Appendix T

Rehabilitation and Landscape Management Strategy Addendum

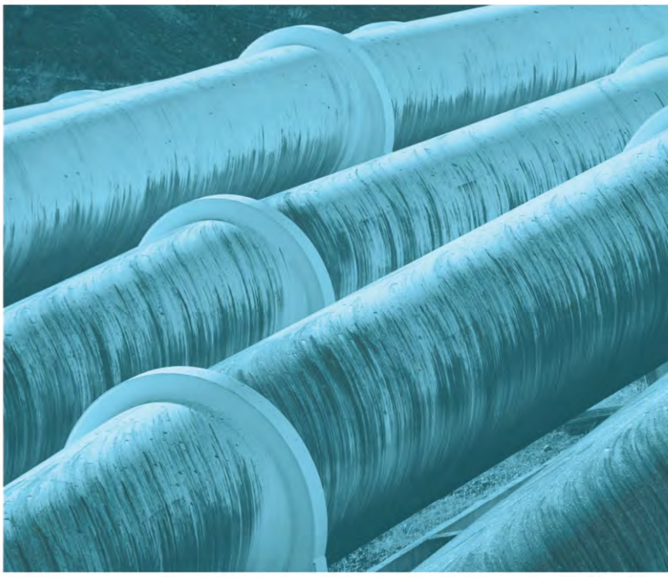
REGIS RESOURCES LTD

McPhillamys Gold Project

Amendment Report - Rehabilitation and Landscape Management Strategy Addendum

Prepared for LFB Resources NL

September 2020



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McPhillamys Gold Project

Amendment Report - Rehabilitation and Landscape Management Strategy Addendum

Report Number

RP1

Client

LFB Resources NL

Date

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Version

v2 Final

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2 September 2020

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2 September 2020

This report has been prepared in accordance with the brief provided by the client and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of the client and no responsibility will be taken for its use by other parties. The client may, at its discretion, use the report to inform regulators and the public.

Executive Summary

LFB Resources NL is seeking development consent for the construction and operation of the McPhillamys Gold Project (the project), a greenfield open cut gold mine and associated water supply pipeline in the Central West of New South Wales (NSW). The project is comprised of two key components:

- the mine site where the ore will be extracted and processed (ie the mine development); and
- an associated water pipeline which will enable the supply of water from near Lithgow to the mine site (ie the pipeline development).

The proponent, LFB Resources NL, is a 100% owned subsidiary of Regis Resources Limited (herein referred to as Regis).

The project is State significant development (SSD) pursuant to Schedule 1 of *State Environmental Planning Policy (State and Regional Development) 2011* (State and Regional Development SEPP). A development application (DA) and an environmental impact statement (EIS) were submitted to the NSW Department of Planning, Industry and Environment (DPIE) in 2019 under Division 4.7 of Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The DA and EIS were subsequently publicly exhibited from 12 September 2019 to 24 October 2019.

Following the public exhibition of the EIS, submissions were received from government agencies, special interest organisations and the general community. In response to issues raised in submissions, as well as a result of further detailed mine planning and design, Regis has made a number of amendments to the project.

This Rehabilitation and Landscape Management Strategy Addendum has been prepared to outline the changes to the project that have been made since the public exhibition of the EIS particularly relevant to rehabilitation and closure, and to provide an updated rehabilitation and closure strategy for the amended project.

While a number of changes have been made to the project, the development for which approval is sought remains largely the same as was presented in the EIS. No amendments have been made to a number of key aspects of the project, including mining and processing methods and the overall project life. As part of the project amendments, some small adjustments have been made to the site layout and disturbance footprint through the process of design optimisation, the general layout remains essentially the same to that presented in the EIS such that the key elements of the open cut pit, the Tailings Storage Facility (TSF) and the waste rock emplacement remain in the same location.

Key amendments to the project relevant to rehabilitation and closure include a change to the waste rock emplacement construction schedule and hence the sequence of progressive rehabilitation, and additional work undertaken to design a post-closure drainage system around the TSF.

No changes are proposed to the overarching rehabilitation objective of the project which is to restore the land as much as possible to its pre-mining land use at the end of its operational life; that is, primarily an agricultural land use comprising grazing on improved pasture while improving the biodiversity values of the area by re-establishing endemic open-woodland communities on the waste rock emplacement as part of the rehabilitation program. These are summarised in Table ES1 on the following page.

There is no change to the proposed rehabilitation and closure management measures for the amended project; however, there are minor changes to the areas covered by the post-mining land and soil capability (LSC) classes due to the amended project footprint. These are shown in Table ES2.

Table ES1 Proposed post mining land uses

EIS project						Amended project
Domain Number	**Primary Domain (Operational)**	**Description**	**Pre-mining LSC classes**	**Post-mining LSC classes**	**Reasons**	**Proposed changes**
1	Infrastructure Areas	Administration office and amenities, carparking, processing plant, process and maintenance buildings, workshop, stores, ROM pad, ore stockpiles, haul roads and access roads, powerlines and water pipelines	4, 5, 6	6	Infrastructure areas will have concrete foundations and slabs removed, any contamination remediated, the surface recontoured to form stable gradients and will be topsoiled. The presence of hardstand materials at depth will restrict the potential for cultivation however grazing will be able to be sustained at pre-mining levels.	Nil
2	Tailings storage facility	Tailings dam	4, 5	4	The capped tailings dam will be capable of sustaining grazing due to the depth of soil and slope of the final landform.	Nil
3	Water management areas	Clean water collection and diversion, primary water facility/dam, secondary water management facility/dam, water management facilities 1, 2, 3 and 4, raw water storage dam.	4, 5, 6	4,5,6	No change other than the clean water diversion that will be a geomorphologically stable watercourse with riparian vegetation.	The post-closure water management system has been revised as part of the amended project, particularly around the TSF. The number of water management facilities will change but no change in rehabilitation or closure measures.
4	Soil stockpiles	Topsoil stockpiles, subsoil stockpiles	4, 5, 6	4, 5, 6	No change	The area and location of soil stockpiles have changed; however, the post-mining land use remains the same for this domain.

Table ES1 Proposed post mining land uses

EIS project						Amended project
Domain Number	**Primary Domain (Operational)**	**Description**	**Pre-mining LSC classes**	**Post-mining LSC classes**	**Reasons**	**Proposed changes**
5	Waste rock emplacement	Waste rock, Out of pit disposal area	4,5, 6	6, 7	The batters of the waste rock emplacement will be unsuitable for grazing due to the slope. Whilst the top of the waste rock emplacement will have sufficient depth of soil to sustain grazing; in order to protect the encapsulated PAF material, to maximise the effectiveness of the store/release cover and to enhance biodiversity, the waste rock emplacement will be planted with Yellow Box - Blakely's Red Gum grassy woodland and Broad leaved Peppermint-Brittle Gum – Red Stringybark dry open forest. As such grazing would need to be limited to well managed occasional crash grazing.	The construction sequence of the waste rock emplacement has changed and the final footprint is slightly smaller at the northern end as a result of the revised waste schedule and associated storage requirements. In addition, an area to be used for TSF capping material has been added to the northern end of the waste rock emplacement (the trapezoidal shape shown in Figure 1.2).
6	Final void	Final void	4, 6	8	Other than the benches, the slopes in the final void limit any productive agricultural post-mine land-use. The final void will be bunded and fenced to prevent the entry of people and stock as it will be a non-managed area.	There is a very small change to the shape of the open cut pit as a result of design optimisation (it is 10m shallower, from 460 m in the EIS to 450 m). However, the final land use has not changed.

Table ES2 Change in LSC class areas over the life of the project

LSC Class	Capability	Pre-mining area (ha)	Post-mining area (ha) – EIS project	Post-mining area (ha) – amended project
Land with a wide range of uses (cropping, grazing, horticulture, nature conservation)				
1	Extremely high	0	0	0
2	Very high	0	0	0
3	High	0	0	0
Land with a variety of uses (cropping with restricted cultivation, pasture cropping, grazing, some horticulture, forestry, nature conservation)				
4	Moderate	932	920	929
5	Moderate-low	1492	1080	1081

Table ES2 Change in LSC class areas over the life of the project

LSC Class	Capability	Pre-mining area (ha)	Post-mining area (ha) – EIS project	Post-mining area (ha) – amended project
Land with a limited range of uses (grazing, forestry and nature conservation)				
6	Low	86	422	409
Land generally unable to support agriculture (selective forestry and nature conservation)				
7	Very low	4	21	29
8	Extremely low	0	71	66

After mining and upon completion of rehabilitation, there will be a small decrease of 3 hectare (ha) in LSC Class 4 land, and a 411 ha decrease of LSC Class 5 land, compared to the pre-mining landscape. The area of LSC Class 6 land will increase by 323 ha in the waste rock emplacement and mine infrastructure areas. There will also be an increase in LSC Class 7 land (by 25 ha) and an additional 66 ha of LSC Class 8 land, associated with the final void. Overall, compared to the EIS the amended mine development will result in less reduction in LSC Class 4 land, the area of LSC Class 5 remains essentially the same, less land becomes LSC Class 6, slightly more LSC Class 7 land will be established (associated with the clean water diversions post-mining), and the area of LSC Class 8 is slightly less, associated with the final void.

The soil balance completed as part of the Land and Soil Capability Assessment for the amended project (SSM 2020) indicates that, consistent with the EIS, there is adequate and suitable topsoil and subsoil available for stripping to construct the planned soil profiles required to achieve the nominated post-mining land uses.

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Figures

1 Introduction

1.1 Background

LFB Resources NL is seeking State significant development consent under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) to develop and operate a greenfield open cut gold mine, associated mine infrastructure and a water supply pipeline in Central West NSW. The project application area is illustrated at a regional scale in Figure 1.1. LFB Resources NL is a 100% owned subsidiary of Regis Resources Limited (herein referred to as Regis).

As shown in Figure 1.1, the McPhillamys Gold Project (the project) is comprised of two key components; the mine site where the ore will be extracted, processed and gold produced for distribution to the market (the mine development), and an associated water pipeline which will enable the supply of water from approximately 90 km away near Lithgow to the mine site (the pipeline development). The mine development is around 8 km north-east of Blayney, within the Blayney and Cabonne local government areas (LGAs).

Up to 8.5 Million tonnes per annum (Mtpa) of ore will be extracted from the McPhillamys gold deposit over a total project life of 15 years. The mine development will include a conventional carbon-in-leach processing facility, waste rock emplacement, an engineered tailings storage facility (TSF) and associated mine infrastructure including workshops, administration buildings, roads, water management infrastructure, laydown and hardstand areas, and soil stockpiles.

In accordance with the requirements of the EP&A Act, the NSW *Environmental Planning & Assessment Regulation 2000* (EP&A Regulation) and the Secretary's Environmental Assessment Requirements (SEARs) for the project, an Environmental Impact Statement (EIS) was prepared to assess the potential environmental, economic and social impacts of the project. The development application and accompanying EIS was submitted to the NSW Department of Planning, Industry and Environment (DPIE) and subsequently publicly exhibited. During this exhibition period Regis received submissions from government agencies, the community, businesses and other organisations regarding varying aspects of the project.

In response to issues raised in submissions received, as well as a result of further detailed mine planning and design, Regis has made a number of refinements to the project. Accordingly, an Amendment Report has been prepared by EMM Consulting Pty Ltd (EMM 2020a) to outline the changes to the project that have been made since the public exhibition of the EIS and to assess the potential impacts of the amended project, compared to those that were presented in the EIS. This report forms part of the Amendment Report and presents a revised Rehabilitation and Landscape Management Strategy for the amended project.

Further, this report considers the rehabilitation and closure strategy for the mine development component of the McPhillamys Gold Project. References to 'the project' throughout this report are therefore referring to the mine development only. Rehabilitation of the pipeline development component are addressed in the Amendment Report (EMM 2020a).

1.2 Project amendment overview

A summary of the key amendments to the project since the exhibition of the EIS are summarised below and described in detail in Chapter 2 of the Amendment Report (EMM 2020a):

- **Site access** – a new location for the site access intersection off the Mid-Western Highway is proposed, approximately 1 km east of the original location assessed in the EIS, in response to feedback from Transport for NSW (TfNSW, former Roads and Maritime Services) and the community. A new alignment is subsequently proposed for the site access road to the mine administration and infrastructure area.

- **Mine and waste rock emplacement schedule** – revision of the mine schedule and the subsequent construction sequence of the waste rock emplacement has been undertaken, in particular consideration of predicted noise levels in Kings Plains. This achieved a reduction in predicted noise levels at nearby residences while extending the construction timeframe for the southern amenity bund.

- **Pit amenity bund** – the size of the pit amenity bund has been reduced as a result of optimisation of the open cut pit design and the improved location of exit ramps for haul trucks.

- **Tailings Storage Facility (TSF)** – amendments to the design include changes to the embankment design and construction timing, the TSF footprint, and the TSF post closure landform.

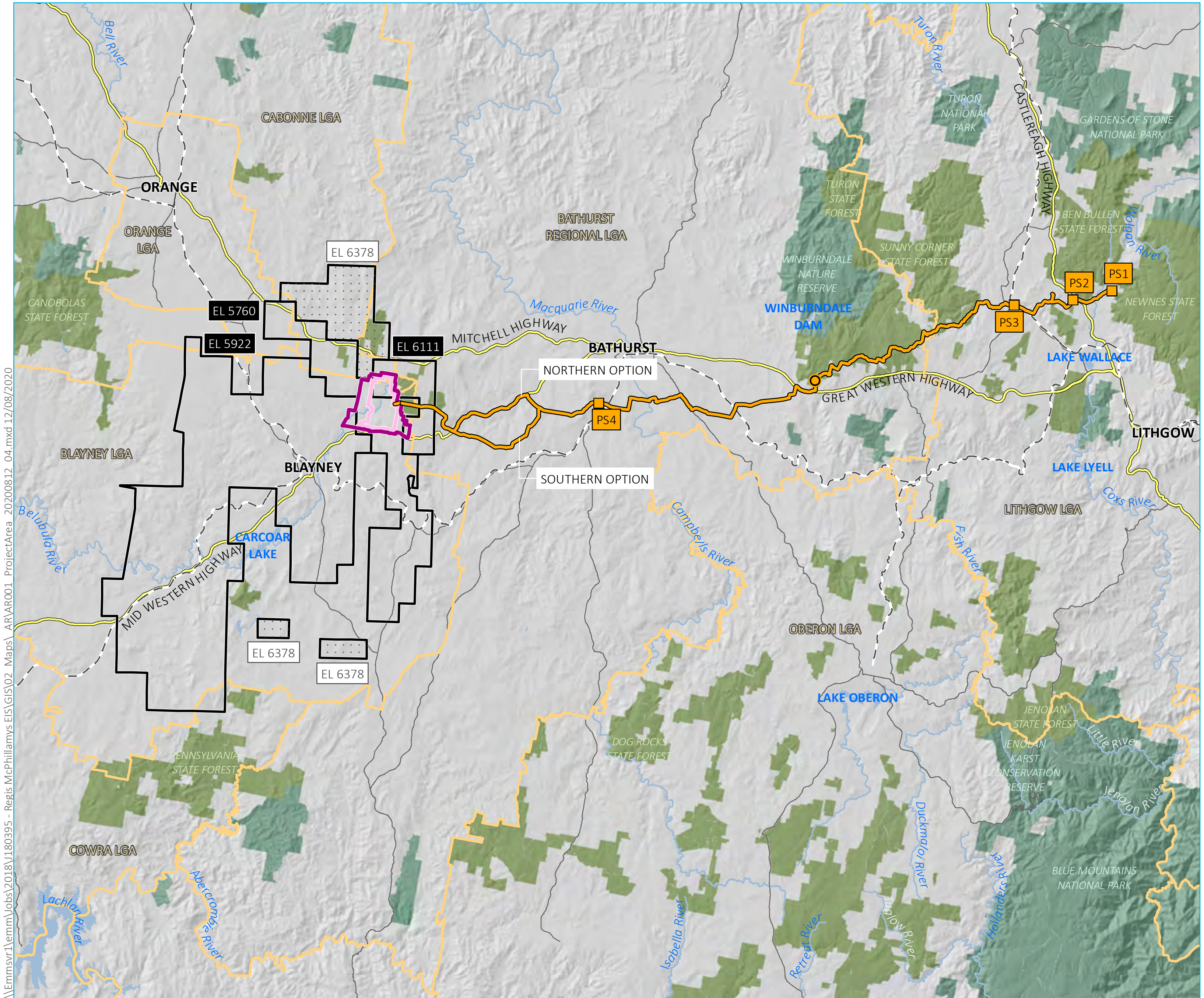
- **Water management system** – the secondary water management facility (WMF) has been removed from the water management system resulting in an avoidance of impacts to a potential item of historic heritage (MGP 23 - Hallwood Farm Complex (Hallwood)). The size of the WMFs has also been revised to achieve a reduced likelihood of discharge from the storages within the operational water management system as part of a revised nil discharge design.

- **Mine administration and infrastructure area** – the layout of this area has been revised and optimised.

- **Mine development project area** – a very small change has been made to the mine development project area along the eastern boundary (an additional 1 ha, or 0.04% change), to accommodate the required clean water management system. The change takes the project area from 2,513 hectares (ha) to 2,514 ha.

No amendments have been made to other key aspects of the project as presented in the EIS for which approval is sought, such as the proposed mining method, operating hours, annual ore extraction rate of up to 8.5 Mtpa, annual ore processing rate of up to 7 Mtpa, employee numbers, and rehabilitation methods and outcomes.

The amended mine development project layout, compared to that assessed in the EIS, is shown in Figure 1.2.



KEY

Project application area

- Mine development project area (2,514.06 ha)
- Mining lease application area (1,806.17 ha) (Note: boundary offset for clarity)
- Pressure reducing system
- Pumping station facility
- Pipeline

Existing environment

- Rail line
- Primary road
- Arterial road
- River
- Waterbody
- NPWS reserve
- State forest
- Local government area

Exploration lease boundaries (of interest)

- Held by LFB Resources NL (Regis)
- Held by others

Source: EMM (2020); Regis Resources (2020); DPE (2018); DFSI (2017); GA (2011)

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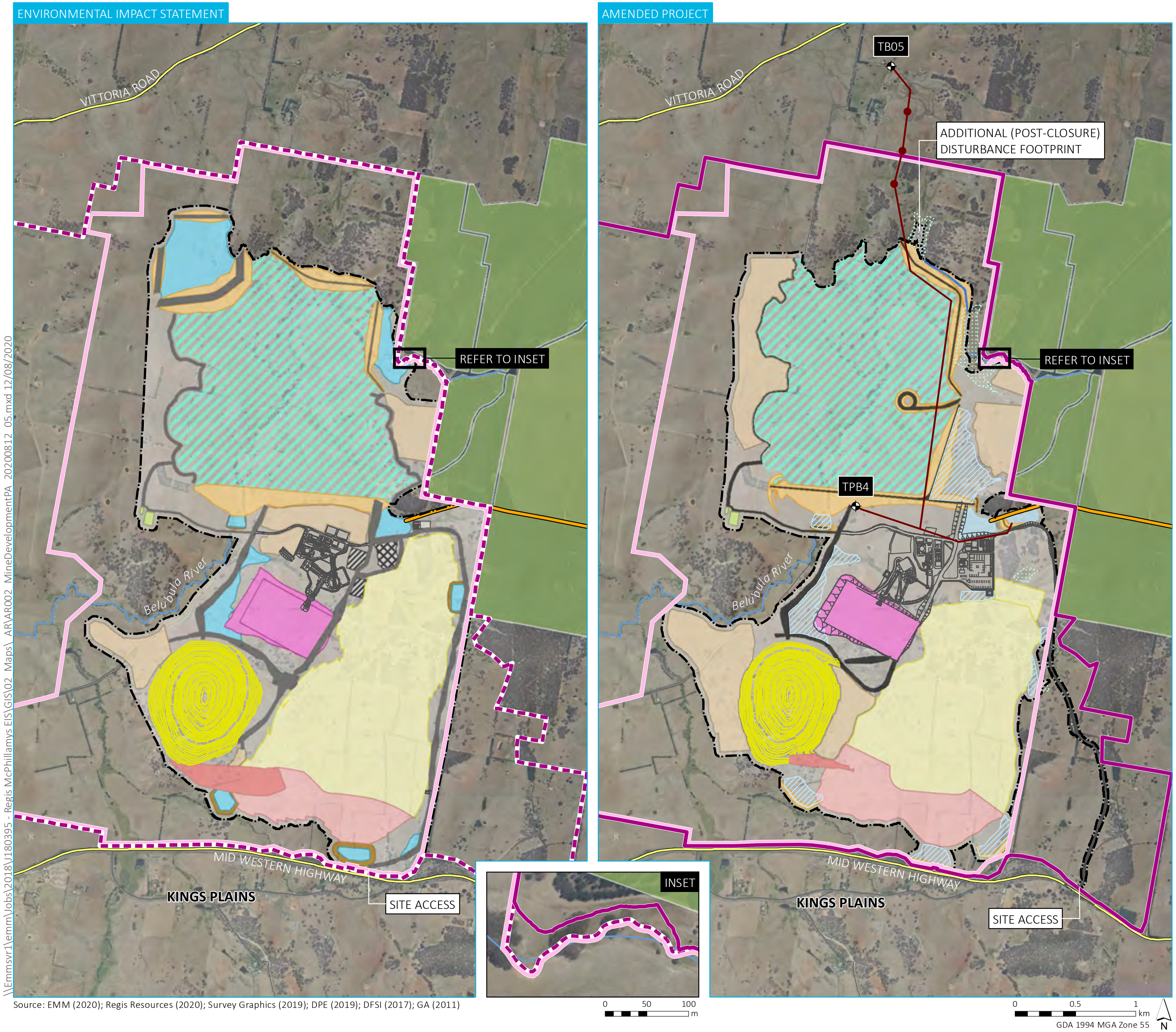
Regional setting – project application area

McPhillamys Gold Project
Amendment report – rehabilitation and landscape management strategy addendum
Figure 1.1



Source: EMM (2020); Regis Resources (2020); Survey Graphics (2019); DPE (2019); DFSI (2017); GA (2011)

Amended mine development layout

McPhillamys Gold Project
Amendment report – rehabilitation and landscape management strategy addendum
Figure 1.2

1.3 Purpose of this report

This report has been prepared to assess the potential rehabilitation and mine closure impacts of the amended project, and to present an updated rehabilitation and landscape management strategy. The assessment considers and outlines the differences in potential impacts associated with the amended project compared to the original project as presented in the EIS. In this way, it serves as an update to the McPhillamys Gold Project Rehabilitation and Landscape Management Strategy included as Appendix U of the McPhillamys Gold Project EIS (EMM 2019) (herein referred to as the EIS Rehabilitation Strategy).

