the Statement of Commitment E9 and the above direction.

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3. Scope of Works

The intent of this monitoring and management program is to assist in the repair of the riparian habitat area providing enhancement through rehabilitation with complementary planting, exclusion of grazing stock where appropriate and identifying and managing noxious weed infestations.

This scope of works has been developed with the understanding that Glennies Creek is an actively migrating and meandering creek line with constant flows from the Glennies Creek Dam, and that Station Creek is an ephemeral stream only flowing during high rainfall periods.

TBG will implement the following works along the Glennies and Station Creek riparian area where owned by the Bloomfield Group;

- Debris removal such as previously dumped waste by others.
- Complementary planting
 - River Oak (*Casuarina Cunninghamiana*) immediately adjacent to streambed of Glennies Creek in order to assist with erosion.
 - Swamp Oak (*Casuarina Glauca*) at lower elevations adjacent to Glennies Creek on the floodplain.
- Annual weed surveys and monitoring which will inform the annual weed control programme.
- Removal of willow and other non-native species.
- Habitat enhancement including installation of nest boxes.
- Along Glennies Creek the riparian area has been fenced to exclude cattle. Crash grazing will be permitted as a means to consciously manage weeds within the area. Crash grazing will be consciously managed to allow native vegetation to regenerate and for erosion of areas to stabilise, while utilising the feed available in the area and controlling certain weeds. Areas where planting has occurred will be excluded from stock for at least two years before crash grazing is undertaken in accordance with recommendation by Catchment Management Authority Glennies Creek Rivercare plan (2005).
- Along station Creek areas of steep embankments and erosion have been fenced to exclude cattle. In accordance with CMA Rivercare Plan 2005, crash grazing will be permitted where required in these fenced areas for the control of weeds and will be monitored to ensure no further impact to the area occurs.
- Ongoing maintenance as required.
- If plant species are not available, other local sources and/or seed collection and propagation are to be investigated in accordance with the NSW Biodiversity Conservation Act (2016).
- The objective of the plantings along Station Creek and associated corridors is to assist in stabilisation of the floodplain and immediate stream bed area where steep embankments occur.
- TBG will include a section within the Annual Review to report on progress of the monitoring and management of the riparian areas along Glennies and Station Creeks owned by The Bloomfield Group.

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Glennies Creek Riparian Areas (GC)

TBG own a number of properties along Glennies Creek which are separated by private ownership. Three areas, Glennies Creek 1,2 and 3 have been defined as management zones as noted on Plan 1. The following sections detail proposed monitoring and management within the three areas of Glennies Creek and the one section of Station Creek located on land owned by TBG.

GC Area 1 East of Middle Falbrook Bridge Scope of Works: **Area includes creek frontage of Lot 3,4 &5 of DP 1215761.**

- Fencing to exclude stock– completed.
- Annual weed management assessment and action plan to ensure a significant reduction in weeds. Results and plan of treated areas to be reported in Annual Review report.
- Remove unused pump equipment. (Figure 1).
- Drill and fill invasive non-native poplar trees. (Figure 2).
- Spotted gum planting along floodplain completed. (Figure 3).
- Installation of nest boxes in trees above Maximum Flood Level.



Figure 1: unused pump and pipe equipment. GC Area 1.

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Figure 2: Poplar trees to be drilled and filled with poison. GC Area 1.



Figure 3: Successful Eucalypt (spotted gum) planting with ongoing weed management. GC Area 1.

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GC Area 2 West of Integra owned land and East of Lot 79 1161577 (Gardiner) Scope of Works:
Area includes creek frontage of Lot 93 DP 752442, Lot 1&2 606344.

- Fencing to exclude stock – completed.
- Annual weed management assessment and action plan to ensure a significant reduction in weeds. Results and plan of treated areas to be reported in Annual Review report.
- Drill and fill invasive non-native poplar trees and willows. (Poplar trees Figure 4, Willows Figure 5)
- Replanting of failed tubestock area with appropriate species. (Figure 4).
- Planting of 100 plants/ha in areas identified where ongoing bank erosion is a concern.
- Installation of nest boxes in trees above Maximum Flood Level.



Figure 4: Mostly unsuccessful planting with ongoing weed management. Background showing Poplar trees to be poisoned. GC Area 2.

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Figure 5: Willow trees to be poisoned and removed. GC Area 2.

GC Area 3 Scope of Works Area South of Great Northern Line to confluence of Station and Glennies Creeks.

Area includes Lot 2 DP 810309, Lot 70 & 71 DP 777661, Lot 2 DP 597205, Lot 2 DP 802596 & Lot G DP 37613

- Fencing to exclude stock completed.
- Annual weed management assessment and action plan to ensure a significant reduction in weeds. Results and plan of treated areas to be reported in Annual Review report.
- Drill and fill invasive non-native poplar trees and willows, poison invasive non-native bamboo. (Figure 6)
- Spotted gum planting along floodplain completed. (Figure 7).
- Installation of nest boxes in trees above Maximum Flood Level.

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Figure 6: Bamboo to be poisoned and removed. GC Area 3.