1.4 Submissions on the EIS

A number of issues relevant to rehabilitation and post mining land use were raised in submissions received on the EIS from the Resources Regulator and the Environment Protection Authority (EPA). These issues have also been considered in this revised strategy. Detailed responses to all the submissions received are provided in the Submissions Report prepared for the project (EMM 2020b), which has been prepared in conjunction with the Amendment Report (EMM 2020a).

A summary of the key issues relevant to this assessment are provided in Table 1.1, together with how each matter has been addressed within this report.

Table 1.1 Key comments received in submissions from Resources Regulator, EPA and DPI Water relating to rehabilitation and closure, and how they have been addressed

Issue	Where addressed
Resources Regulator	
Issue 1 – Conceptual Final Landform Design Provide drawings at an appropriate scale of the waste rock emplacement (WRE) and ROM final landform including, but not limited to, the following: i. Plan view ii. Section views, including reference to surrounding natural topography and any other proposed landforms or infrastructure. iii. Contours including labels (where appropriate) iv. Dimensions and slopes v. Structures and materials	A plan view of the conceptual landform with the requested information is provided in Figure 4.7 and Figure 4.8. Sections views across the final landform are provided in Figure 4.9, Figure 4.10 and Figure 4.11.
b) In support of the drawings requested above, provide an overview of the key characteristics of the final landform for the TSF, WRE and ROM. Based on the characterisation of materials, the overview should include a discussion on capping strategies; the source of associated capping material and associated volumes that may be required; and measures that will be implemented to ensure a sustainable post-mining landform that is commensurate with the surrounding natural areas is achieved.	Sections 3.2.2, Chapter 4

Table 1.1 Key comments received in submissions from Resources Regulator, EPA and DPI Water relating to rehabilitation and closure, and how they have been addressed

Issue	Where addressed
Issue 2. Post mining land uses	
a) Grazing is identified as being part of the post mine land use. Additional information is required to demonstrate the land use will be effective and functional post-closure, including (but not limited to):	
i. Assess the capacity of the final landform to sustain grazing, including assessment of potential impacts of grazing to the integrity of rehabilitated landforms.	Section 3.2.2 and 4.1
ii. Outline measures that may be integrated into the final landform to support a functional grazing land use. Issues to address include accessibility to water (e.g. do dams need to be constructed), shelter for domestic stock and whether infrastructure may be required (e.g. fencing etc.) to support sustainable grazing practices.	Section 3.2.2 and 4.1
iii. Provide consideration of other post mine land use options that will ensure the sustainability of the rehabilitated landform in the long term. Currently based on the lack of detail provided, the Regulator is concerned whether grazing practices can be achieved on the final landform without compromising the long term integrity of the rehabilitation.	Section 4.1
b) Grass cover is proposed on the TSF but consideration of trees potentially naturally establishing on the TSF post-closure has not been provided. Provide an assessment of the TSF's ability to support tree establishment post-closure, including identification of potential impacts.	Section 4.2.3
Issue 3. Progressive Rehabilitation	
a) An indicative project schedule and diagrammatic representation of rehabilitation progression is provided. However, further information is required on the range of assumptions behind the life of mine rehabilitation schedule to determine whether opportunities for progressive rehabilitation have been maximised.	Section 4.2.2
Issue 4. Tailings Management	
b) more detail regarding final capping design including how final land use can be achieved with proposed capping and cover design since grass cover is proposed on the TSF but consideration of trees potentially naturally establishing on the TSF post-closure has not been provided.	Section 4.2.3

Table 1.1 Key comments received in submissions from Resources Regulator, EPA and DPI Water relating to rehabilitation and closure, and how they have been addressed

Issue	Where addressed
Environment Protection Authority	
The assessment of waste rock materials identifies 42% of the waste rock to be PAF material. The proposal is to contain the PAF within non-PAF rock cells which should seal the material off from contact with ground and surface waters and prevent impacts. There is no consideration of contingency outcomes regarding waste materials, for example how impacts to ground and surface water will be avoided if the percentage of PAF turns out to be significantly more than the modelled 42% and how this will impact closure and rehabilitation management actions. Recommendation: 6. The proponent revises the assessment to include scenario modelling that accounts for contingency outcomes such as impacts from PAF to surface waters during the operational, closure and final landform phases of the project.	Section 3.2.1
DPI Water	
DPIE Water: The rehabilitation strategy presented in Appendix U of the Environmental Impact Statement does not address loss of available aquatic habitat, or propose any replacement habitat or rehabilitation of rivers on the McPhillamys mine site that will not be mined or buried. The approach to managing watercourses, and remediation strategy for impacted watercourses located on the McPhillamys mine site and on land under Regis Resources control requires improvement.	Section, 4.3.3
The proponent needs to demonstrate a strategic approach to riverine reconstruction which mimics pre-disturbance geomorphic processes and river types. This should generally follow the strategy outlined in A Rehabilitation Manual for Australian Streams by Rutherford, Jerie and Marsh Cooperative Centre for catchment Hydrology, LWRRDC Canberra 2000.	Section.4.3.3
We require further information about site rehabilitation such as: • the reconstruction of watercourses crossing the post-mine landform	Section.4.3.3
• explanation about the application of the mining landform models such as SIBERIA mentioned in the EIS,	Section.4.2.2
• drainage density or conveyance of flow south west from Vittoria State Forest to the undisturbed Belubula River	See surface water addendum report
The procedures proposed for environmental monitoring of watercourses, flow alterations and geomorphic risks also require more explanation. The EIS (Appendix J ss 5.2-5.4) lacks any details as to timing, frequency, locations and justification for monitoring watercourse condition.	See surface water addendum report
Inspection and response to water management and erosion control structures on the site requires a longer term monitoring, maintenance and rehabilitation period than the two year period nominated by the applicant. Monitoring and maintenance periods should extend until vegetation is established and sediment transfer and channel geomorphic features are functioning. This usually requires a minimum ten year period commitment.	Section 4.3.3 (SW report inspection and monitoring aspects needs to be consistent with the rehab monitoring strategy (analogue sites, completion criteria etc).

2 Rehabilitation domains

2.1 Overview

The mine development project area (refer to Figure 1.2) presented in the EIS was divided into a series of primary closure domains, with each domain having similar bio-physical characteristics. These domains were assigned in accordance with the requirements of the Department of Trade and Investment's guideline *ESG3: Mining Operations Plan (MOP) Guidelines* (September 2013) (the MOP guidelines), so that they can be easily transferred into the MOP when it is prepared post-approval. These domains remain the same for the amended project, other than minor area adjustments associated with some layout/design changes, as discussed in the following sections.

2.2 Primary domains

Primary domains (as defined in the MOP guidelines) are based on land management units within the project area, usually with a unique operational and functional purpose during operation and therefore have similar characteristics for managing environmental issues. The primary domains form the basis of conceptual rehabilitation and project closure planning for this strategy. The primary domains that have been identified for the project (and remain unchanged for the amended project), in accordance with the MOP guidelines are:

1. Infrastructure area
2. Tailings storage facility
3. Water management area
4. Waste rock emplacement
5. Soil stockpiles
6. Open cut void

The primary domains for the amended project are illustrated in Figure 2.1, and the extent of disturbance per primary domain is presented in Table 2.1. A comparison of the area covered by the primary domains presented in the EIS, compared to the amended project, is provided in Figure 2.2. An overview of the decommissioning and rehabilitation activities to be carried out in each primary domain is described in Section 4.3 of the EIS Rehabilitation Strategy.

Table 2.1 Surface Infrastructure disturbance by primary domain

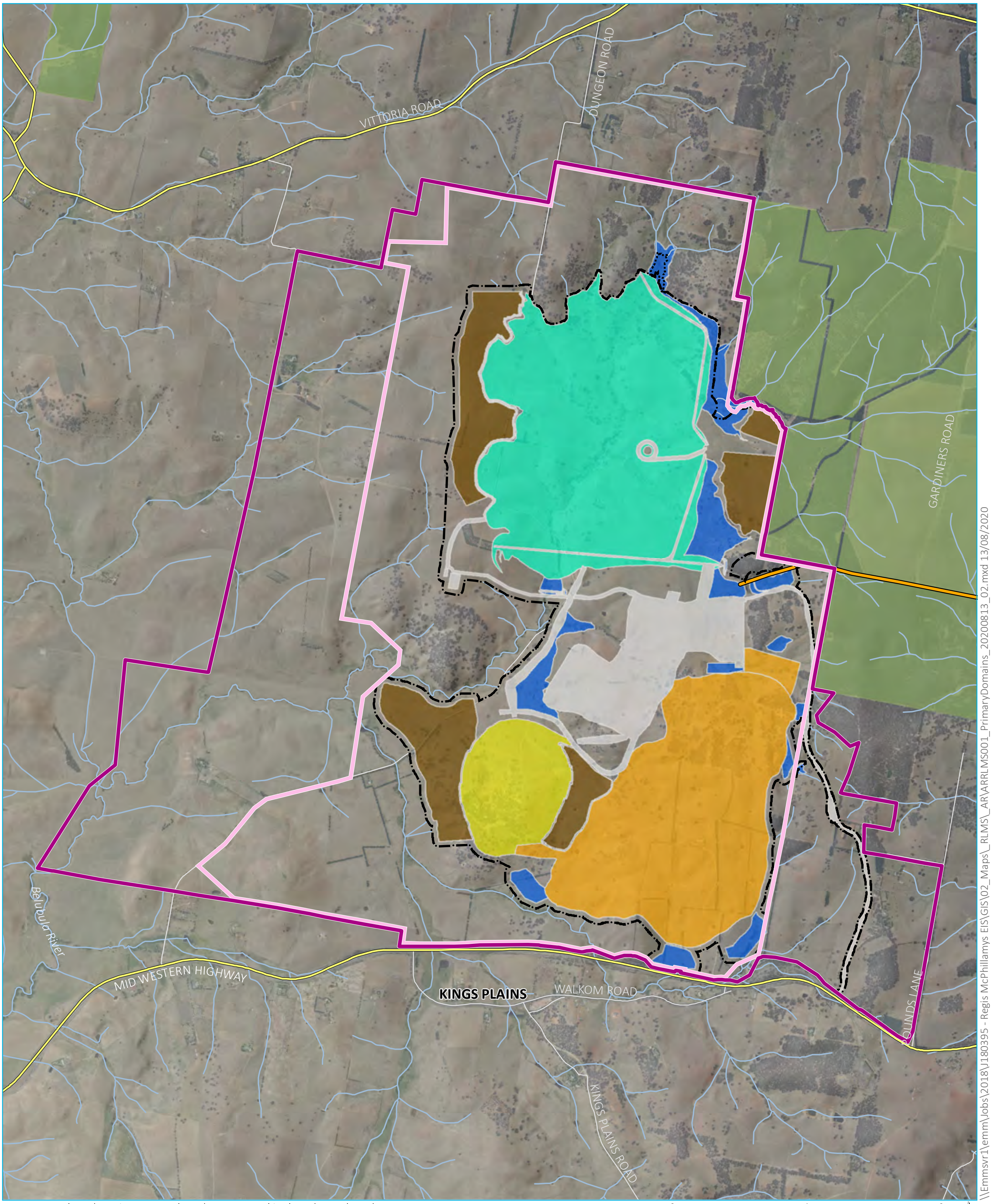
	EIS Rehabilitation Strategy		Amended project		
Primary domain	**Project element**	**Area (ha)**	**Project element**	**Area (ha)**	**Change (ha)**
1. Infrastructure areas	Ore handling and Processing Crushing circuit Processing Plant (Carbon in Leach) Water Treatment Plant Run of Mine (ROM) stockpiles General infrastructure Access roads and haul roads Offices, bathhouse, carpark, workshop, stores Temporary construction facilities Utilities (power line, water pipelines)	137	Small change in area due to optimisation of the layout, allowing better use of natural topography for shielding of this area. No change to the final landform other than some amendments to the ROM landform to achieve a more geomorphic profile.	123	-14
2. Tailings storage facility	Tailings storage facility (TSF)	294	Small change in area and layout (primarily related to the surface water drainage system).	299	5

Table 2.1 Surface Infrastructure disturbance by primary domain

	EIS Rehabilitation Strategy		Amended project		
Primary domain	Project element	Area (ha)	Project element	Area (ha)	Change (ha)
3. Water management areas	Water management facilities (WMF), including: - Raw WMF - Primary WMF - Secondary WMF - Clean WMF - Site runoff WMFs TSF seepage interception water storage facility TSF clean water diversion	85	Primary WMF renamed the Site runoff WMF. The Secondary WMF has moved from the north-west to the south-east of the TSF and renamed the Main WMF. TSF clean water diversion flow path changed for more stable gradient and river entry, and to facilitate appropriate drainage from and around the TSF at post closure.	69	-16
4. Waste rock emplacement	Waste rock emplacement including the pit amenity bund	270	The overall shape, size and height of the waste rock emplacement broadly remains the same as that proposed in the EIS, with the exception of a reduced footprint at the northern end, as a result of the revised waste schedule and associated storage requirements. In addition, an area to be used for TSF capping material has been added to the northern end of the WRE (the trapezoidal shape shown in Figure 1.2).	243	-27

Table 2.1 Surface Infrastructure disturbance by primary domain

	EIS Rehabilitation Strategy		Amended project		
Primary domain	**Project element**	**Area (ha)**	**Project element**	**Area (ha)**	**Change (ha)**
5. Soil stockpiles	Subsoil stockpiles for capping and amelioration to growing media Topsoil stockpiles	55	Location of some stockpiles changed and increased area.	123	68
6. Open cut void	Void	71	Change in the exit ramp design, primarily to reduce noise impacts, resulting in a small area reduction.	66	-5



Source: EMM (2020); Regis Resources (2020); Survey Graphics (2019); DFSI (2017)

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KEY

Project application area

- Mine development project area
- Mining lease application area (Note: boundary offset for clarity)
- Disturbance footprint
- Additional (post-closure) disturbance footprint
- Pipeline

Primary domains

- 1. Infrastructure area
- 2. Tailings storage facility
- 3. Water management area
- 4. Waste rock emplacement
- 5. Soil stockpile
- 6. Open cut void

Existing environment

- Major road
- Minor road
- Watercourse/drainage line
- Vittoria State Forest

Primary domains

McPhillamys Gold Project
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Figure 2.1

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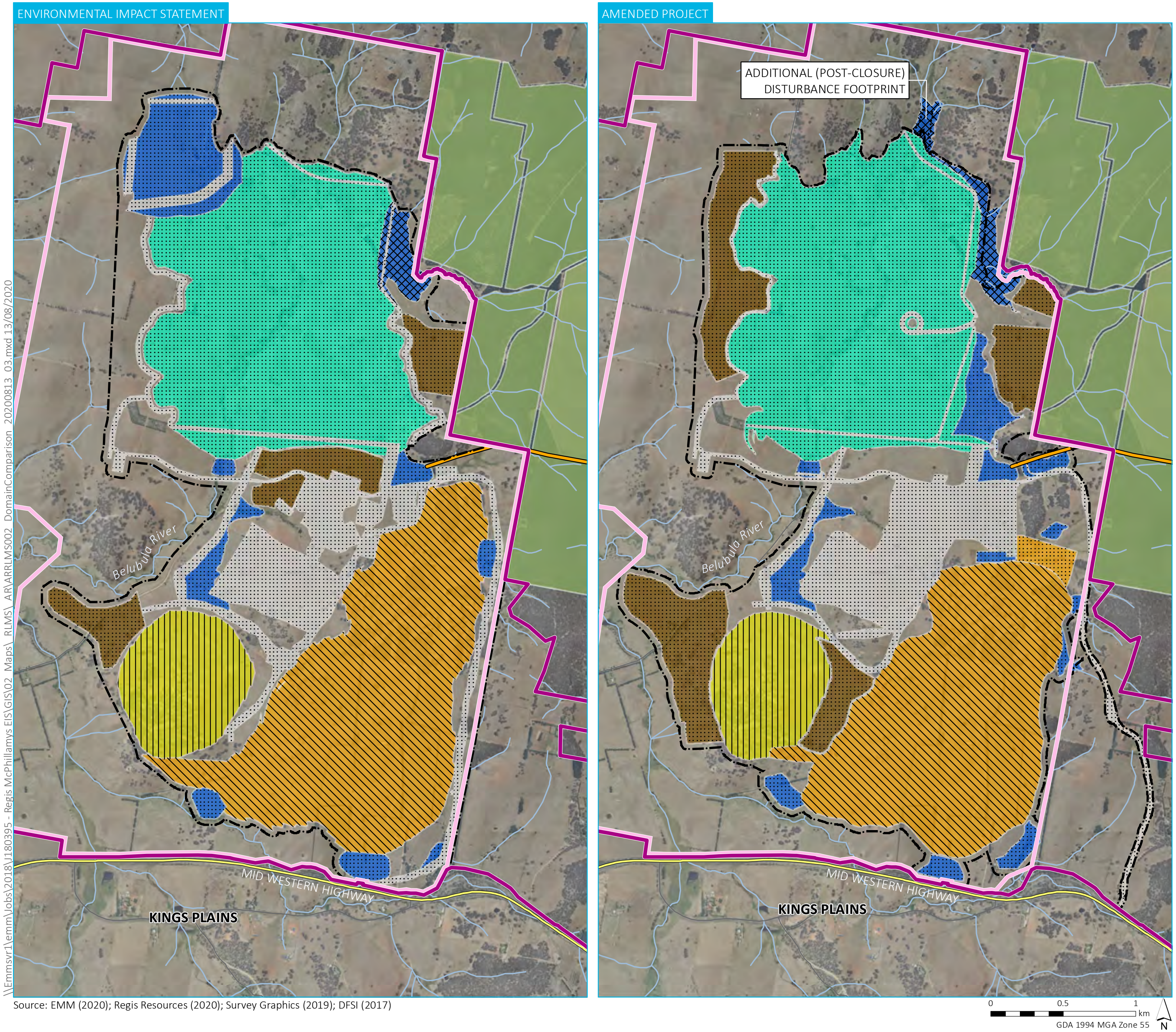
EMM creating opportunities



KEY

Project application area
- Mine development project area
- Mining lease application area (Note: boundary offset for clarity)
- Disturbance footprint
- Pipeline

Primary domains
- 1. Infrastructure area
- 2. Tailings storage facility
- 3. Water management area
- 4. Waste rock emplacement
- 5. Soil stockpile
- 6. Open cut void

Secondary domains
- B - Riparian vegetation
- D - Pastures
- E - Open woodland and open forest
- I - Final void

Existing environment
- Major road
- Minor road
- Watercourse/drainage line
- Vittoria State Forest

Amended primary and secondary domains compared to EIS

McPhillamys Gold Project
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Figure 2.2

Source: EMM (2020); Regis Resources (2020); Survey Graphics (2019); DFSI (2017)

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3 Environmental and socio-economic risk management

3.1 Overview

Identifying environmental, social and economic risks associated with rehabilitation and closure is essential for effective closure planning.

The key risks associated with rehabilitation and closure as discussed in Chapter 3 of the EIS Rehabilitation Strategy remain applicable to the amended project and include:

- potential for long term acid rock drainage due to the geochemistry of the ore and waste rock;
- not achieving the agreed post mining land and soil capability (LSC) classes on rehabilitated lands and post mine land uses;
- erosion and sediment control;
- noise and dust;
- weeds;
- hydrocarbons, chemicals and wastes;
- bushfire; and
- socio-economic considerations.

Additional commentary on these risks where applicable due to amended elements of the project is provided below. Further information is also provided on the management of the risk of potentially acid forming (PAF) material, as raised in the EPA submission (refer to Section 3.2.1) and the achievability of a grazing post-mining land use (refer to Section 3.2.2), as raised in the submission by the Resources Regulator.

3.2 Environmental risk

3.2.1 Geochemistry and geotechnical stability

i Management of PAF material

Detailed characterisation of the McPhillamys ore body, waste rock and tailings was undertaken by SRK (2019) to guide the design of the waste rock emplacement and the tailings storage facility. The results were used to interpret what material would potentially generate acid if exposed to air (ie PAF) and what material has capacity to neutralise the acid (ie not acid forming material, or NAF). Samples from the ore material in the centre of the open cut and of the tailings reported the greatest proportion of PAF material. A significant portion of the samples tested at the laboratory were unclassified (uncertain, UC) in terms of their acid generation meaning that these samples tend to exhibit acidic and neutralising properties. The pH of the samples when mixed with pure water were near neutral, with some samples reported to have minor amounts of sulphide-sulphur which may oxidise to generate a small amount of acid, and some others having slower reacting neutralising minerals that may exceed the acid producing capacity.

Based on the sampling locations, the laboratory results were used to create a three-dimensional representation of the geochemical properties of material that will be excavated during mining (ie PAF, NAF and UC material). This model representation showed that the majority of the acid forming material is spatially and geologically related to the ore body, and that in the eastern and western parts of the open cut the material has capacity to neutralise part or all of the acid. To help with the mine planning, the central zone from where the majority of the PAF samples were collected were defined as a PAF 'shell' and it was estimated that 42% of the waste rock material would originate from this zone. The material within this PAF 'shell' consists of PAF, UC and some NAF material, but it was conservatively assumed that all material within this zone would be classified as PAF. The resulting material balance showed that sufficient NAF material is available to encapsulate a mixture of acid forming and non-acid forming material from the PAF 'shell' even under this conservative assumption.

Based on the model, it is estimated the PAF mixture that will make up 42% of the waste rock consisting of 27% PAF and 15% UC material. The laboratory results also suggest that NAF and UC material is present within manageable sub-zones of the PAF 'shell' and there is an opportunity to decrease the amount of excavated waste rock which contain PAF material. Regis will implement a field-testing program to distinguish PAF material from NAF material during operations, and operational management measures will be implemented to separate the identified PAF material. The testing technique will be designed based on existing laboratory results and will provide results on a rapid turnaround time such that the proportion of PAF material in the waste rock will decrease to less than 42%. This procedure will therefore reduce the volume of PAF material that requires encapsulation and increase the volume of NAF material available to construct the PAF encapsulation cells. In summary, the 'worst case' scenario was adopted in the mine plan, and consideration of other scenarios would result in less PAF material that requires encapsulation.

During operations PAF rock will be mined from the open cut pit as either ore or waste. Ore will be trucked to the ROM pad for temporary stockpiling prior to processing and waste PAF material will be trucked to the PAF cells primarily in the waste rock emplacement (WRE) for disposal. Tailings will be piped to the TSF for disposal.

ii Tailings storage facility design

The key risks generally associated with TSFs are:

- acidic and metalliferous seepage from the TSF;
- capillary rise of metals into the capping layer(s);
- inadequate geotechnical strength within the tailings to support the placement of the capping layers; and
- inadequate quantities of materials to cap the tailings.

The TSF layout has been revised for the amended project, primarily to further enhance the robustness of the TSF landform in terms of surface water management during operations and post-closure. Notably however, the design principles which apply to the TSF for the amended project remain the same to those presented in the EIS. The expected maximum height and combined length of the main TSF embankment is 49 m and 3,600 m, respectively. The expected ultimate inundation footprint of the TSF is approximately 273 ha, containing up to 47 Mm^3 of tailings, with storage for over 5,000 ML of water. The rate of rise of tailings will approach 20 m/year in the first year, with an average rate of 2.5 m/year, and <2 m/year towards the end of the mine life (Williams 2020). The general layout of the revised TSF is shown in Figure 3.1.

Other features of the TSF are sufficient storage to accommodate the rate of rise of tailings, a decant structure to recover process water, a downstream seepage sampling and recovery system, an emergency spillway to safely convey extreme flood inflows, a clean runoff collection and diversion system upstream, and a TSF runoff interception system downstream. Notably, the location of the TSF in the headwaters of the Belubula River minimises the impact on clean rainfall runoff and the need for its diversion. As shown in Figure 1.2 the decant structure has been moved from the original proposed location on the western side of the TSF, to a central location on the eastern extents of the TSF.

Average embankment downstream slopes of 4 horizontal (h) to 1 vertical (v) and upstream slopes of 2(h):1(v) and a crest width of 15 m provide more than adequate steady state geotechnical stability, as described in the Revised TSF Review Report (ATC Williams 2020), and in the expert review reports prepared by CMW Geosciences and Dr David Williams (included in the ATC Williams (2020)). The extreme (1:10,000-year) earthquake loading is estimated using conservative (pseudo-static) methods to result in instability, resulting in insignificant permanent deformation, insufficient to cause the release of water or tailings (Williams 2020). The expert review report by Dr David Williams (2020) noted that:

> [Regis and their consultants] approach has been to select the optimal upper catchment siting for the TSF, and the optimal disposal method for the site of thickened tailings. They have adopted the most conservative 'Extreme' basis of design, conservative design parameters, and downstream construction of the embankment. Under this conservative approach, they have proposed a very stable tailings embankment, with a margin of stability well in excess of that required by the governing Guidelines that will be maintained throughout operations and post-closure.

Stage 1 (starter) construction of the TSF will be prior to the start of processing and will be sufficient to store the first 2 years of tailings production, plus stormwater. Further stages will be constructed in downstream lifts. Stage 2 will accommodate a further three years of tailings production plus stormwater, and Stage 3 will accommodate the remaining tailings production plus stormwater (refer to Figure 3.2).

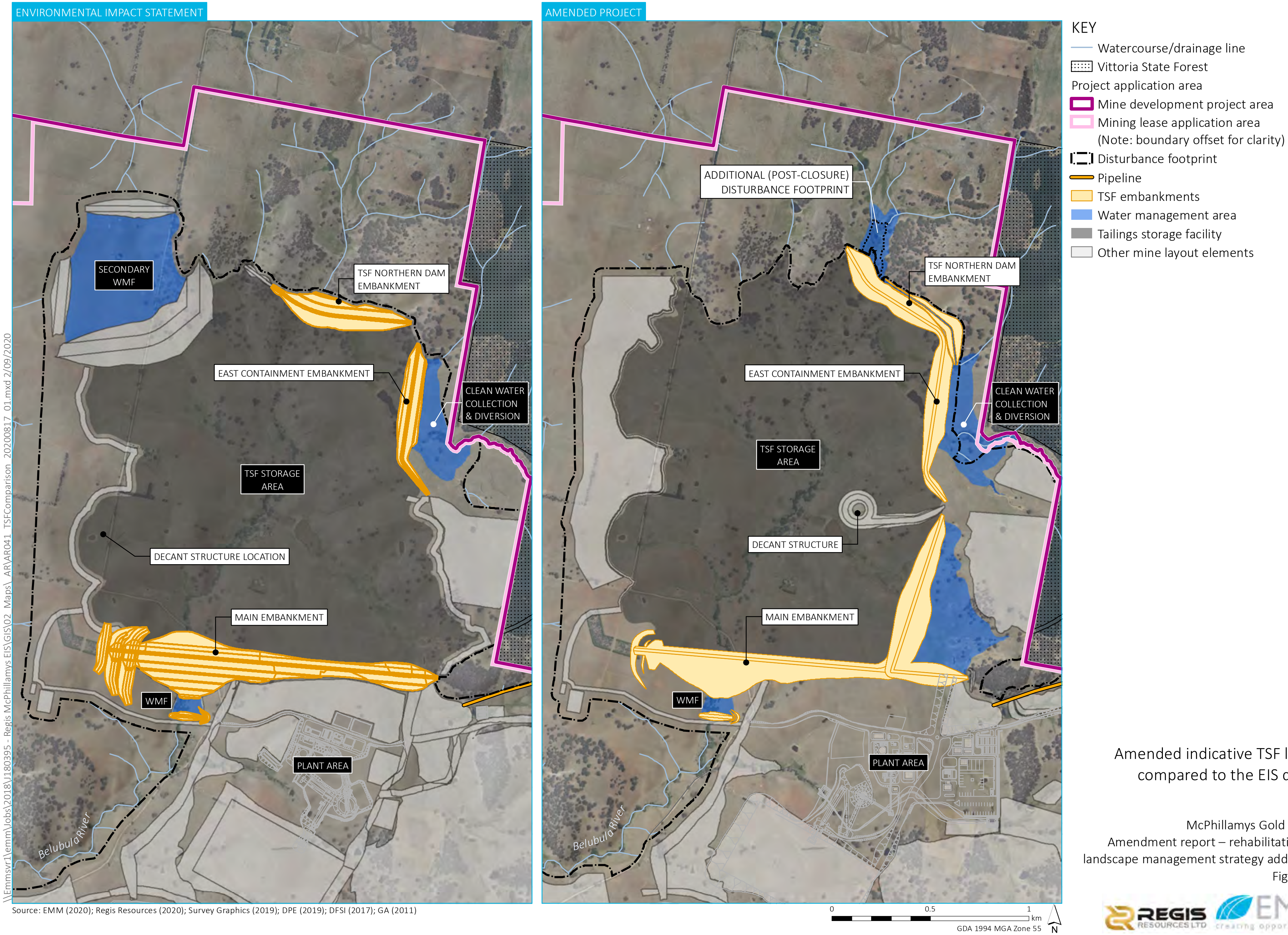
As described in the EIS, the tailings will be discharged as a thickened slurry sub-aerially, from multiple points (via spigots) around the perimeter of the TSF. Deposition will be cycled between spigots to limit the deposited layer thickness and allow time for consolidation and desiccation of each layer, while maintaining the tailings surface sufficiently wet from fresh tailings to limit dusting and oxidation. Supernatant water released from the tailings will flow to the decant structure to the east (previously to the west as noted above), from which it will be recovered for re-use in the processing plant. The operation and condition of the TSF will be kept under regular surveillance and monitored.

The management of seepage from the TSF will include a multi-barrier system that meets or exceeds the EPA's permeability requirements, a low permeability compacted clay cut-off beneath the TSF embankment, lining on the upstream side of the embankment with low permeability compacted clay, a drain at the downstream toe of the embankment, groundwater monitoring bores and seepage collection (and recirculation to the decant pond) around the TSF, and further seepage monitoring bores and collection, if required, downstream of the monitoring network.

Further modelling undertaken by ATC Williams (2020) demonstrates that the multi-barrier system comprising a 300 mm thick compacted clay liner with a permeability of 3.3×10^{-10} m/s overlying a minimum 700 mm of natural clay (subsoil), an engineered geosynthetic clay liner (GCL), and embankment underdrainage, will restrict seepage to a greater extent than the EPA's specified 1,000 mm thick compacted clay liner with a permeability of 1×10^{-9} m/s. Further points to note on seepage management include:

- Site clays have been shown to be capable of achieving on laboratory compaction more than acceptable permeability, with test values in the range from 1×10^{-10} to 9×10^{-9} m/s.
- The depth of natural clay (subsoil) beneath the TSF footprint is greatest towards the revised location of the decant pond, which will limit seepage from this source.

- The depth of natural clay (subsoil) is least around the south-western and central northern perimeters of the TSF footprint, where the final depth of tailings will be minimal, and hence the source of seepage is minimal.
- The permeability of settled tailings is expected to be approximately 1 x 10^{-7} m/s, with lower permeabilities in the vertical direction due to layering on beaching.



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Source: EMM (2020); Regis Resources (2020); Survey Graphics (2019); DPE (2019); DFSI (2017); GA (2011)

Amended indicative TSF layout compared to the EIS design

McPhillamys Gold Project
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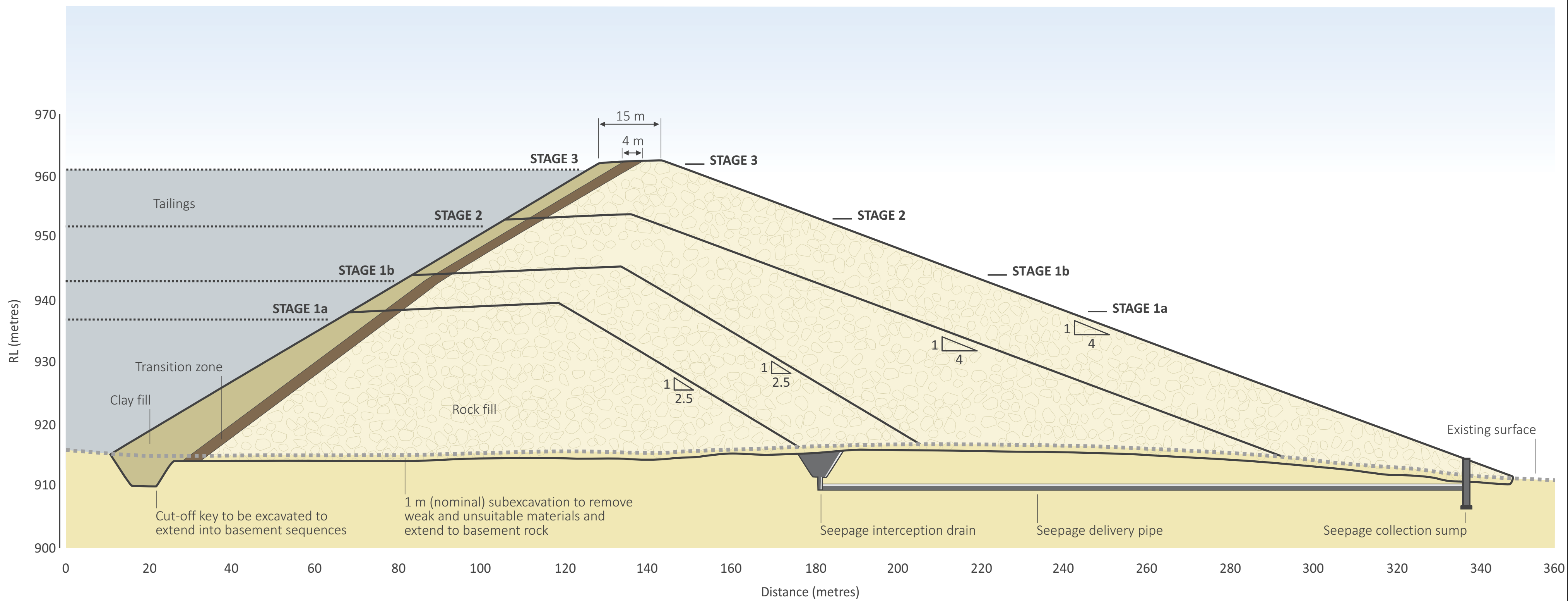
Figure 3.1



Amended TSF embankment design

McPhillamys Gold Project
Rehabilitation and Landscape Management Addendum
Figure 3.2

The availability of clay suitable for a compacted liner of the TSF footprint, and for low permeability embankment zones, has been identified as listed below:

- Using in-situ and imported clays within the TSF storage area will achieve an overall equivalent seepage performance to a 1,000 mm thick clay liner at $1x10^{-9}$m/s permeability. The in-situ clay liner proposed (and using locally imported clays) represents some 86% of the total TSF storage area.

- Enhancing the clay liner thickness in the areas of the existing drainage features and beneath the decant structure will comprise a minimum 1,000 mm at $1x10^{-9}$m/s liner. This liner area represents some 8% of the total TSF storage area.

- An engineered liner such as a GCL would be provided in areas of limited clays and unsuitable clays. This area represents an area of some 6% of the total TSF storage area and would be installed in the various stages, generally on the upper slopes/ridge areas.

Detailed quality assurance procedures will be developed as part of the detailed TSF design, to be applied during the construction, operation and closure of the TSF. It will include testing to confirm that the design permeability of the TSF liner system is achieved.

In addition to the lining of the TSF footprint and the sealing of the embankment, downstream groundwater monitoring with seepage collection capability is proposed as a secondary control measure to detect and capture any inevitable small seepage flows, as discussed in the Groundwater Assessment Addendum prepared for the amended project (refer to Appendix H of the Amendment Report, EMM 2020a).

In summary, seepage controls will include:

1. the TSF liner and sealing of the embankment to contain seepage;

2. thickening the tailings and minimising the storage of water on the TSF to minimise the sources of seepage;

3. seepage collection via a seepage interception trench constructed downstream of the TSF embankment cut-off key, which will direct any seepage into the seepage sump;

4. seepage monitoring;

5. capping the tailings at closure to promote evapotranspiration and the runoff of excess rainfall; and

6. maintaining monitoring and seepage collection post-closure.

As described in the EIS, at closure, the TSF will be covered with a capillary break layer (which will also function as a trafficking layer) of NAF waste rock approximately 0.5 m thick. The capillary break will minimise the potential for capillary rise of salts and heavy metals into the above capping layers and provides a bridging layer.

The capillary break will be 0.5m (nominal thickness) covered with a capping layer consisting of 0.6 m of subsoil capped with 0.10 m of topsoil. This arrangement is shown conceptually in Figure 3.3.

There may be periods of high rainfall where the volume of rain exceeds the infiltration rate and storage capacity of the cover. Therefore, the final surface of the TSF has been designed to drain runoff in these instances to the proposed clean water diversion on the south-east side of the TSF wall.

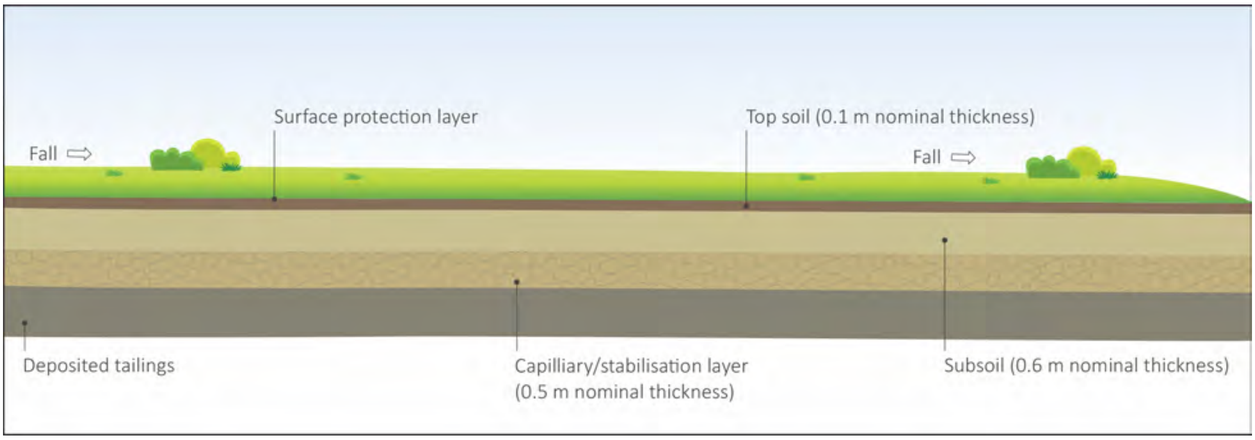


Figure 3.3 TSF capping arrangement

The TSF will be actively dewatered during operations and the rehabilitation phase into the onsite water management system to minimise the volume of supernatant water stored on the TSF to facilitate desiccation of the tailings. Dewatering will continue until there is insufficient water to pump from the decant pond.

Anticipated seepage rates were modelled by ATC Williams (2020), which investigated the various TSF liner options. As shown by the yellow line below in Figure 3.4, seepage rates, which are extremely low to start with and peak at just 3.1 mm/m^2/year, will decrease even further overtime.

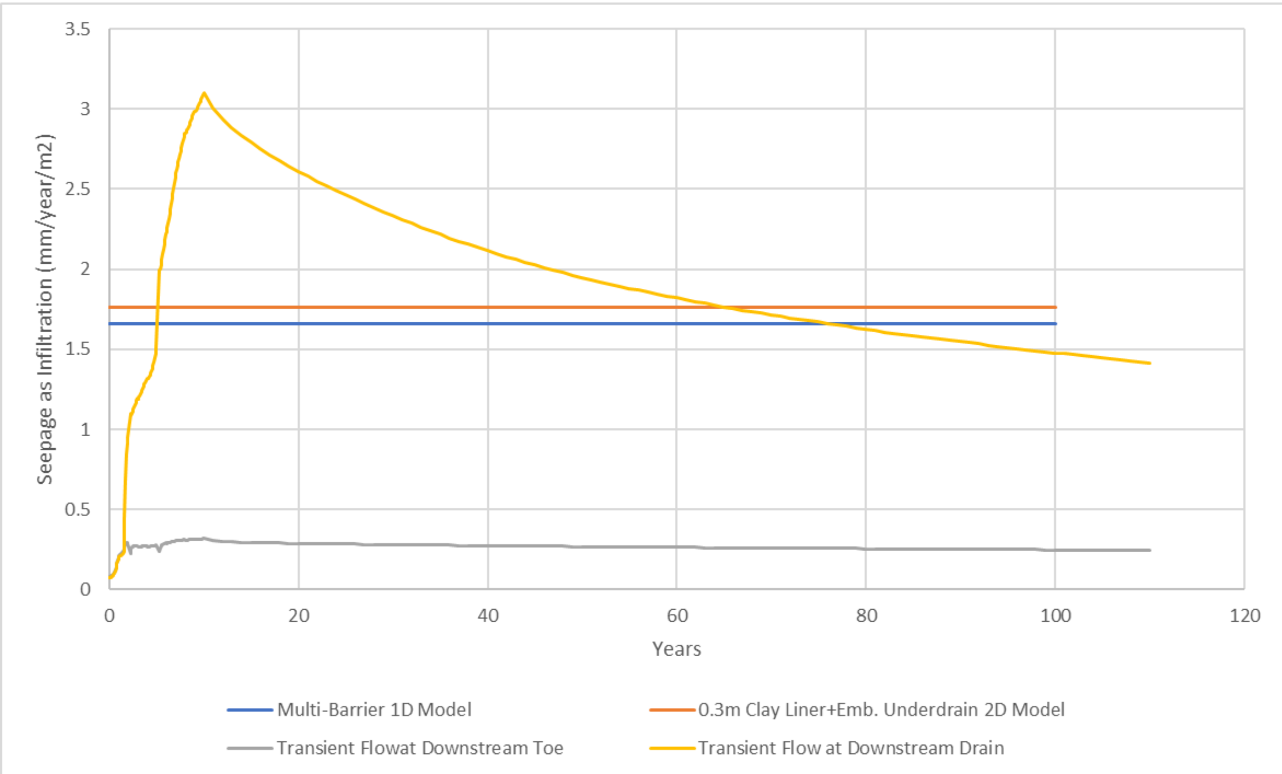


Figure 3.4 Modelled TSF liner seepage rates (ATC Williams 2020)

It is expected that capping of the TSF, grading the surface of the cap to the east, and establishment of an effective grass cover on the surface will significantly minimise the potential for seepage from the TSF.

Cyanide levels in the tailings will be reduced using the sulphur dioxide/air cyanide detoxification method, a proven method used successfully at Cowal and Tomingley gold mines within NSW (Williams 2020). The expected low concentration of cyanide released with the tailings would be below that affecting bird life (due to cyanide gas that forms) and will readily and rapidly break down in sunlight and through natural degradation (Williams 2020).

The cyanide detoxified tailings are anticipated to be elevated in sulphate, selenium and fluorine relative to ANZECC (2000) livestock drinking water guidelines. As a result of the elevated sulphate, the tailings are expected to be classified as potentially acid forming, and may oxidise on exposed tailings beach, with the potential for acid and metalliferous runoff and drainage. To limit oxidation, the tailings will be maintained moist to limit oxygen ingress. Also, any acidity may be neutralised by the alkaline water from cyanide processing (Williams 2020).

iii Void

The final void will be approximately 450 m deep with the void slope ranging from 40 to 45° in competent rock areas. This is slightly shallower than that proposed in the EIS (at 460 m), due primarily to an amendment to the pit exit ramp design and hence a small change to the dimensions of the void. Groundwater modelling demonstrates that the void will function as a groundwater sink, as was also described in the EIS (EMM 2020c). Modelling shows that the final void will reach an equilibrium level approximately 9 m below the spill level after 500 years, with an average equilibrium level approximately 14 m below spill level and is therefore predicted to never overtop (HEC 2020).