Figure 7: Successful spotted gum planting, note lack of weeds through ongoing maintenance. GC Area 3.

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Station Creek (SC) Riparian Areas

Implement the general requirements of the Glennies Creek Riparian Management Plan (SCS, 2010) on the Station Creek riparian areas and the associated corridors from Station Creek to Glennies Creek including re-vegetation, debris removal, weed management, fencing for partial exclusion of cattle for erosion control where steep banks or areas of erosion occur.

Scope of Works:

- Fencing to exclude stock in areas of steep banks and risk to erosion where required.- Completed. (Figure 8.-note grass coverage on banks).
- Annual weed management assessment and action plan to ensure a significant reduction in weeds. Results and plan of treated areas to be reported in Annual Review report.
- Planting of 100 plants/ha in areas identified where ongoing bank erosion is a concern. Areas to be determined and provided in Annual Report.
- Debris removal.
- Installation of nest boxes in trees above Maximum Flood Level.



Figure 8: Fenced areas of steep high banks along Station Creek.

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1.4 General Revegetation Notes

Native vegetation species, as outlined below in Table 1, contains species present within the proposed management areas (SCS, 2010).

Table 1: Native vegetation present within the proposed management area (SCS, 2010).

COMMON NAME	BOTANICAL NAME	PLANT TYPE
Common Maidenhair	<i>Adiantum aethiopicum</i>	Fern – Riparian
Giant Maidenhair	<i>Adiantum formosum</i>	Fern – Riparian
Rough Maidenhair	<i>Adiantum hispidulum</i>	Fern – Riparian
Tall Sedge	<i>Carex appressa</i>	Sedge – Riparian
Bergalia Tussock	<i>Carex longibrachiata</i>	Sedge – Riparian
Common Rush	<i>Juncus usitatus</i>	Rush – Riparian
Weeping Grass	<i>Microlaena stipoides</i>	Grass – Riparian
Basket Grass	<i>Oplismenus aemulus</i>	Grass – Riparian
River She-Oak	<i>Casuarina cunninghamiana</i>	Tree – Riparian
Swamp She-Oak	<i>Casuarina glauca</i>	Tree – Riparian
River Apple	<i>Angophora subvelutina</i>	Tree – Riparian
Grey Myrtle	<i>Backhousia myrtifolia</i>	Shrub – Riparian
River Bottlebrush	<i>Callistemon salignus</i>	Shrub – Riparian
White Mahogany	<i>Eucalyptus acmenoides</i>	Tree – Riparian
Forest Ribbon Gum	<i>Eucalyptus nobilis</i>	Tree – Riparian
	<i>Eplibium billardierianum</i>	Herb – Riparian
Grey Box	<i>Eucalyptus moluccana</i>	Tree
Sandpaper Fig	<i>Ficus Coronata</i>	Tree
Forest Red Gum	<i>Eucalyptus tereticornis</i>	Tree
Wireweed	<i>Polygonum aviculare</i>	Herb – Riparian
Common Buttercup	<i>Ranunculus lappaceus</i>	Herb – Riparian

Table 2 below contains weed species present throughout the proposed riparian management areas.

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Table 2: Weed species present within the proposed management area. (SCS, 2010).

COMMON NAME	BOTANICAL NAME	PLANT TYPE
Madeira Vine	<i>Anredera cordifolia</i>	Vine
Spiky Rush	<i>Juncus acctus</i>	Rush
Rush	<i>Juncus articulatus</i>	Rush
Onion Weed	<i>Asphodelus fistulosus</i>	Herb
Mother of Millions	<i>Bryophyllum delagoense</i>	Herb
Wandering Jew	<i>Tradescantia fluminensis</i>	Herb
Onion Grass	<i>Romulea rosea</i>	Herb
Cobbler's Pegs	<i>Bidens pilosa</i>	Herb
Saffron Thistle	<i>Carthamus lanatus</i>	Herb
Catsear/Flatweed	<i>Hypochaeris radicata</i>	Herb
Common Sowthistle	<i>Sonchus oleraceus</i>	Herb
Noogoora Burr	<i>Xanthium occidentale</i>	Herb
Prickly Pear	<i>Opuntia stricta</i>	Herb
Common Chickweed	<i>Stellaria media</i>	Herb
Large Plantain	<i>Plantago major</i>	Herb
Khaki Weed	<i>Alternanthera pungens</i>	Herb
Narrow-leaved cottonbush	<i>Gomphocarpus fruticosus</i>	Herb
Inkweed	<i>Phytolacca octandra</i>	Herb
Hexham Scent	<i>Melilotus indicus</i>	Herb
Narrow Carpet Grass	<i>Axonopus affinis</i>	Grass
Barnyard Grass	<i>Echinochloa crusgalli</i>	Grass
Barley Grass	<i>Hordeum leporinum</i>	Grass
Rye Grass	<i>Lolium rigidum</i>	Grass
Paspalum	<i>Paspalum dilatatum</i>	Grass
Kikuyu Grass	<i>Pennisetum clandestinum</i>	Grass
Phalaris	<i>Phalaris aquatica</i>	Grass
Poa annua	<i>Winter Grass</i>	Grass
Castor Oil Plant	<i>Ricinus communis</i>	Shrub
Crofton Weed	<i>Ageratina adenophora</i>	Shrub
Blackberry	<i>Rubus ulmifolius</i>	Shrub
Green Cestrum	<i>Cestrum parqui</i>	Shrub
African Boxthorn	<i>Lycium ferocissimum</i>	Shrub
Lantana	<i>Lantana camara</i>	Shrub
Purple Top	<i>Verbena bonariensis</i>	Shrub
White Poplar	<i>Populus alba</i>	Tree
Honey Locust	<i>Gleditsia triacanthos</i>	Tree
Willow	<i>Salix spp</i>	Tree
Large Leaved Privet	<i>Ligustrum lucidum</i>	Tree
Blue Morning Glory	<i>Ipomoea indica</i>	Vine