While the mine void acts as a groundwater sink (for around 500 years), the dissolved salts and metals are expected to become concentrated with time due to evaporation and exposed potentially acid forming material within the void. Under predicted long-term steady state conditions, the pit lake is predicted to act as a minor throughflow pit. As such, there is the potential for water with elevated salts and metals within the pit lake to migrate from the final void in the very long-term (greater than 500 years after mining). However, the rate that the water is predicted to flow from the pit is very low (11 ML/year) (EMM 2020c).

The final pit lake salinity assessment has been conducted by HEC (2020) as part of the pit lake recovery modelling using inputs from the Geochemical Characterisation (SRK 2019), groundwater and surface water quality monitoring data. HEC estimates that the salinity of the pit lake is predicted to increase due to evapo-concentration, reaching around 1,600 µS/cm (electrical conductivity) after 1,000 years, which is similar to the current groundwater salinity range.

3.2.2 Land and Soil Capability

The post-mining LSC classes of the mine development project area have been revised as part of the Land and Soil Capability Assessment Addendum prepared for the amended project (Sustainable Soils Management 2020), in accordance with the *Land and Soil Capability Assessment Scheme – second* approximation (OEH 2012).

The LSC assessment classifies land into one of eight soil and land capability classes. These classes give an indication of what the land can be used for without causing land and soil degradation (Table 3.1).

Table 3.1 Land and soil capability classes (OEH 2012)

LSC Class	Description
Land capable of wide variety of uses (cropping, grazing, horticulture, forestry, nature conservation)	
1	Extremely high capability land: Land has no limitations. No special land management practices required. Land capable of all rural uses and land management practices.

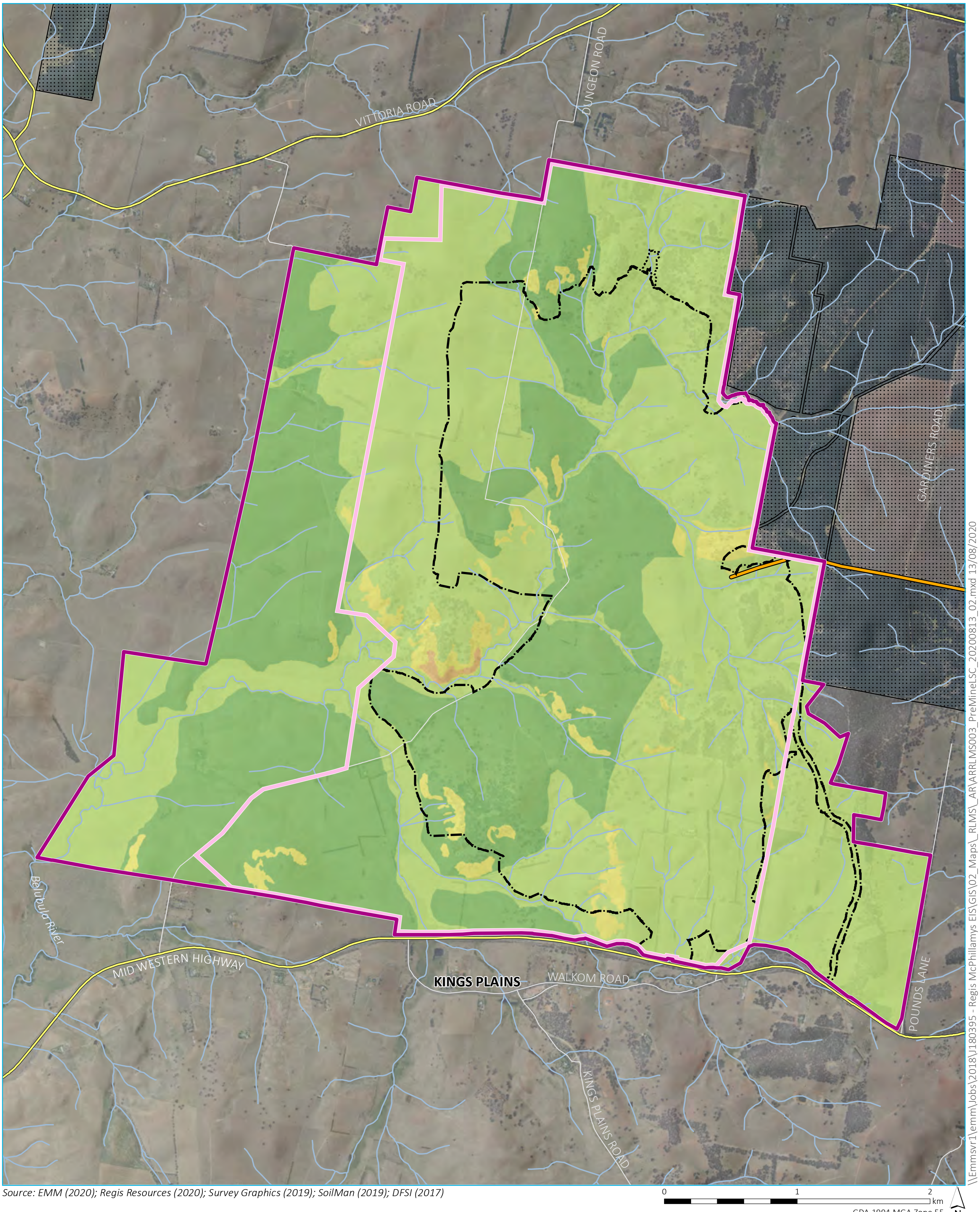
Table 3.1 Land and soil capability classes (OEH 2012)

LSC Class	Description
2	Very high capability land: Land has slight limitations. These can be managed by readily available, easily implemented management practices. Land is capable of most land uses and land management practices, including intensive cropping with cultivation.
3	High capability land. Land: Has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental limitations
Land capable of a variety of land uses (cropping with restricted cultivation, pasture cropping, grazing, some horticulture, forestry, nature conservation)	
4	Moderate land capability land: Land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology.
5	Moderate-low capability land: Land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations will need to be carefully managed to prevent long-term degradation.
Land capable of a limited set of land uses (grazing, forestry, nature conservation and some horticulture)	
6	Low capability land: Land has very high limitations for high-impact land uses. Land use restricted to low-impact land uses such as grazing, forestry and nature conservation. Careful management of limitations is required to prevent severe land and environmental degradation.
Land generally Incapable of agriculture land use (selective forestry, nature conservation)	
7	Very low capability land: Land has severe limitations that restrict most land uses and generally cannot be overcome. On-site and off-site impacts of land management practices can be extremely severe if limitations not managed. There should be minimal disturbance of native vegetation.
8	Extremely low capability: Limitations are so severe that land is incapable of sustaining any land use apart from nature conservation. There should be no disturbance of native vegetation.

The project area is currently predominantly LSC Class 4 and Class 5, which is consistent with the historic land-use of growing naturalised pasture to support grazing by cattle and sheep. Some Class 6 land also occurs across the project area, with very small patches of Class 7 (SSM 2020).

Much of the project area has previously been cultivated; however, the strongly acidic nature of the soils and high aluminium levels constrains the range of crops that can be grown and limits their productivity. Intensive soil amelioration is required to sustain cropping and as such agricultural land-use has transitioned to grazing (SSM 2019).

Pre mining LSC classes for the project area are shown in Figure 3.5. Proposed post mining LSC classes for the EIS and amended project are shown in Figure 3.6.



Source: EMM (2020); Regis Resources (2020); Survey Graphics (2019); SoilMan (2019); DFSI (2017)

KEY

Project application area
- Mine development project area
- Mining lease application area (Note: boundary offset for clarity)
- Disturbance footprint
- Additional (post-closure) disturbance footprint
- Pipeline

Existing environment
- Major road
- Minor road
- Watercourse/drainage line
- Vittoria State Forest

Pre mining LSC class
- 4
- 5
- 6
- 7

Pre mining land and soil capability classes

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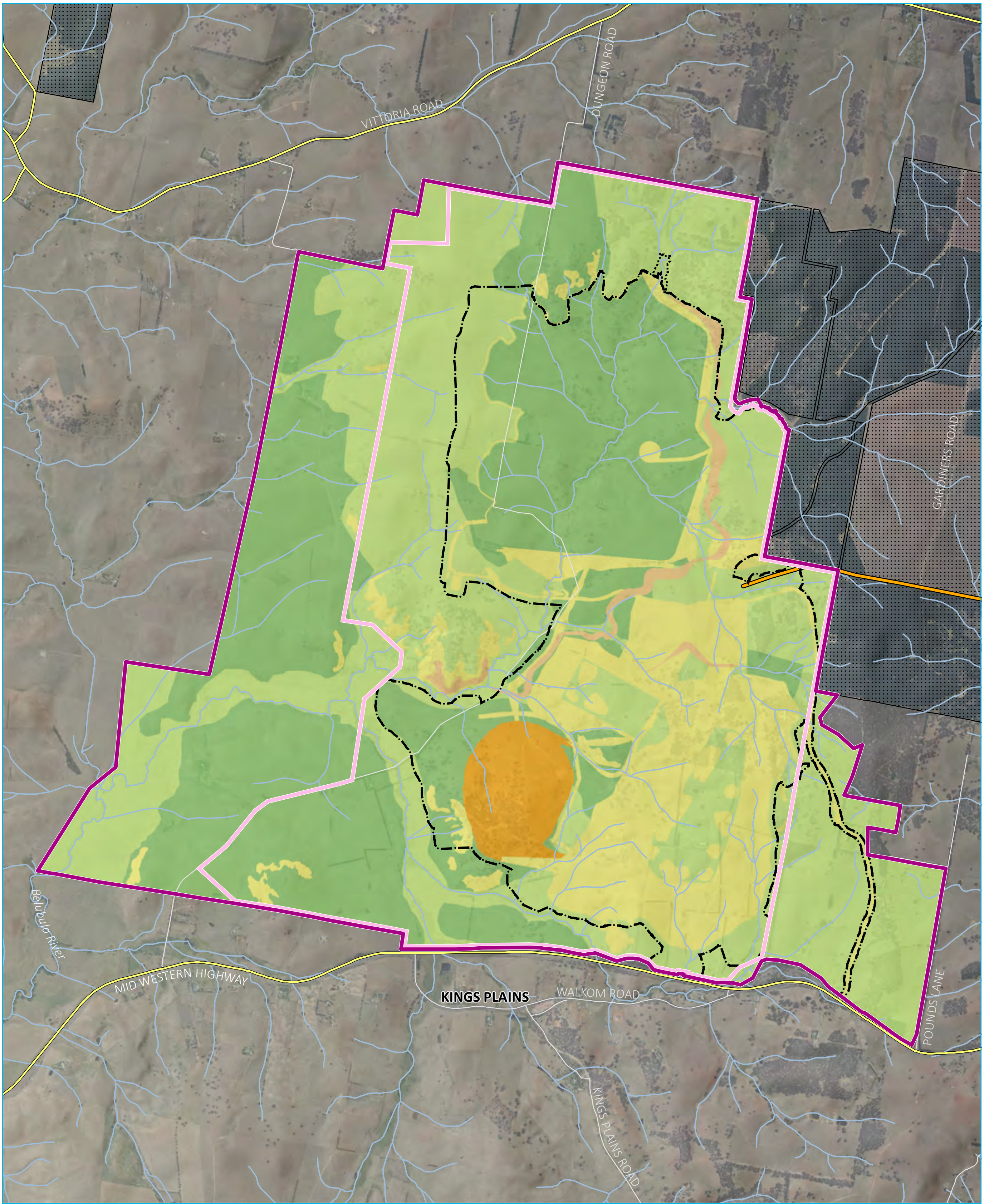
Figure 3.5

REGIS RESOURCES LTD
EMM creating opportunities



Source: EMM (2020); Regis Resources (2020); SoilMan (2020); Survey Graphics (2019); DFSI (2017)

KEY

Project application area
- Mine development project area
- Mining lease application area (Note: boundary offset for clarity)
- Disturbance footprint
- Additional (post-closure) disturbance footprint
- Pipeline

Existing environment
- Major road
- Minor road
- Watercourse/drainage line
- Vittoria State Forest

Post mining LSC class
- 4
- 5
- 6
- 7
- 8

Post mining land and soil capability classes

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Figure 3.6

Rehabilitation works to be undertaken during the closure phase will replace sufficient soil in some areas (eg the TSF) to achieve LSC Class 4 which would be suitable for agricultural land uses including cropping with restricted cultivation, pasture cropping, grazing, some horticulture, forestry and nature conservation (OEH 2012); however, due to a focus on protection of the tailings cover and propensity of project soil for waterlogging, a grazing post mine land use is proposed instead of cropping. Sufficient depth of subsoil and topsoil will be placed on the top sections of the WRE that will allow a LSC Class of 5 and LSC Class 6 on slopes (LSC Class 6 is due to slope limitations not soil depth); however, given the focus on protecting the integrity of the WRE landform, PAF cells and capping layers from erosion, grazing will be excluded via fencing and native woodland and forest species established.

Where required to support the proposed post mining land use, some soils will be ameliorated with lime during the stripping phase at rates determined by site specific testing, to address the soil acidity and aluminium toxicity and therefore are likely to produce more productive pastures than currently exists. Sufficient topsoil and subsoil will be stripped during mine establishment and mining operations for respreading during the closure phase to ensure the post-mining LSC's are achieved.

To ensure viable pastures for grazing, adequate depths of subsoil and topsoil will be replaced and appropriately ameliorated. The TSF is proposed to be LSC Class 4 which will have a 0.5 m deep trafficking and capillary break layer, approximately 0.6 m of subsoil and 0.1 m of topsoil, whereas to achieve LSC Class 6 0.25 m of subsoil and 0.1 m topsoil would be required (SSM 2020). All areas where a grazing post mining land use is proposed will be LSC Class 6 or better. Further discussion on the post mining land use is provided in Chapter 4.

There will be some loss of LSC Class 4 and LSC Class 5 land in the footprint of the WRE, and loss of LSC Class 4 and LSC Class 6 land due to the final void. However, the increase in LSC Class 4 in the TSF footprint will predominately offset this loss of Class 4 land, with a net reduction of only 3 ha of LSC Class 4 land.

The change in areas of each LSC Class over the life of the mine is shown in Table 3.2. Overall, compared to the EIS there is a less reduction in LSC Class 4 land, the area of LSC Class 5 remains the same, less land becomes LSC Class 6, slightly more LSC Class 7 land is established (associated with the clean water diversions post-mining), and slightly less area of LSC Class 8 land, associated with the final void.

Table 3.2 Change in LSC Class areas over the life of the EIS project and amended project

Pre mining			**EIS Project**		**Amended Project**	
LSC Class	**Capability**	**Pre-mining area (ha)**	**Post-mining area (ha)**	**Change (ha)**	**Post-mining area (ha)**	**Change (ha)**
Land with a wide range of uses (cropping, grazing, horticulture, nature conservation)						
1	Extremely high	0	0		0	
2	Very high	0	0		0	
3	High	0	0		0	
Land with a variety of uses (cropping with restricted cultivation, pasture cropping, grazing, some horticulture, forestry, nature conservation)						
4	Moderate	932	920	-12	929	-3
5	Moderate-low	1491	1080	-411	1080	-411
Land with a limited range of uses (grazing, forestry and nature conservation						
6	Low	86	422	+336	409	+323
Land generally unable to support agriculture (selective forestry and nature conservation)						
7	Very low	4	21	17	29	+25

Table 3.2 Change in LSC Class areas over the life of the EIS project and amended project

Pre mining			EIS Project		Amended Project	
LSC Class	Capability	Pre-mining area (ha)	Post-mining area (ha)	Change (ha)	Post-mining area (ha)	Change (ha)
8	Extremely low	0	71	71	66	+66

4 Final land use and landform

4.1 Final land use overview

The proposed post mining land uses for the amended project are identical to those proposed in the EIS Rehabilitation Strategy. As described in the EIS, a grazing land use is proposed across most of the rehabilitated mine development project area, with woodland proposed over the WRE. The final void will remain a void, as discussed further in Section 4.2.4. The rehabilitation objectives committed to in the EIS remain applicable to the amended project and the rehabilitation approach for the project continues to comprise the reinstatement of pre-mining land-uses as much as possible, while enhancing biodiversity values lost due to past agricultural clearing.

The WRE will have an LSC Class of 5 on the top surface and LSC Class 6 on the slopes (due to slope gradient limitations, not soil depth). Stock will be excluded from the WRE via fencing and will be revegetated with woodland and open forest species to achieve a biodiversity post mine land use to:

- enhance the biodiversity and visual amenity of the project area;
- protect the integrity of the WRE PAF cell from the erosion risks associated with poorly managed grazing practices; and
- enhance the function of the store and release cover by establishing trees that maximise evapotranspiration of water stored in the soil.

For land with a post mining grazing land use the minimum LSC Class will be Class 6 for the ROM and infrastructure areas, and LSC Class 4 for the TSF. The capped TSF could support higher intensity agricultural activities such as minimal till cropping; however, the priority is the protection of the integrity of the tailings cover and therefore a less intrusive agricultural land use is proposed.

A grazing post mining land-use requires access to adequate stock drinking water facilities. The project will result in the loss of approximately 11 farm dams within the infrastructure and TSF footprint that may have been previously used for stock water supply. However, numerous other farm dams are present, and will remain, around the mine development project area. Additional dams could also be built to service changed paddock configuration. In grassland pastures adult sheep require between 2-6 L of water per day and cattle between 40 and 100 L per day depending on the condition of the pastures and distance from watering points (DPI, 2014).

In pastoral areas, sheep normally graze within a radius of about 2.5 km of a watering point, and cattle within a radius of about 5 km (DPI 2014) depending on if they are lactating and the condition of the pastures. The various farm dams to remain at closure, including in the vicinity of the TSF, will provide the required water supply for these animals under a grazing scenario. It is acknowledged that to maintain the integrity of the TSF final landform, dams for stock will not be established within the TSF footprint; however given the above grazing distances, and that the TSF is approximately 2 km long and 1.5 km wide at its longest and widest point respectively, it is considered that the requirements of a grazing land use, such as access to water around the TSF, will be met.

In addition, the grazing productivity of the TSF and infrastructure areas could be enhanced by future landowners by installing a solar pumps and reticulated water supply using a polyethylene pipe and trough network in combination with appropriate management fencing to facilitate rotational grazing. Further discussion on the TSF is provided in Section 4.3.2.

The clean water diversions that remain post-closure, as shown on the conceptual final landform figure in Section 4.2, will be fenced, with appropriate stock crossing points if necessary, to allow the diversion to be planted with riparian species to form a riparian corridor and to protect the diversion from stock damage.

As described in the EIS, there are some infrastructure areas associated with the project that may be able to provide an alternate beneficial post mining land use.

Alternate land use options will be considered, along with any other identified options by Regis during operation of the mine as part of detailed closure planning, and in consultation with relevant stakeholders, including the NSW Department of Planning, Industry and Environment and Blayney Council.

Proposed post mining land uses for each domain remain unchanged from the EIS and are summarised for ease of reference in Table 4.1 below.

Table 4.1 McPhillamys mine proposed post mining LSC Class and land uses

Domain Number	Primary Domain (Operational)	Description	Pre-mining LSC Classes	Post-mining LSC Classes	Notes
1	Infrastructure Areas	Administration office and amenities, carparking, processing plant, process and maintenance buildings, workshop, stores, ROM pad, ore stockpiles, haul roads and access roads, powerlines and water pipelines	4, 5, 6	6	Infrastructure areas will have concrete foundations and slabs removed, any contamination remediated, the surface recontoured to form stable gradients and will be topsoiled. The presence of hardstand materials at depth will restrict the potential for cultivation however grazing will be able to be sustained at pre-mining levels.
2	Tailings storage facility	Tailings dam	4, 5	4	The capped tailings dam will be capable of sustaining grazing due to the depth of soil and slope of the final landform. There will be sufficient depth of cap to allow cultivation with conventional agricultural cultivation equipment.
3	Water management areas	Clean water collection and diversion, primary water facility/dam, secondary water management facility/dam, water management facilities 1, 2, 3 and 4, raw water storage dam.	4, 5, 6	4,5,6	No change other than the clean water diversion that will be a geomorphologically stable watercourse with riparian vegetation.
4	Soil stockpiles	Topsoil stockpiles, subsoil stockpiles	4, 5, 6	4, 5, 6	No change
5	Waste rock emplacement	Waste rock, Out of pit disposal area	4,5, 6	6, 7	The batters of the waste rock emplacement will be unsuitable for sustainable grazing due to the slope. Whilst the top of the waste rock emplacement will have sufficient depth of soil to sustain grazing; in order to protect the encapsulated PAF material, to maximise the effectiveness of the store/release cover and to enhance biodiversity, the waste rock emplacement will be planted with Yellow Box - Blakely's Red Gum grassy woodland and Broad leaved Peppermint-Brittle Gum – Red Stringybark dry open forest. As such grazing would need to be limited to well managed occasional short duration, high intensity grazing.

Table 4.1 McPhillamys mine proposed post mining LSC Class and land uses

Domain Number	Primary Domain (Operational)	Description	Pre-mining LSC Classes	Post-mining LSC Classes	Notes
6	Final void	Final void	4, 6	8	Other than the benches, the slopes in the final void limit any productive agricultural post-mine land-use. The final void will be bunded and fenced to prevent the entry of people and stock as it will be a non-managed area.

4.2 Conceptual post-mining landform design

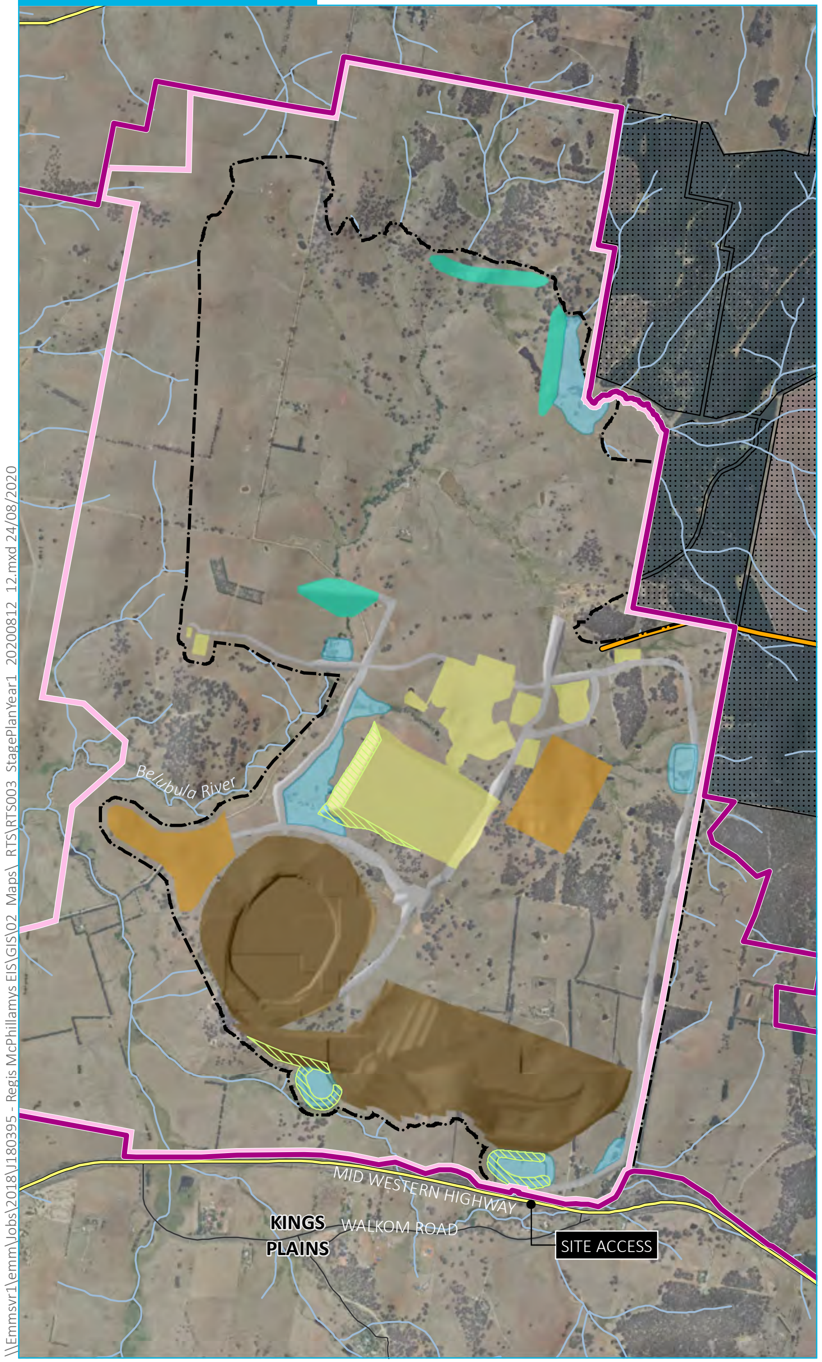
4.2.1 Overview

The conceptual final landform for the mine development remains broadly the same to that presented in the EIS. Slight amendments have been made to reflect the changes to the site layout and disturbance areas. The main amendments include:

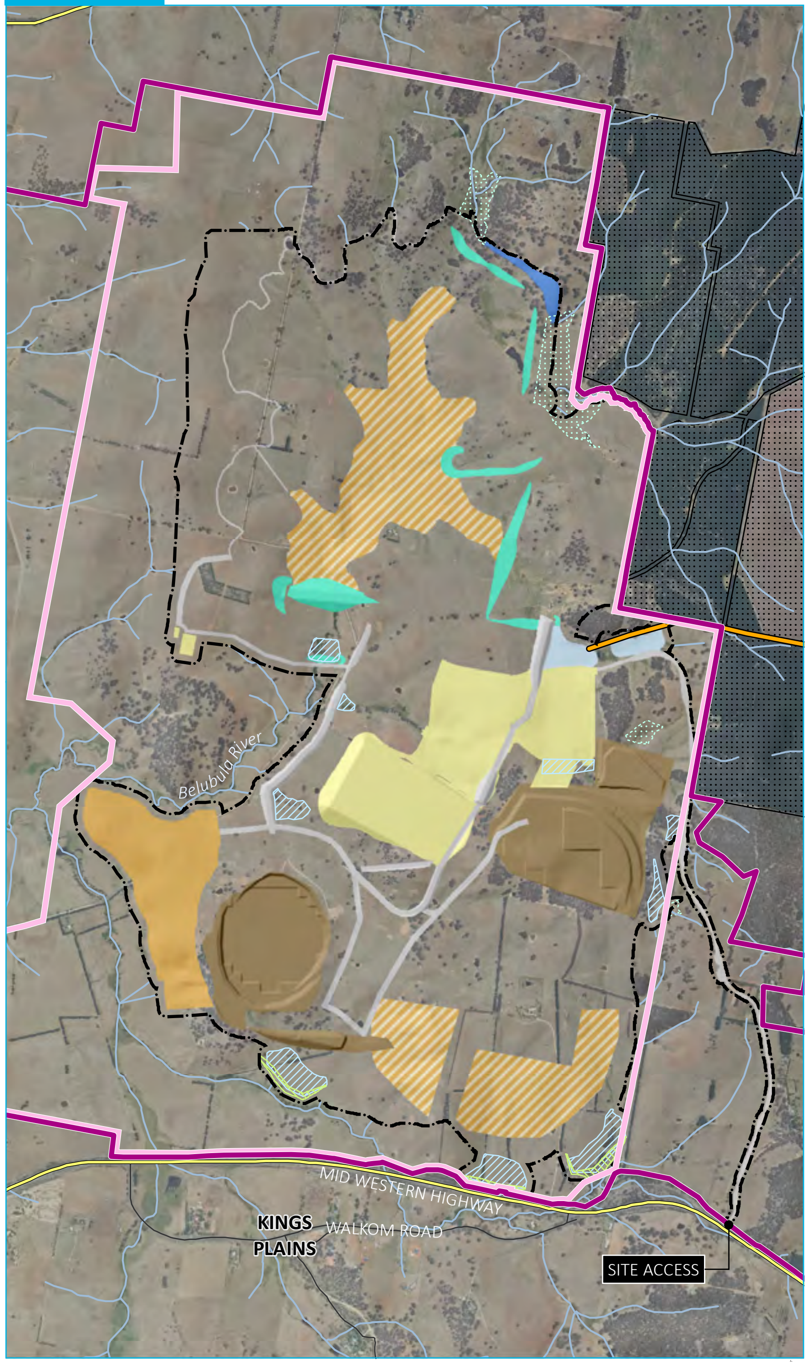
- Further detailed design has been undertaken on post-closure water management, particularly with respect to the TSF. The drainage of the TSF final landform has been integrated with the water diversions that will be constructed along the north-east, east and south-east of the TSF, to facilitate the safe and stable flow of rainfall runoff through the site.
- The ROM pad final landform has been softened compared to that presented in the EIS so that it blends better within the existing topography and is less visually intrusive.
- The final height of the pit amenity bund has been reduced by approximately 20 m from that proposed in the EIS.

Progressive mine plans for Years 1, 2, 4, 6, 8, 11 are provided in Figures 4.1 to 4.6 which illustrate the progressive rehabilitation proposed. The conceptual final landform for the amended project is shown in Figure 4.7. Cross sections of the final landform have also been developed and are provided in Figures 4.8, 4.9, 4.10 and 4.11.

ENVIRONMENTAL IMPACT STATEMENT



AMENDED PROJECT



Source: EMM (2020); Regis Resources (2020); Survey Graphics (2019); DFSI (2017)

0 0.5 1 km
GDA 1994 MGA Zone 55
N

\\Emmsvr1\emm\Jobs\2018\180395 - Regis McPhillamys EIS\GIS\02_Maps_RTS\RTS003_StagePlanYear1_20200812_12.mxd 24/08/2020

KEY

Project application area
- Mine development project area
- Mining lease application area (Note: boundary offset for clarity)
- Disturbance footprint
- Pipeline

Existing environment
- Major road
- Minor road
- Watercourse/drainage line
- Vittoria State Forest

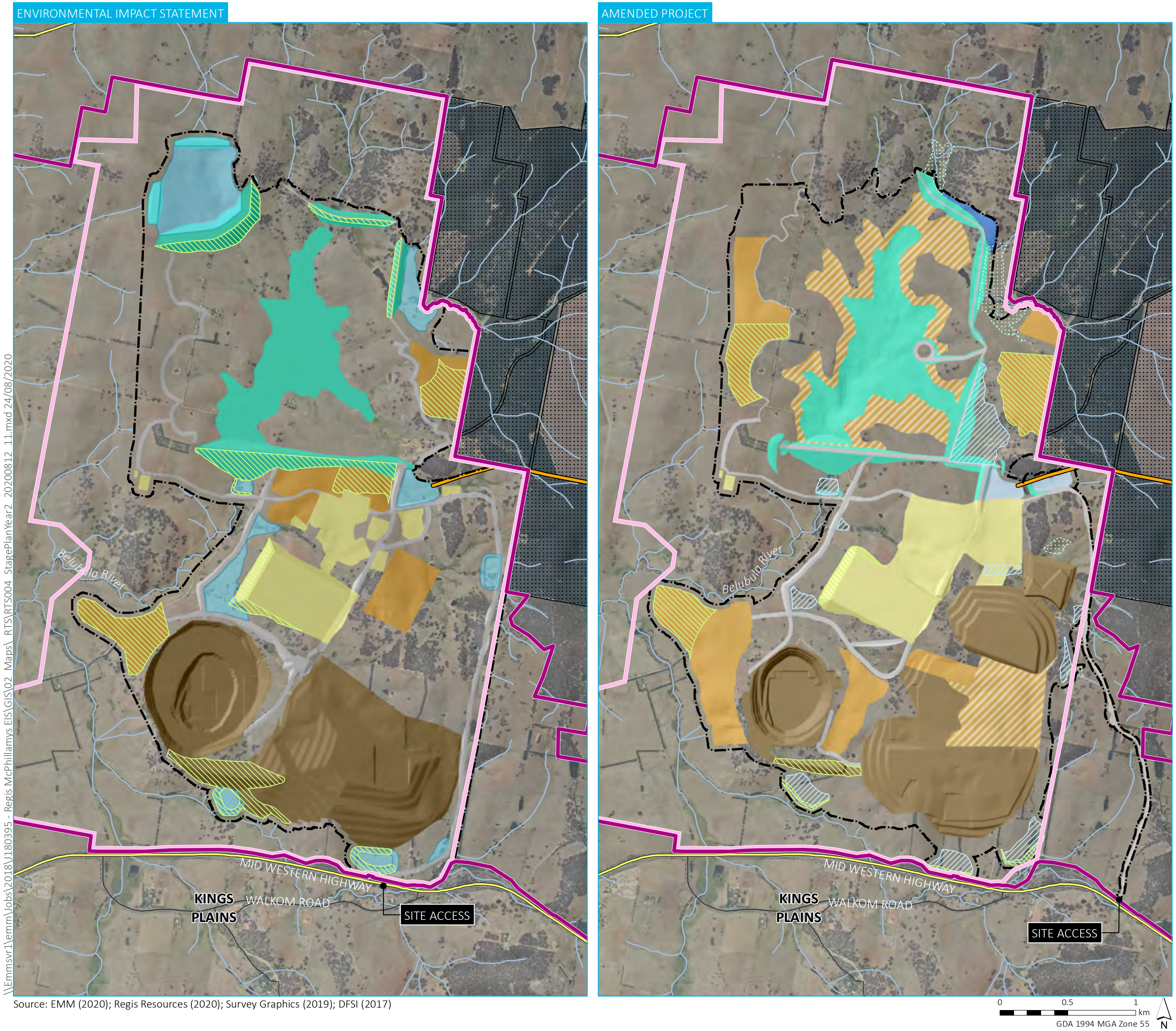
Completed works
- Mine infrastructure area (under construction)
- Mining operations (open cut & waste rock emplacement)
- Road
- Tailings storage facility construction
- Soil zone
- Soil stripping
- Water management area (EIS)
- Clean water diversion (amended project)
- Water management facility (WMF) - continuous storage (amended project)
- Water management facility (WMF) - infrequent storage (amended project)
- Clean water facility (CWF) (amended project)

Mine rehabilitation
- Hydromulched/grass

Year 1 – mine development general arrangement and rehabilitation progression

McPhillamys Gold Project
Amendment report – rehabilitation and landscape management strategy addendum
Figure 4.1

REGIS RESOURCES LTD
EMM creating opportunities



Source: EMM (2020); Regis Resources (2020); Survey Graphics (2019); DFSI (2017)

KEY

Project application area
- Mine development project area
- Mining lease application area (Note: boundary offset for clarity)
- Disturbance footprint
- Pipeline

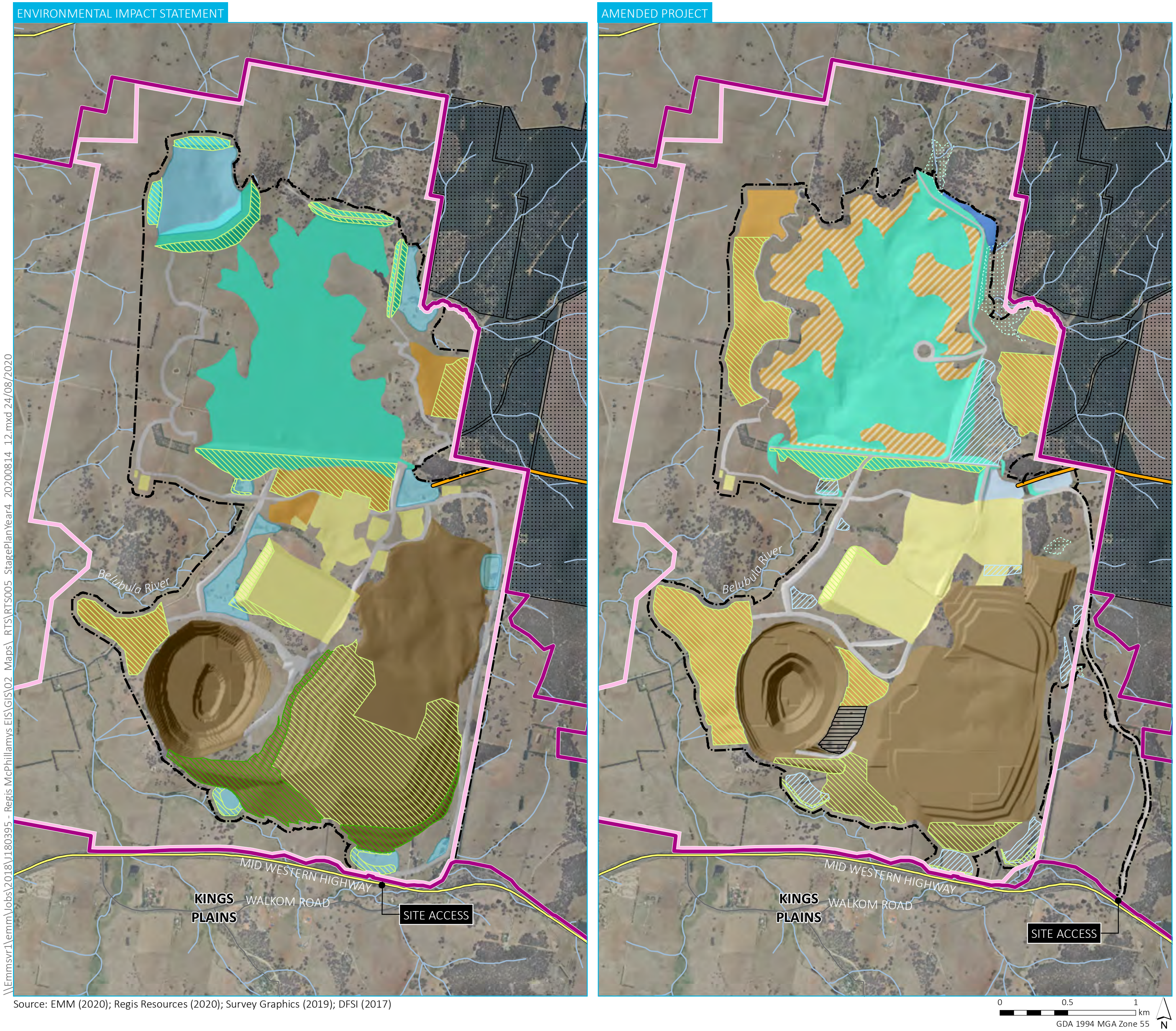
Existing environment
- Major road
- Minor road
- Watercourse/drainage line
- Vittoria State Forest

Completed works
- Mine infrastructure area
- Mining operations (open cut & waste rock emplacement)
- Road
- Tailings storage facility
- Soil zone
- Soil stripping
- Water management area (EIS)
- Clean water diversion (amended project)
- Water management facility (WMF) - continuous storage (amended project)
- Water management facility (WMF) - infrequent storage (amended project)
- Clean water facility (CWF) (amended project)

Mine rehabilitation
- Hydromulched/grass

Year 2 – mine development general arrangement and rehabilitation progression

McPhillamys Gold Project
Amendment report – rehabilitation and landscape management strategy addendum
Figure 4.2



Source: EMM (2020); Regis Resources (2020); Survey Graphics (2019); DFSI (2017)

KEY

Project application area
- Mine development project area
- Mining lease application area (Note: boundary offset for clarity)
- Disturbance footprint
- Pipeline

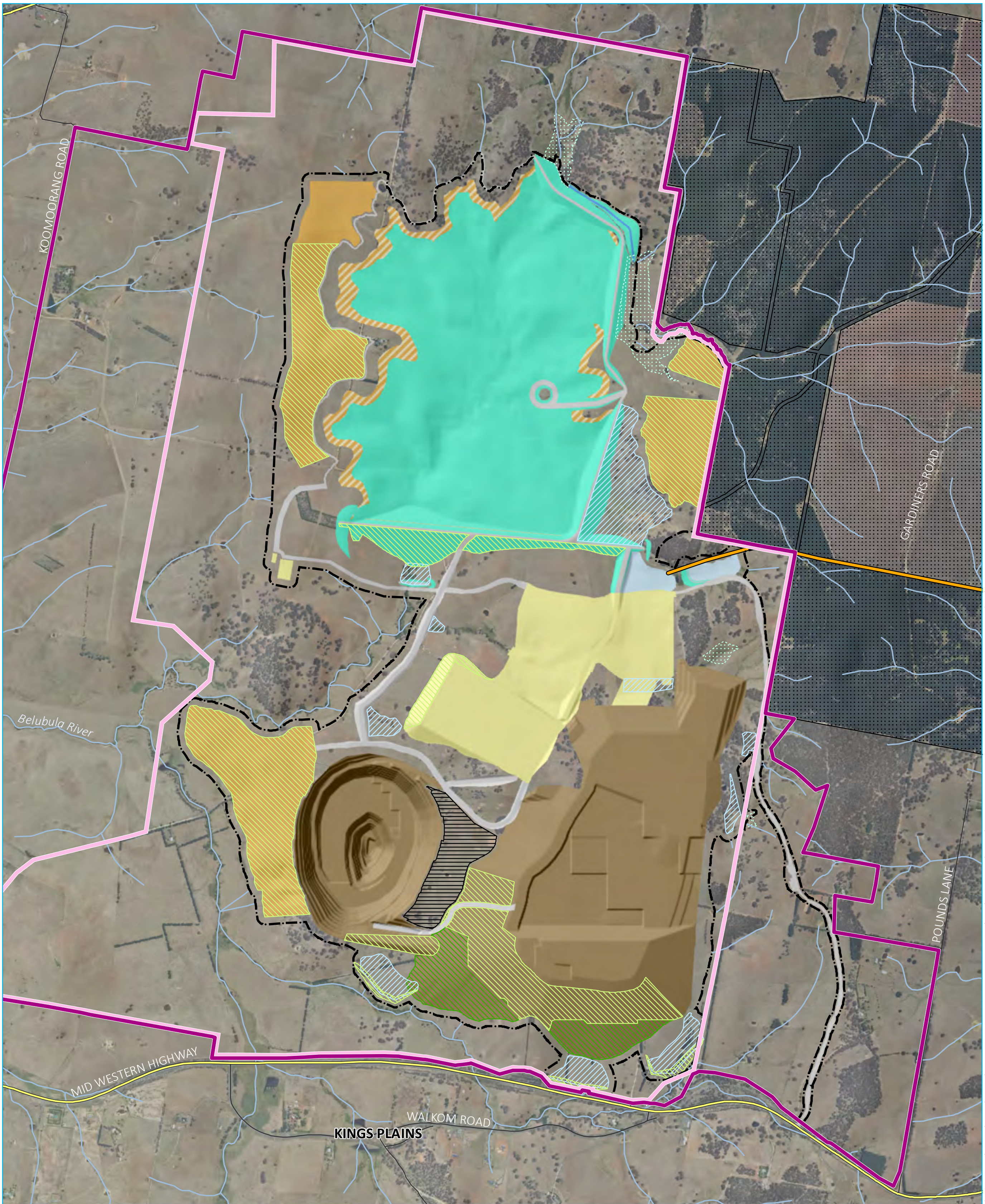
Existing environment
- Major road
- Minor road
- Watercourse/drainage line
- Vittoria State Forest

Completed works
- Mine infrastructure area
- Mining operations (open cut & waste rock emplacement)
- Road
- Tailings storage facility
- Soil zone
- Soil stripping
- Water management area (EIS)
- Clean water diversion (amended project)
- Water management facility (WMF) - continuous storage (amended project)
- Water management facility (WMF) - infrequent storage (amended project)
- Clean water facility (CWF) (amended project)

Mine rehabilitation
- Hydromulched/grass
- Decommissioned topsoil zone (amended project)
- Early stages of open woodland establishment

Year 4 – mine development general arrangement and rehabilitation progression

McPhillamys Gold Project
Amendment report – rehabilitation and landscape management strategy addendum
Figure 4.3



Source: EMM (2020); Regis Resources (2020); Survey Graphics (2019); DFSI (2017)

0 0.5 1 km
GDA 1994 MGA Zone 55
N

KEY

Project application area
- Mine development project area
- Mining lease application area (Note: boundary offset for clarity)
- Disturbance footprint
- Pipeline