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Suggested Riparian Revegetation Species:

Tube stock will be sourced from a local supplier (where available) who is experienced in the production of native endemic long stem tubes. Table 3 below contains the trees for re-vegetating the riparian zone of Glennies and Station Creek. These species will form the next stages in the re-vegetation and further stabilisation of the management areas. The list has been restricted to species shown to be successful from recent plantings which are also consistent with immediate species surrounding the area. An initial re-vegetation planting density of 600 plants/ha has been suggested, once these species are established and weeds are controlled the diversity of riparian zone will be increased by natural germination of the native seed bank.

Table 3: *Riparian Re-vegetation Species.*

BANK POSITION	COMMON NAME	BOTANICAL NAME	PLANT TYPE
Lower	River She Oak	<i>Casuarina cunninghamiana</i>	Tree
Mid	Swamp She Oak	<i>Casuarina glauca</i>	Tree

VEGETATION MANAGEMENT: REVEGETATION:

a. Initial Planting:

- Site preparation (apply herbicide/ slash area and loosen soil),
- Supply and plant tubestock at 600 trees/ha fertiliser tablet,
- Supply and install tree guards and apply initial watering or use wetting agent.
- If flood expected remove all plastic tree guards.

b. Maintenance:

- Year 1: Watering (as required), herbicide treatments or slashing, check and replace tree guards.
- Ongoing: Herbicide treatments or slashing – target weeds and revegetation areas till mine closure or no longer required.

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4. Schedule of Works

The schedule of works and ongoing maintenance as outlined in section 1.3 will be completed on an annual basis and reported in the Annual Review report.

5. References

Catchment Management Authority, (2005). **Glennies Creek Rivercare Plan** (Glennies Creek Dam to Hunter River). Companion Booklet Version 1.0.

Soil Conservation Service (2010) **Glennies Creek Riparian Management Plan**, prepared for Integra Coal Operations, June 2010.

North Open Cut Environmental Assessment (NOC EA) (2007). **Glennies Creek Open Cut Coal Mine Environmental Assessment**, prepared by R.W. Corkery for Integra Coal Operations.

Open Cut Extension Environmental Assessment (OCE EA) (2009). **Integra Open Cut Project Environmental Assessment**, prepared by URS Australia for Integra Coal Operations, June 2009.

Underground Environmental Assessment (UG EA) (2009) **Proposed Integra Underground Coal Project**, prepared by ERM for Integra Coal Operations, July 2009.

6. Glossary

BMP – Biodiversity Management Plan

BOA – Biodiversity Offset Area

EP&A Act – *Environmental Planning and Assessment Act 1979*

BCD – Biodiversity Conservation Division of DPIE

TBG- The Bloomfield Group

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Rix's Creek Mine
Bloomfield Collieries Pty Ltd
Four Mile Creek Road
ASHTONFIELD NSW 2323

Attention: Chris Knight, Environment Manager

Via Email ONLY: cknight@bloomcoll.com.au; cquinn@bloomcoll.com.au

16/10/2020

Dear Mr Knight

**RIX'S CREEK NORTH (MP 08_0102)
GLENNIES CREEK AND STATION CREEK RIPARIAN REHABILITATION**

Reference is made to the Glennies and Station Creek Riparian Monitoring and Management Program (the program) for Rix's Creek North (v1.0 and dated 14 July 2020), submitted to the Department of Planning, Industry and Environment (the Department) to outline a program to achieve commitments under Statement of Commitment E9 of Project Approval MP 08_0102, as modified (the approval) for Rix's Creek North (the site).

The Department considers the program generally satisfies the requirements of Statement of Commitment E9 of the approval.

Please ensure a brief report on the condition of the riparian areas and the progress of works is reported in each Annual Review.

In accordance with Schedule 5, Condition 13 of the approval, please upload the most recent approved version of the program on the company website by 15 November 2020.

Should you need to discuss the above, please contact Ms Ann Hagerthy, Senior Compliance Officer, on (02) 6575 3407 or email to compliance@planning.nsw.gov.au

Yours sincerely

A handwritten signature in black ink that reads 'H Watters'.

Heidi Watters
Team Leader Northern
Compliance

As nominee of the Planning Secretary