Existing environment
- Major road
- Minor road
- Watercourse/drainage line
- Vittoria State Forest

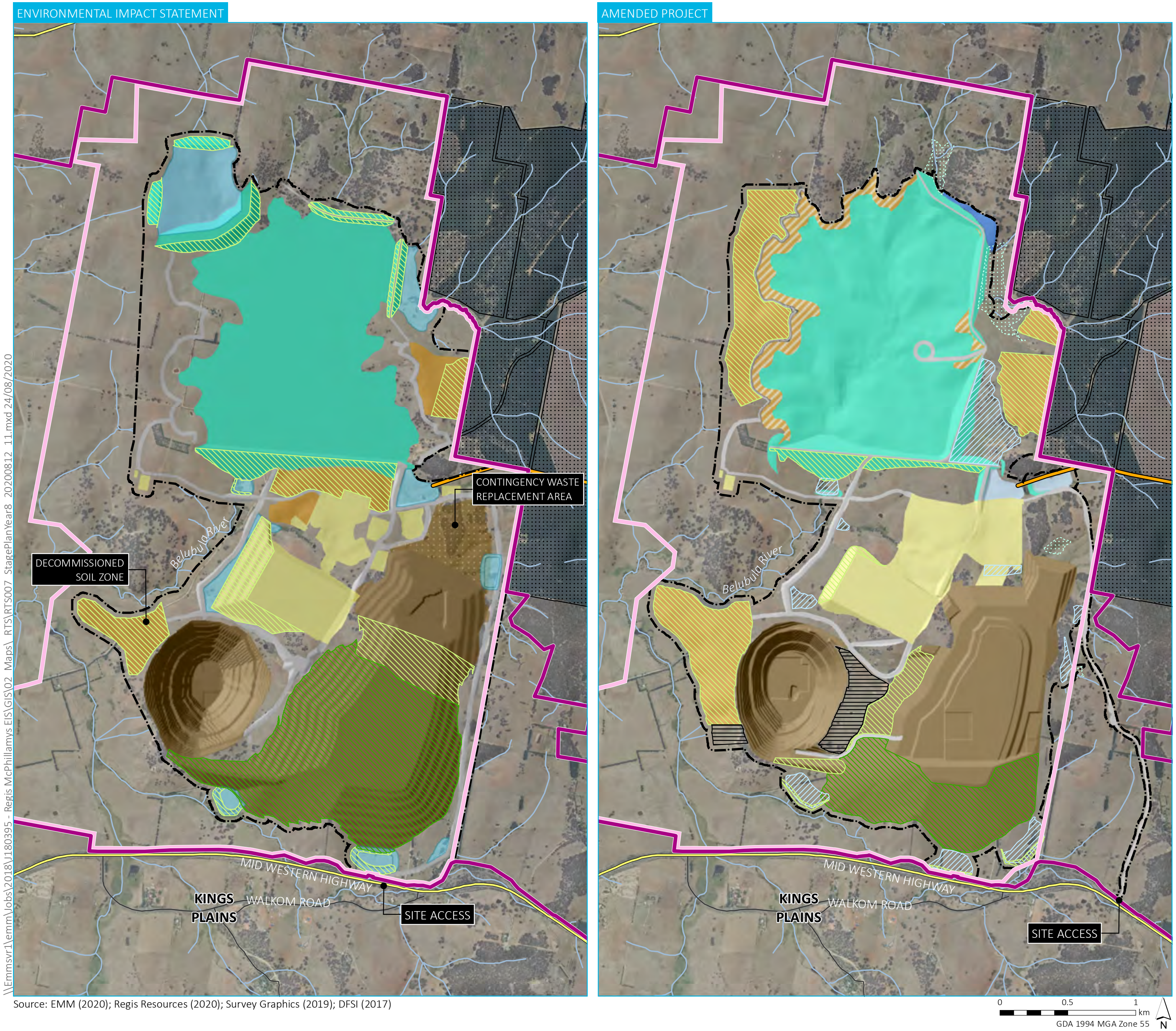
Completed works
- Mine infrastructure area
- Mining operations (open cut & waste rock emplacement)
- Road
- Tailings storage facility
- Soil zone
- Soil stripping
- Clean water diversion
- Water management facility (WMF) - continuous storage
- Water management facility (WMF) - infrequent storage
- Clean water facility (CWF)

Mine rehabilitation
- Hydromulched/grass
- Decommissioned topsoil zone
- Early stages of open woodland establishment

Year 6 – mine development general arrangement and rehabilitation progression

McPhillamys Gold Project
Amendment report – rehabilitation and landscape management strategy addendum
Figure 4.4

REGIS RESOURCES LTD
EMM creating opportunities



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Source: EMM (2020); Regis Resources (2020); Survey Graphics (2019); DFSI (2017)

KEY

Project application area
- Mine development project area
- Mining lease application area (Note: boundary offset for clarity)
- Disturbance footprint
- Pipeline

Existing environment
- Major road
- Minor road
- Watercourse/drainage line
- Vittoria State Forest

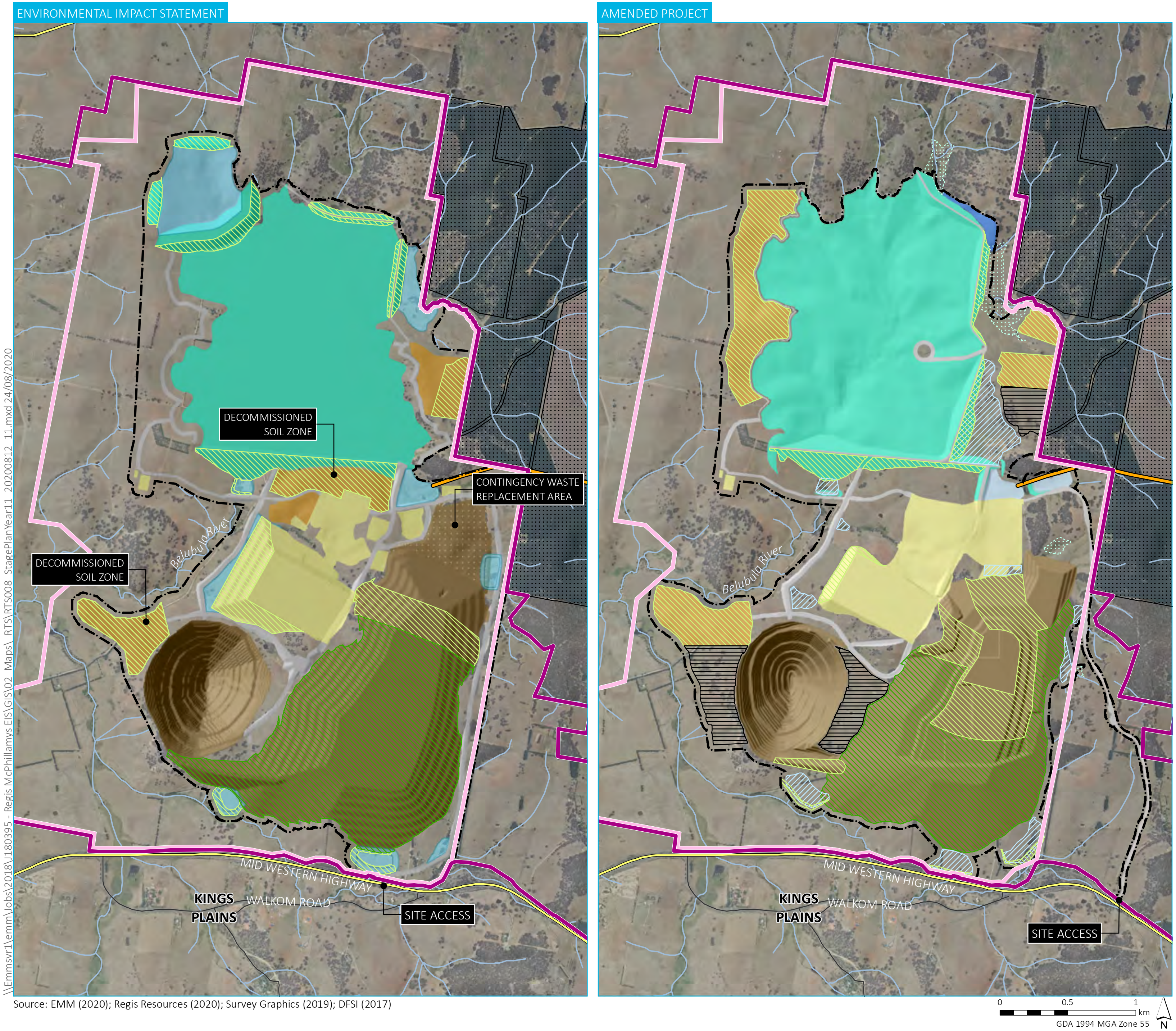
Completed works
- Mine infrastructure area
- Mining operations (open cut & waste rock emplacement)
- Road
- Tailings storage facility
- Soil zone
- Soil stripping
- Water management area (EIS)
- Clean water diversion (amended project)
- Water management facility (WMF) - continuous storage (amended project)
- Water management facility (WMF) - infrequent storage (amended project)
- Clean water facility (CWF) (amended project)

Mine rehabilitation
- Hydromulched/grass
- Decommissioned topsoil zone (amended project)
- Early stages of open woodland establishment

Year 8 – mine development general arrangement and rehabilitation progression

McPhillamys Gold Project
Amendment report – rehabilitation and landscape management strategy addendum
Figure 4.5

REGIS RESOURCES LTD
EMM creating opportunities



Source: EMM (2020); Regis Resources (2020); Survey Graphics (2019); DFSI (2017)

KEY

Project application area
- Mine development project area
- Mining lease application area (Note: boundary offset for clarity)
- Disturbance footprint
- Pipeline

Existing environment
- Major road
- Minor road
- Watercourse/drainage line
- Vittoria State Forest

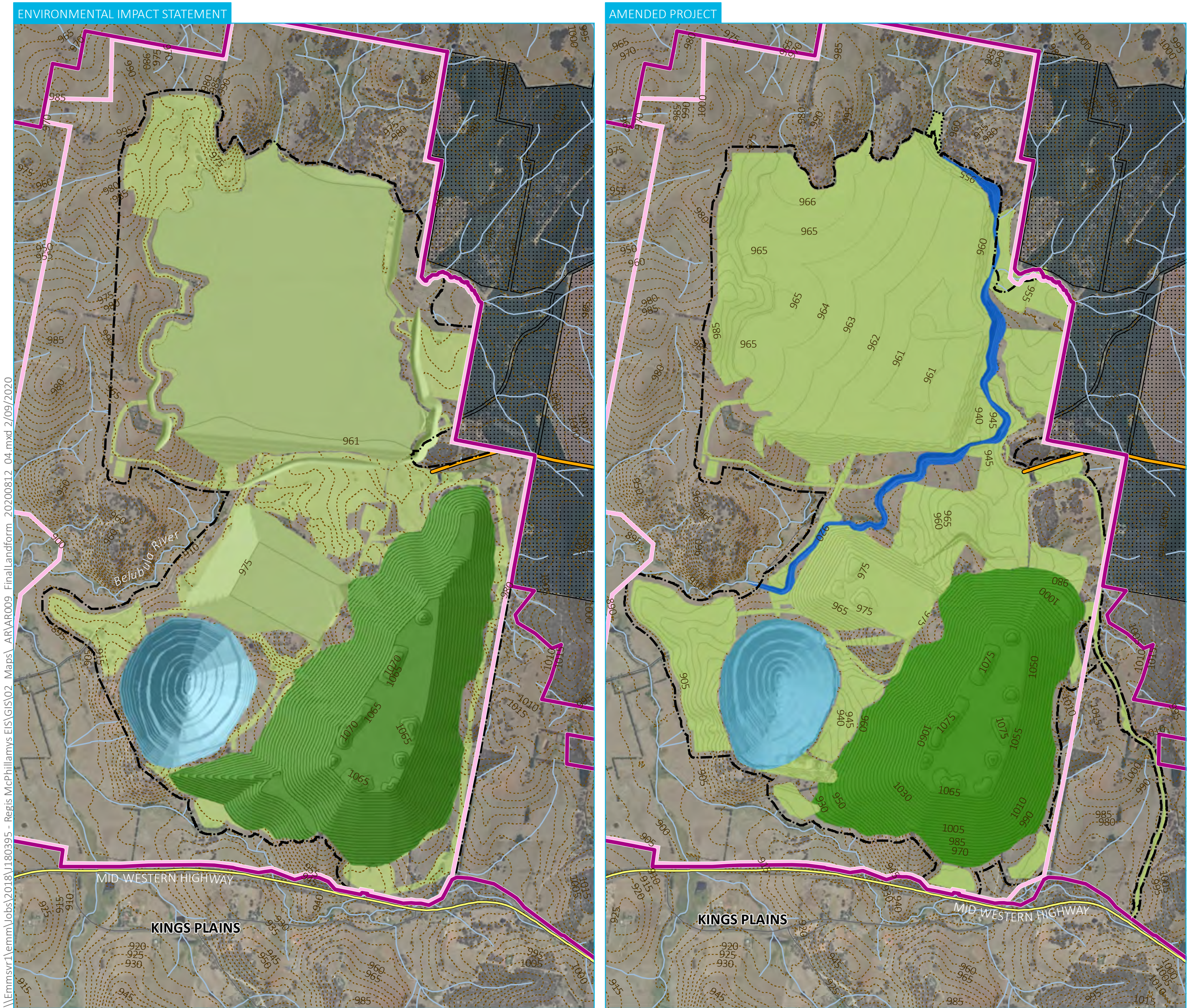
Completed works
- Mine infrastructure area
- Mining operations (open cut & waste rock emplacement)
- Road
- Tailings storage facility
- Soil zone
- Water management area (EIS)
- Clean water diversion (amended project)
- Water management facility (WMF) - continuous storage (amended project)
- Water management facility (WMF) - infrequent storage (amended project)
- Clean water facility (CWF) (amended project)

Mine rehabilitation
- Hydromulched/grass
- Decommissioned topsoil zone (amended project)
- Early stages of open woodland establishment

Year 10 (EIS), year 11 (amended project) – mine development general arrangement and rehabilitation progression

McPhillamys Gold Project
Amendment report – rehabilitation and landscape management strategy addendum
Figure 4.6

REGIS RESOURCES LTD
EMM creating opportunities



KEY

Project application area
- Mine development project area
- Mining lease application area (Note: boundary offset for clarity)
- Disturbance footprint
- Pipeline
- Mine plan contour (5 m); TSF contour (1 m)

Conceptual final landform elements
- Rehabilitated area (grazing)
- Rehabilitated area (open woodland)
- Clean water diversion
- Void

Existing environment
- Major road
- Minor road
- Watercourse/drainage line
- Existing contour (5 m)
- Vittoria State Forest

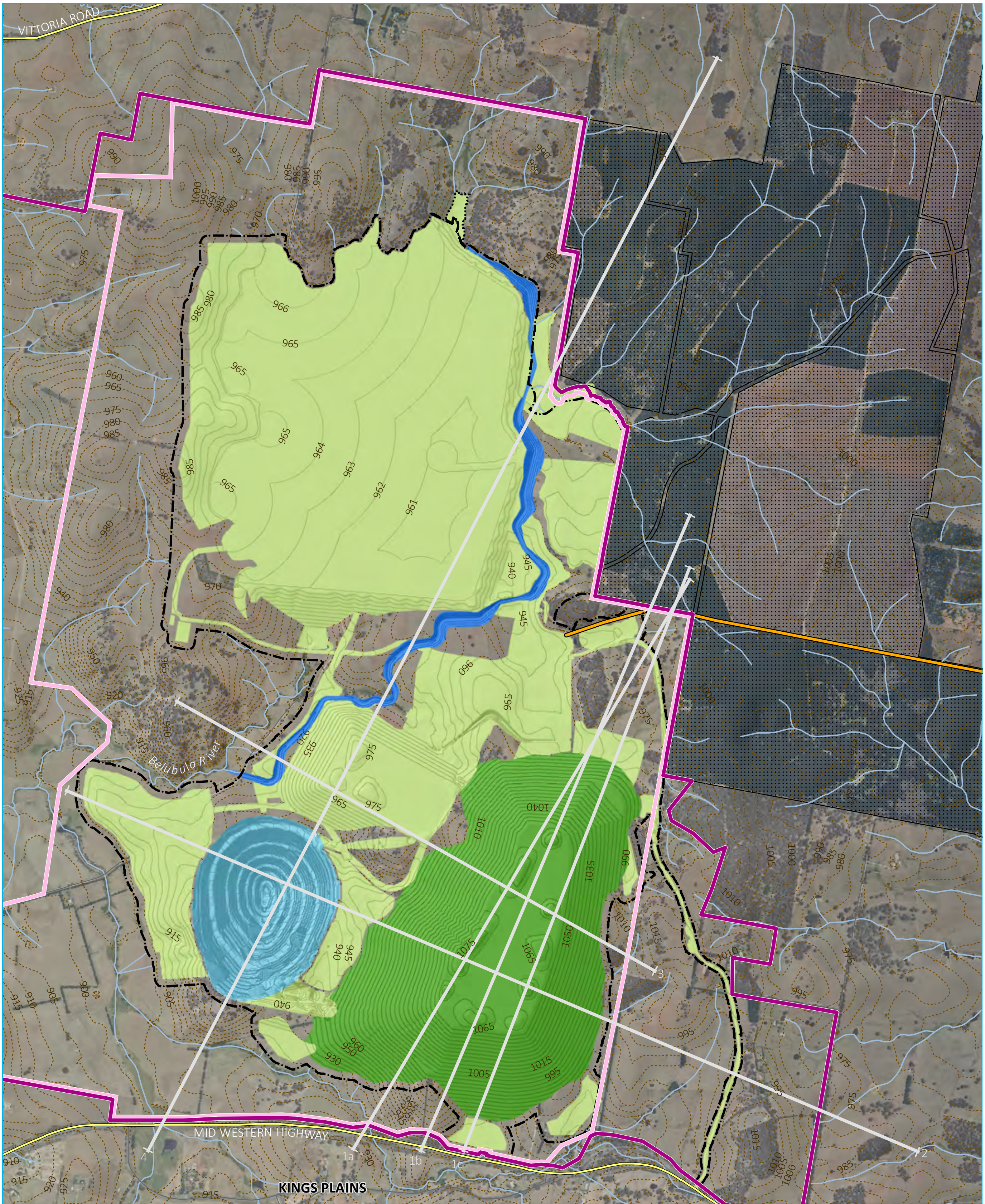
Source: EMM (2020); Regis Resources (2020); Survey Graphics (2019); DPE (2019); DFSI (2017); GA (2011)

0 0.5 1 km
GDA 1994 MGA Zone 55
N

Conceptual final landform comparison

McPhillamys Gold Project
Amendment report – rehabilitation and landscape management strategy addendum
Figure 4.7

\\Emmsvr1\emm\Jobs\2018\J180395 - Regis McPhillamys EIS\GIS\02_Maps_AR\AR009_FinalLandform_20200812_04.mxd 2/09/2020



Source: EMM (2020); Regis Resources (2020); Survey Graphics (2019); DFSI (2017)

0 0.5 1 km
GDA 1994 MGA Zone 55
N

KEY

Project application area
- Mine development project area
- Mining lease application area (Note: boundary offset for clarity)
- Disturbance footprint
- Additional (post-closure) disturbance footprint
- Pipeline
- Mine plan contour (5 m); TSF contour (1 m)

- Cross section

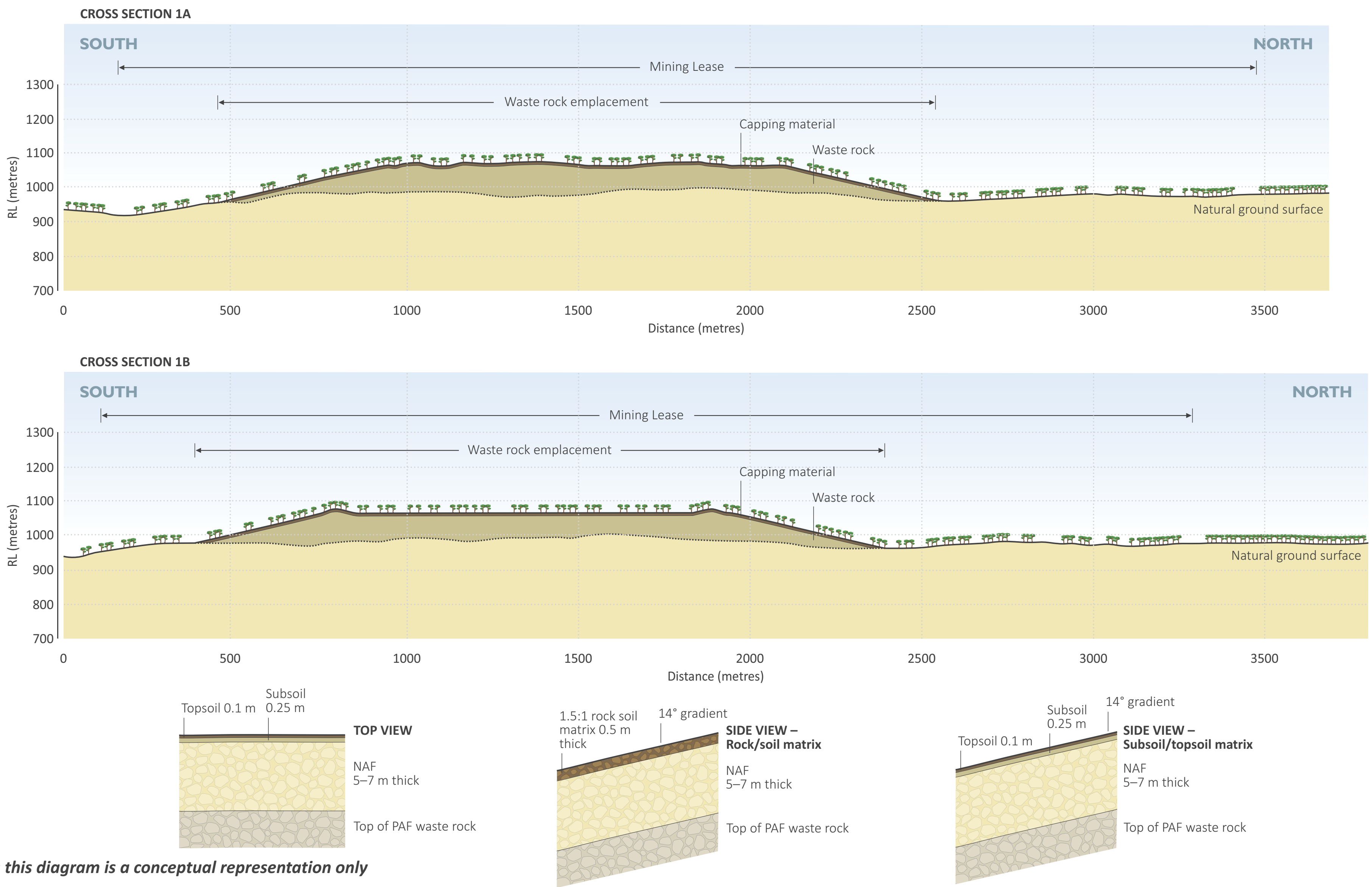
Conceptual final landform elements
- Rehabilitated area (grazing)
- Rehabilitated area (open woodland)
- Clean water diversion
- Void

Existing environment
- Major road
- Minor road
- Watercourse/drainage line
- Existing contour (5 m)
- Vittoria State Forest

Conceptual final landform – amended project

McPhillamys Gold Project
Amendment report – rehabilitation and landscape management strategy addendum
Figure 4.8

\\Emmsvr1\emm\Jobs\2018\J180395 - Regis McPhillamys EIS\GIS\02_Maps_RLMS_AR\ARRLMS004_FinalLandformAROnly_20200813_02.mxd 13/08/2020



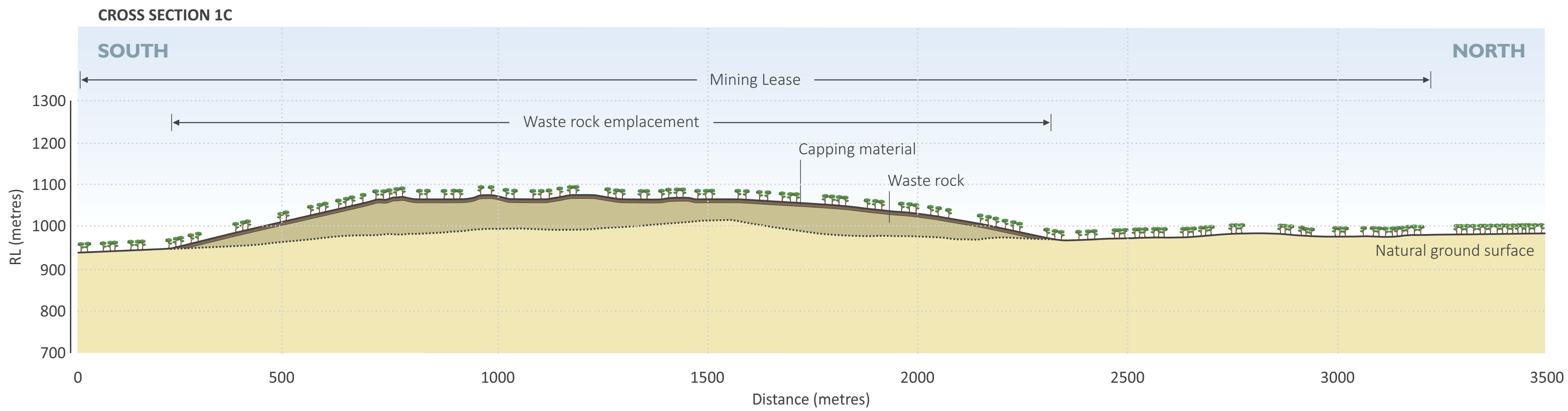
NOTE: this diagram is a conceptual representation only

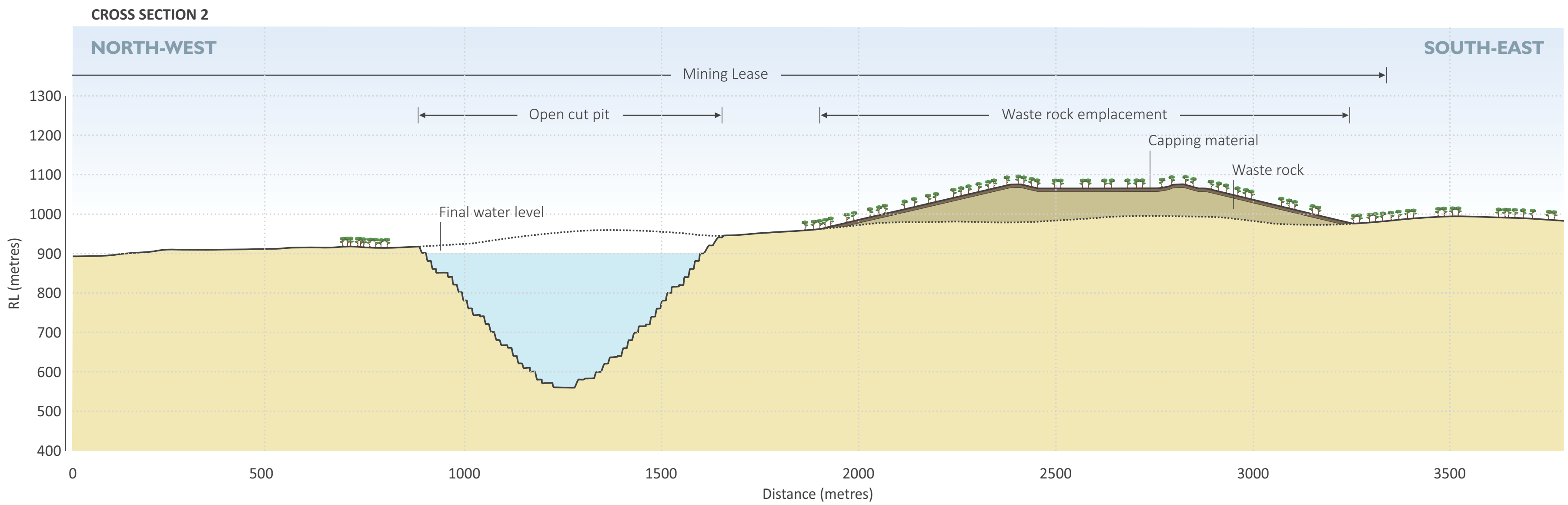
Conceptual final landform cross sections: 1A and 1B

McPhillamys Gold Project

Rehabilitation and Landscape Management Strategy Addendum

Figure 4.9





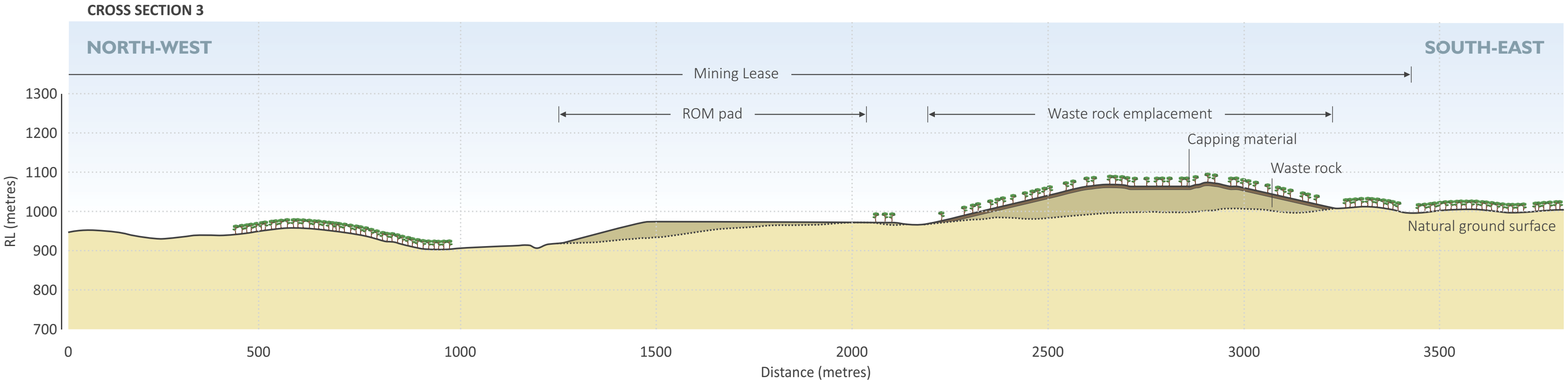
NOTE: this diagram is a conceptual representation only

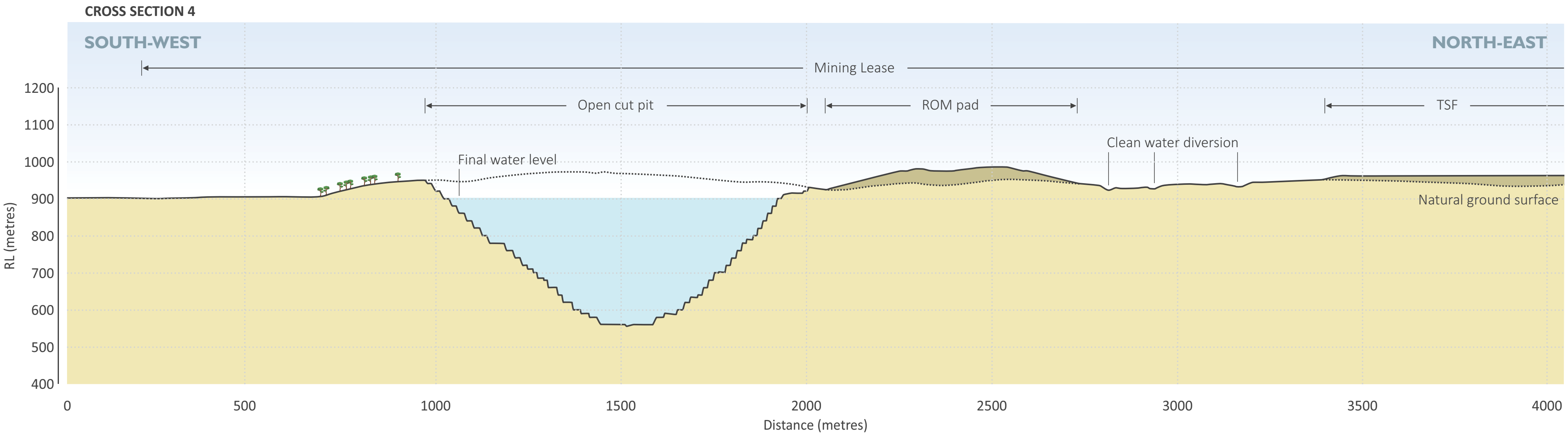
Conceptual final landform cross sections: 1C and 2

McPhillamys Gold Project

Rehabilitation and Landscape Management Strategy Addendum

Figure 4.10





NOTE: this diagram is a conceptual representation only

EMM creating opportunities

REGIS RESOURCES LTD

Conceptual final landform cross sections: 3 and 4

McPhillamys Gold Project

Rehabilitation and Landscape Management Strategy Addendum

Figure 4.11

4.2.2 Waste rock emplacement

The overall conceptual landform of the WRE remains largely the same as that proposed in the EIS, with the exception of a small reduction in the footprint at the northern end. An area in the north was included in the footprint of the WRE in the EIS as a contingency, should the swell factor of the waste rock be greater than anticipated. The contingency volume was based on a conservative estimate of waste rock volume, which has been refined by the more detailed mine design undertaken for the amended project (107.5 mbcm for the amended project compared to 109 mbcm in the EIS). Therefore, the required waste rock storage volume for the amended project, with some contingency still built in, is less than that presented in the EIS. A stockpile of capping material has been included at the northern end of the waste rock emplacement, which will be removed during rehabilitation at the end of the operating mine life to cap the TSF.

While there is a small reduction in the footprint at the northern end of the WRE, the design remains essentially the same such that the erosion and landform evolution modelling conducted for the EIS, and described in the EIS Rehabilitation Strategy, remains applicable to the amended project.

As described in the EIS Rehabilitation Strategy, erosion modelling using the Water Erosion Prediction Program (WEPP) was undertaken to develop slope gradient and slope length rules for the design of the WRE. WEPP considers parameters for rainfall intensity and rainfall erosivity, effective hydraulic conductivity, critical shear for rills formation, rill detachment and interill detachment and sediment size (Loch 2019).

The WRE design was then tested using the SIBERIA landscape evolution model which simulates the evolution of the WRE under the effect of run off and erosion for a 500-year period using erosion rate parameters including erosion rate parameters and run-off volume per unit time at a point.

The SIBERIA modelling demonstrated a very low rate of erosion for the WRE primarily due to the low erosivity of rainfall and the amount and consistency of rainfall which will allow adequate vegetation cover to protect the WRE from erosion (Landloch, 2019).

Rock/soil matrices will be used if required, in concentrated flow paths to provide additional erosion protection where critical shear values exceed those that can be provided by vegetation alone. Detailed soil characterisation and refinement of the WEPP and SIBERIA modelling will be undertaken during the development of the MOP to determine where rock/soil matrices will be required.

The reduction in the size of the WRE from the EIS project does not change the erosional stability of the WRE landform. WEPP predicted annual average erosion rates of less than 2t/ha/y (ie no rills) and a peak erosion rate of less than 5t/ha/y in its rehabilitated state (60 to 80% grass cover) which is equivalent to SLC 1 or very low erosion hazard.

These target erosion rates were adopted to ensure protection of the encapsulated PAF cell by ensuring no erosion that that allows rills to enlarge or points of erosion to form that are likely to extend and develop into gullies over time.

For the amended project, the size of the pit amenity bund has been reduced due to the optimisation of the open cut pit design by lowering the level of the south-eastern pit exit. This lowering of the ramp (via a keyway cut), combined with the smaller pit amenity bund, and with trucks also existing from the north-east, will help shield Kings Plains receivers from haul truck noise.

At closure, the bulk of the PAF cells will have been enclosed with a small area remaining open to receive PAF materials from closure operations. Once all PAF materials have been placed in the PAF cells, it will be encapsulated and remaining unrehabilitated areas shaped and revegetated.

The WRE will be constructed to achieve a final height across the landform of approximately 1,065 RL, as proposed in the EIS. Microrelief has been incorporated into this final design to facilitate a natural looking landform as much as practicable, as can be seen the cross section in Figure 4.9-4.11. These microrelief features will be up to 1,075 RL in places across the top of the landform.

4.2.3 Tailings storage facility

As part of the development of the amended project, ATC Williams (2020) conducted a review and update of the TSF, primarily to improve the clean water diversion around the TSF. However, as described by ATC Williams, the overall arrangement of the TSF is highly similar and not expected to perform materially different to that modelled in the EIS.

In addition to the drainage design amendment, a change to the TSF wall design has been made as part of the amended project, with the construction of the main wall in a series of three downstream lifts. This differs from the construction described in the EIS, which was a pyramid type construction. The embankment will still comprise the key elements of an upstream clay fill core, internal rock fill transition zone and downstream rock fill shell/buttress. The amended design provides even greater safety and stability (Williams 2020). Revegetation of the TSF wall will be undertaken after completion of the downstream construction in stage 3.

Changes have also been made to the north and eastern embankments around the TSF, to facilitate clean water diversion during operations and post closure. At the northern end of the TSF, the design of the embankment has been revised. During operations some water will pool against this embankment, in clean water facility (CWF) 1A, from where it will be pumped into the eastern clean water diversion. At closure, CWF1A will be filled in so that any rainfall runoff from upstream of the TSF will not need to be pumped but will naturally drain around the north-eastern side of the TSF into the diversion drain, remaining within the Belubula River catchment. In the EIS, due to the original design of the northern embankment, a large diversion drain would have had to be cut into the natural ground to enable CWF1A to be free draining at closure, resulting in impacts to Box Gum Woodland listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, in that area. The re-design of the north-eastern embankment and the ability to fill in the revised CWF1A, avoids the need for this large diversion drain construction at closure. The filling of CWF1A will result in an additional 1.64 ha of disturbance during closure works.

Subsoil and topsoil stockpiles have been moved to the western side of the TSF to minimise the distance required for soil to be hauled in the rehabilitation phase for capping purposes. Waste rock for capping of the TSF will be sourced from the stockpile at the northern end of the waste rock embankment, from the Main WMF embankment which will be removed during closure works, and from material removed during establishment of the clean water diversions to the east.

As described in Section 3.2.1 and Chapter 4, a grazing land use is proposed to be established on the TSF. The flat terrain of the rehabilitated TSF combined with the subsoil and topsoil depth, and amelioration of the soils and their ability to hold water compared with other rehabilitated grazing areas, will result in the highest quality pastures being on the rehabilitated TSF.

It is anticipated that trees may naturally establish on the surface of the capped TSF post mining. Roots from trees may have the potential to penetrate through the covering layers. However, given the improved pastures to be established on the TSF during the rehabilitation phase and likely antecedent soil nutrient conditions, it will be difficult for trees to establish due to competition from grasses and legumes growing on the rehabilitated TSF and the potentially elevated nitrogen levels within the soil. Further, given the high quality pastures that will be able to be established on the TSF, it is anticipated that this area will be preferentially grazed over other rehabilitated areas and any emerging trees are likely to be grazed by animals further limiting their establishment.

If trees are able to establish on the rehabilitated tailings dams it is anticipated that their roots will extend laterally instead of vertically in search of nutrients and plant available water. The capillary break layer will have the ability to 'self-heal' if penetrated by a root once the root rots away (Williams 2020). The compaction from hoofs from cattle during grazing will also help reseal any voids on the subsoil and topsoil. The structure and amelioration of the soil will prevent tunnels from forming in the subsoil.

CMW Geosciences (2020) considered the closure concept of the TSF in their expert review of the TSF, finding that:

> The closure concept is appropriate. Adequate planning has been performed that should ensure the closure outcomes are achievable.

4.2.4 Final void

The final void will be approximately 450 m deep. In the competent rock areas, the void will have side slopes of 40 to 45°. Figure 4.10 and 4.11 show cross sections through the final void.

The void has been designed with the steepest possible geotechnically stable sides to economically access the ore body and minimise the generation of waste rock. As described in the EIS, there is no opportunity to progressively backfill the void due to the single pit configuration, and any backfilling would prevent access to the ore body at depth. Reclaiming the waste rock to backfill the void after mining has been completed would also both prolong the duration of visual, noise and air quality impacts on sensitive receivers by a number of years (anticipated to be approximately 8 years) and would render the project financially unviable.

Notwithstanding, the blasting and movement of rock results in swelling of the rock, meaning that even if the pit could be backfilled, only a portion of the waste rock material would fit back into the pit and a WRE would always be required.

For these reasons, backfilling of the void is not reasonable or feasible and would exclude the full extent of the resource being mined.

Minimal modification to the final void landform is anticipated during the rehabilitation phase, other than reshaping upper batters of the void where soil and weathered rock is present and the construction of a safety bund and security fence.

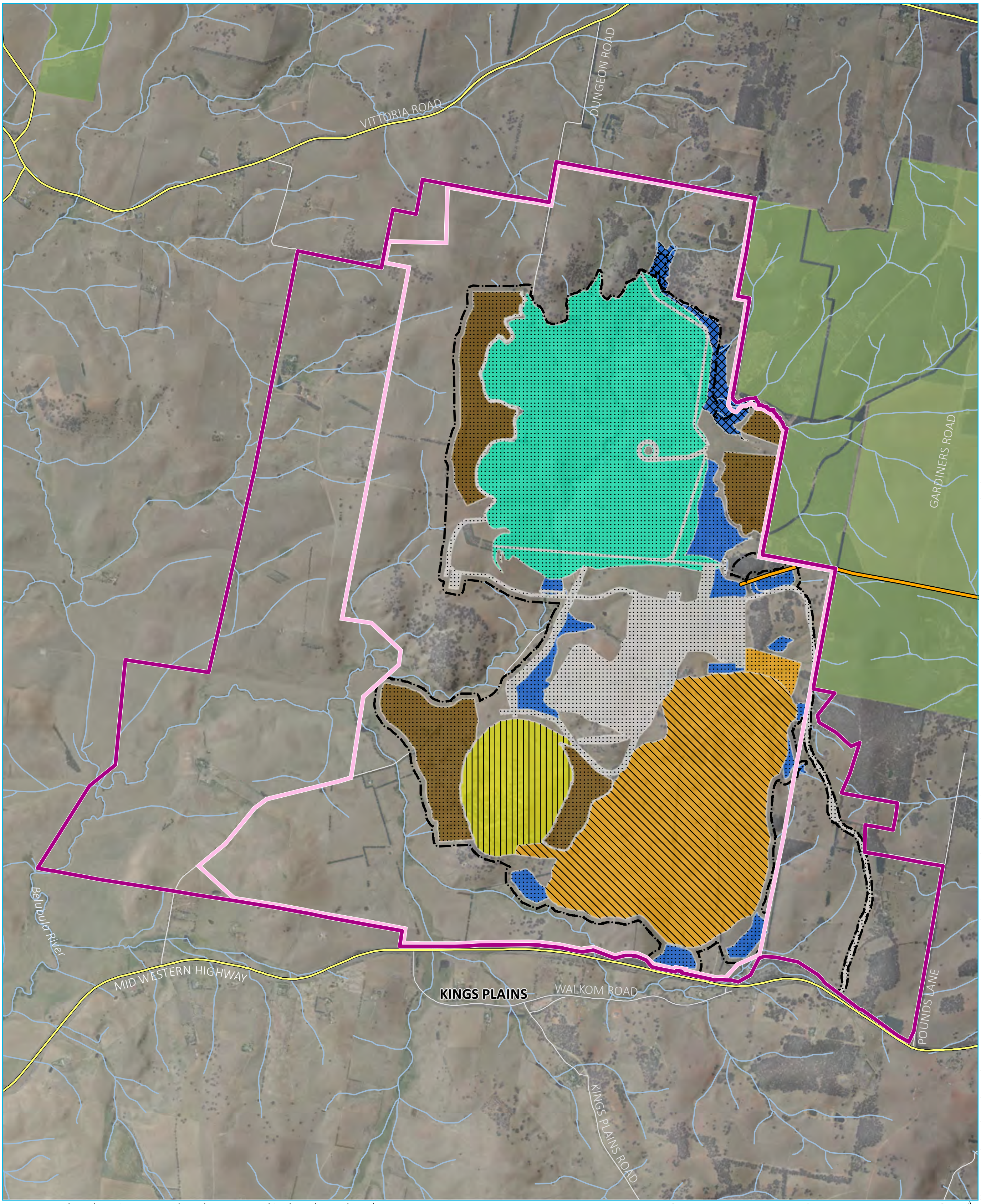
4.3 Rehabilitation by domain

4.3.1 Secondary domains

Primary and secondary domains for rehabilitation planning have been developed for the project in accordance with the requirements of ESG3, as shown in Figure 4.12. As described in Section 2.2, the primary domains are defined based on land management units within the project area with unique operational and functional purposes. The secondary domains are the post-mining land-use domains and are characterised by similar post-mining land-uses. These domains form the basis of performance criteria used for measuring rehabilitation and closure success. The domains remain the same as per the EIS Rehabilitation Strategy and are re-produced in Table 4.2 for ease of reference.

Table 4.2 Primary and Secondary Domains

Code	Primary Domain (Operational)	Mine Areas included	Code	Secondary Domains (Post Mining Land Use)
1	Mine Infrastructure Areas	Process Plant (CIL), Water treatment plant, Facilities, STP, ROM, Haul Roads and Access Roads, power lines and water pipelines	D	Rehabilitation Pasture –Land and Soil Capability Class 6
2	Tailings storage facility	Tailings Storage Facility	D	Rehabilitation Pasture –Land and Soil Capability Class 4
3	Water management areas	Raw Water Dam, Primary WSF (process water dam), TSF Seepage Interception WSF, Secondary WSF and sediment dams (WSF1 to WSF4), TSF clean water diversion	D, B	Mountain Gum – Manna Gum open forest of the South Eastern Highlands Biogregion
4	Waste rock emplacement	Waste, Out of pit disposal area, pit amenity bund	E	Yellow Box - Blakely's Red Gum grassy woodland and Broad-leaved Peppermint-Brittle Gum – Red Stringybark dry open forest.
5	Soil stockpiles	Topsoil stockpiles, subsoil stockpiles	D	Rehabilitation Pasture – Land and Soil Capability Class 4 and 5
6	Open cut void	Final void	I	Final Void



Source: EMM (2020); Regis Resources (2020); Survey Graphics (2019); DFSI (2017)

KEY

Project application area
- Mine development project area
- Mining lease application area (Note: boundary offset for clarity)
- Disturbance footprint
- Additional (post-closure) disturbance footprint
- Pipeline

Primary domains
- 1. Infrastructure area
- 2. Tailings storage facility
- 3. Water management area
- 4. Waste rock emplacement
- 5. Soil stockpile
- 6. Open cut void

Secondary domains
- B - Riparian vegetation
- D - Pastures
- E - Open woodland and open forest
- I - Final void

Existing environment
- Major road
- Minor road
- Watercourse/drainage line
- Vittoria State Forest

Primary and secondary domains

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Figure 4.12

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EMM creating opportunities

The opportunity for progressive permanent rehabilitation for the amended project, as was the case in the EIS, includes the WRE, southern slope of the pit amenity bund, and TSF main embankment following the final stage of downstream construction. Temporary revegetation of water storage facility embankments, the ROM outer embankments, some road fill batters, and soil stockpiles will all be undertaken where possible when construction of these project elements is completed.

The bulk of progressive rehabilitation will be undertaken on the WRE on the south-eastern, southern and south-western slopes when the final landform height is reached to provide erosion protection and improved visual amenity outcomes. Figures 4.1 to 4.6 illustrate progressive rehabilitation of the mine development.

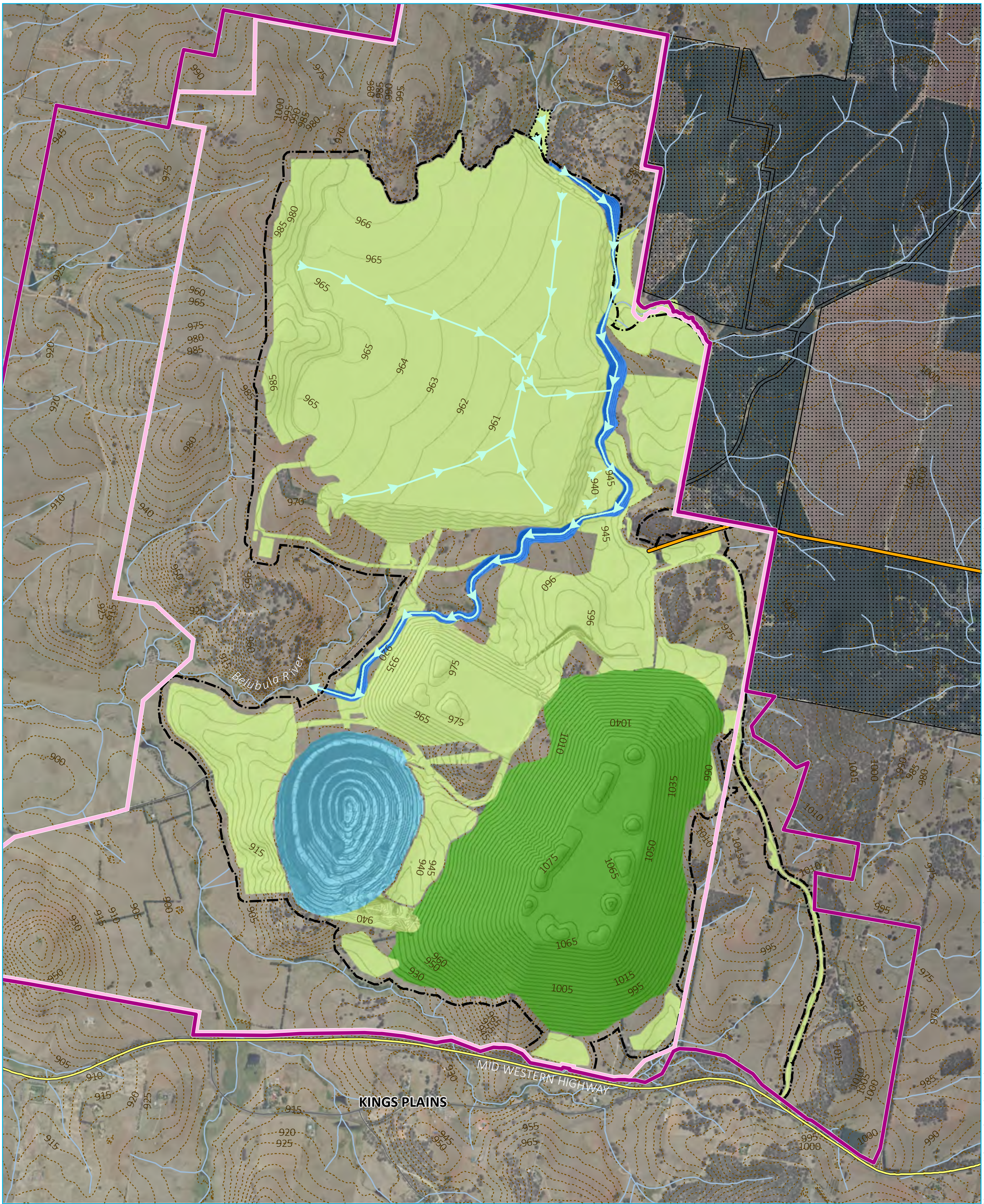
The proposed rehabilitation methods for each domain as described in the EIS Rehabilitation Strategy remain applicable to the amended project. Any changes are noted in the sections below.

4.3.2 Domain 2 Tailings storage facility

The overall objective of TSF rehabilitation will be to form the TSF such that runoff from the rehabilitated surface will report to the clean water diversion system located on the eastern extent of the TSF. As described in ATC Williams (2020), this revised drainage design is generally a reversal of the landform drainage proposed in the EIS design (refer ATC Williams 2019). The benefits of this change are considered as follows:

- The post-closure drainage will be more centrally aligned within the catchment providing greater integration into the surrounding topography.
- The final landform will be formed to ensure no dead storage/ponding within the catchment, allowing the entire catchment to be reinstated post mining, although noting that some storage may be provided as part of the closure planning for use in post-mining land use, such as agriculture.
- The grading of the final closure channel will vary from 0.5% to 2%.

The post-closure drainage system of the amended TSF is illustrated in Figure 4.13.



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Source: EMM (2020); Regis Resources (2020); Survey Graphics (2019); DFSI (2017)

0 0.5 1 km

GDA 1994 MGA Zone 55

KEY

Project application area
- Mine development project area
- Mining lease application area (Note: boundary offset for clarity)
- Disturbance footprint
- Additional (post-closure) disturbance footprint
- Pipeline
- Mine plan contour (5 m); TSF contour (1 m)

- Post-closure drainage pathway

Conceptual final landform elements
- Rehabilitated area (grazing)
- Rehabilitated area (open woodland)
- Clean water diversion
- Void

Existing environment
- Major road
- Minor road
- Watercourse/drainage line
- Existing contour (5 m)
- Vittoria State Forest

Conceptual post closure drainage system

McPhillamys Gold Project
Amendment report – rehabilitation and landscape management strategy addendum
Figure 4.13

Permanent revegetation of the TSF main embankment will be completed once the TSF embankment has reached maximum height around Year 5. This is a change from the EIS, where permanent vegetation would have been established on some of the TSF embankment by around Year 2.

Topsoil and subsoil will be stripped and stockpiled on both the eastern and western sides of the TSF, for respreading at the completion of tailings depositing and capping. Subsoil from within the footprint of the TSF that isn't used to construct the liner in the floor of the TSF will either be used to construct the eastern embankments or stockpiled for capping purposes. Where necessary, the subsoil and topsoil will be ameliorated to address soil chemistry constraints.

Additional capping material for covering the TSF at closure will be sourced from the stockpile of capping material at the northern end of the waste rock emplacement, the wall of the Main WMF and from excavation of the clean water diversion channel. As described in Section 3.2.1, a capillary break/trafficking layer approximately 0.5 m thick will be placed on the TSF, followed by a capping layer that will consist of approximately 0.6 m of subsoil and 0.1 m of topsoil. Prior to placing both the subsoil and topsoil layers, the capillary break/trafficking layer will be allowed to settle and if necessary, additional NAF rock and/or subsoil placed to achieve the final landform design, followed by topsoil placement and revegetation with pasture species by either drill or broadcast seeding.

4.3.3 Domain 3 Water management areas

The water management system has been revised as part of the amended project, and this domain has been updated accordingly.

As per the EIS Rehabilitation Strategy, other than the clean water diversions around the TSF, all water management facilities (WMFs) will be rehabilitated during mine decommissioning and closure. The rehabilitation process will entail dewatering, removal of any embankments, topsoiling, revegetation and monitoring. Rehabilitation will vary depending on the storage history. WMFs that contained saline water or other contaminants such as the Main WMF (used for process water) and the TSF Runoff Interception WMF, may require remediation. These dams will be dewatered once site discharge water criteria has been achieved and any contaminated sediment excavated and taken to the TSF prior to placement of the capillary break layer or offsite to an appropriately licensed facility.

WMFs that have been used as sediment basins such as WMF1 through to WMF6 may require treatment with suitable coagulants and/or flocculants, dewatering and backfilling once the accumulated sediment has been allowed to desiccate. WMFs that have been used for water storage will be dewatered and excavations backfilled.

Slope gradients will generally be in accordance with those that existed pre-mining. WMFs will be rehabilitated to a grazing post mine land use and to an LSC Class 6 or better.

As described above, a clean water diversion drain will be constructed around on the eastern side of the TSF. The clean water will be piped through the mine infrastructure area during mining operations. This will be removed, and an open channel constructed during the rehabilitation phase.

The location of the southern end of the clean water diversion has been revised for the amended project to enable channel gradients more consistent with the natural gradients of the Belubula River. The diversion will be approximately 4,700m in length with an average grade of approximately 1% with grades ranging between 0.5 and 2%.

The diversion channel will be constructed to generally mimic natural geomorphological features consistent with appropriate reference reaches of the Belubula River with similar gradients and guided by *A Rehabilitation Manual for Australian Streams* Rutherford, Jerie and Marsh Cooperative Centre for catchment Hydrology, LWRRDC Canberra 2000 or current best practice natural channel design guideline.

The amended design avoids the need for two large engineered drop structure associated with the EIS design, where the diversion entered the Belubula River downstream of the TSF. A bed level stabilised stock crossing and light vehicle/machinery crossing may be included in the design if deemed necessary for the post mining agricultural land use.

The diversion will be fenced to exclude stock (other than the crossing point) and will be revegetated with appropriate riparian community species to form a riparian corridor along the diversion. Indicative species are provided in Table 4.3.

The stability and rehabilitation of the clean water diversion will be monitored in accordance with the methods described in section 6 of the EIS Rehabilitation Strategy using analogue sites, appropriate completion criteria and annual formal rehabilitation monitoring.

It is also noted that there is the potential for some water management infrastructure associated with the pipeline development to remain in place, in the event that a use for the water supply from Lithgow is identified post-mining. This would be considered as part of the detailed closure planning phase. Retaining this water supply could have some for regional benefits relating to water security, subject to appropriate approvals at the time.

Table 4.3 Riparian community structurally dominant species

Community	Mountain Gum – Manna Gum open forest of the South Eastern Highlands Biogregion
Understory species	Purplish Wallaby Grass *Rytidosperma tenuius*
	Short Wallaby Grass *Rytidosperma carphoides*
	Snow Grass *Poa sieberiana*
	Kangaroo Grass *Themeda triandra*.
	Weeping Grass *Microlaena stipoides*.
	Slender Knot Weed *Persicaria decipiens*
Mid-story species	Silver Wattle *Acacia dealbata subsp. dealbata*
	White Dogwood *Ozothamnus diosmifolius*
Overstory species	Manna Gum *Eucalyptus viminalis*

4.3.4 Domain 5 Waste rock emplacement

Domain 5 also includes the pit amenity bund, which will be one of the first landforms to be constructed and rehabilitated so as to provide an effective noise and visual bund to viewpoints south of the project area.

A key change from the EIS with respect to the WRE is that the construction sequence of the emplacement has been amended to reduce noise impacts in Kings Plains, resulting in an extended construction timeframe for the southern amenity bund (ie the southern face of the WRE). This bund will be completed in around Year 6 of the project, rather than Year 4 as described in the EIS. No changes have been made to the dimensions and shape of the southern amenity bund.

Construction of the WRE will commence in the north, rather than in the south and progressing north as was proposed in the EIS. Waste rock emplacement will then start at the southern end in around Year 2 when pit benches are in place to shield activities in the open cut pit. As shown on the staged mine plans in Figures 4.1 - 4.6, from Year 2 emplacement will occur in both the northern and southern ends as the emplacement is constructed at either end, eventually meeting in the middle. This will include development of the floor of the PAF cells and the downslope containment bunds so that PAF waste rock is contained during mining operations.

Sediment dams will be installed to collect any surface run-off and seepage from the WRE until it is substantially revegetated.

It will be necessary to maintain benches and windrows on the outer sections of the WRE in the active emplacement areas to minimise spillage of waste rock to the lower slopes that are being progressively rehabilitated. Some reshaping will be required to infill the benches and achieve the design slope gradient. Bulk reshaping is not anticipated.

Some areas of the WRE and pit amenity bund such as steeper slopes and concentrated flow areas will require the use of topsoil and rock matrices to withstand the critical shear of overland and concentrated flows.

Progressive rehabilitation planning for the project will focus on the WRE and its schedule is driven by two key aspects:

- availability of reshaped batters adequately protected by temporary upslope benches and berms, whereby topsoiling and seeding activities can be undertaken without fear of being damaged by upslope materials during waste dumping and shaping works; and
- minimising the time that slope lengths up to 20 m are exposed without hydromulch (or similar) and grass cover to minimise potential for erosion of the slopes.

The WRE will be rehabilitated with open woodland and open forest species for a woodland post mine land use. This will include the Yellow Box-Blakely's Red Gum grassy woodlands, South Eastern Highlands Bioregion and Broad-leaved Peppermint – Brittle Gum – Red Stringybark dry open forest of the South Eastern Highland Bioregion. Introduced and native grasses will also be used to provide short- and long-term erosion protection and improved visual amenity outcomes.

5 Rehabilitation methods for closure

5.1 Overview

The rehabilitation methods described in the EIS Rehabilitation Strategy remain applicable to the amended project. The soil balance has been updated to determine the availability of soil resources for rehabilitation to reflect the amended disturbance footprint and is presented below.

5.1.1 Soil stripping

The depth of soil material suitable for recovery and re-use as a topsoil in rehabilitation was determined using available information from the soil assessment prepared for the amended project (SSM 2020). This assessment identified that topsoil is available across the project area for stripping to a depth of approximately 0.15 m. SSM (2020) estimates that 1,163,000 m^3 of topsoil and 3,133,000 m^3 of subsoil is available for stripping within the disturbance footprint of the amended project and that approximately 825,000 m^3 of topsoil and 2,825,000 m^3 of subsoil is required for rehabilitation purposes, as shown in Table 5.1.

These estimates will be confirmed before construction begins, but consistent with the EIS, they indicate that there is adequate suitable topsoil and subsoil to construct the planned soil profiles.

Table 5.1 Topsoil and subsoil volume estimates

	EIS Rehabilitation Strategy								Amended Project							
Infrastructure type	**Topsoil available**		**Subsoil available**		**Topsoil required**		**Subsoil required**		**Topsoil available**		**Subsoil available**		**Topsoil required**		**Subsoil required**	
	Depth (m)	**Volume (m³)**	**Depth (m)**	**Volume (m³)**	**Depth (m)**	**Volume (m³)**	**Depth (m)**	**Volume (m³)**	**Depth (m)**	**Volume (m³)**	**Depth (m)**	**Volume (m³)**	**Depth (m)**	**Volume (m³)**	**Depth (m)**	**Volume (m³)**
Mine void	0.15	106,000	0.50	353,000		-		-	0.15	105,000	0.50	351,000				
Waste Rock Emplacement, Amenity Bunds and ROM pad - top surface	0.15	107,000	0.45	321,000	0.115	82,000	0.50	357,000	0.15	104,000	0.45	311,000	0.115	59,000	0.50	254,000
Waste Rock Emplacement, Amenity Bunds and Run of Mine pad - batters	0.15	402,000	0.45	1,207,000	0.115	308,000	0.25	670,000	0.15	309,000	0.45	926,000	0.115	74,000	0.25	596,000
Waste Rock Emplacement – Low grade ore and Cap rock stockpile									0.15	11,000	0.45	34,000	0.115	13,000	0.60	68,000
Tailings Storage Facility- top surface	0.15	416,000	0.45	1,247,000	0.115	319,000	0.50	1,386,000	0.15	386,000	0.45	1,157,000	0.115	311,000	0.60	1,623,000
Tailings Storage Facility- embankments	0.15	44,000	0.45	131,000	0.115	34,000	0.25	73,000	0.15	62,000	0.45	187,000	0.115	35,000	0.25	76,000
Topsoil stockpiles	0	-	0	-		-		-	0		0					
Water storage embankments	0.15	34,000	0	-	0.115	26,000		-	0.15	16,000	0		0.115	13,000		
Water storages	0	-	0	-		-		-	0		0					
Processing Plant and associated infrastructure and laydown yards	0.15	41,000	0	-	0.115	31,000	0.20	54,000		71,000	0		0.115	52,000	0.20	90,000

Table 5.1 Topsoil and subsoil volume estimates

	EIS Rehabilitation Strategy								Amended Project							
Infrastructure type	Topsoil available		Subsoil available		Topsoil required		Subsoil required		Topsoil available		Subsoil available		Topsoil required		Subsoil required	
	Depth (m)	Volume (m³)	Depth (m)	Volume (m³)	Depth (m)	Volume (m³)	Depth (m)	Volume (m³)	Depth (m)	Volume (m³)	Depth (m)	Volume (m³)	Depth (m)	Volume (m³)	Depth (m)	Volume (m³)
Roads	0.15	67,000	0.15	67,000	0.115	52,000	0.20	90,000	0.15	69,000	0.15	69,000	0.115	40,000	0.20	69,000
Diversion Drain	0.15	26,000	0.50	86,000	0.115	20,000	0.20	34,000	0.15	30,000	0.50	98,000	0.115	28,000	0.20	49,000
Total		1,243,000		3,412,000		872,000		2,664,000		**1,163,000**		**3,133,000**		**825,000**		**2,825,000**

5.1.2 Soil stockpiling

A soil management plan will be incorporated into the Rehabilitation Management Plan, to identify where the stripped soil will be placed, based on its suitability for reuse and the soil balance. Suitability will be determined following soil testing. Soil stockpile locations, volumes and date of soil stripping will be recorded as part of the Rehabilitation Management Plan.

The following process for soil stockpiling will be followed:

- where possible, soil stockpiles will be located away from drainage lines. If necessary, drainage will be diverted around stockpiles to prevent erosion;
- sediment controls will be installed downstream from stockpiles to prevent contamination of clean water;
- stockpiles will be approximately 3 m high for topsoil;
- more erodible materials will be placed on flatter areas to minimise the potential for erosion;
- the surface of soil stockpiles shall be contour scarified in order to promote infiltration and minimise erosion until vegetation is established; and
- stockpiles will be seeded with cover crops to protect the stockpile from raindrop splash erosion, aerate the soil to reduce anaerobic conditions, enhance organic carbon levels and suppress weeds.

References

AS/NZS ISO 3100:2009 *Risk Management - Principles and Guidelines.*

ATC Williams 2019, *McPhillamys Gold Project Tailings Storage Facility Definitive Feasibility Study.*

ATC Williams 2020, *McPhillamys Gold Project Tailings Storage Facility Design Review and Response to Submissions Received in Relation to the Development Application and Associated EIS.*

Australian and New Zealand Minerals and Energy Council (ANZMEC) and Minerals Council of Australia (MCA) 2000, *The Strategic Framework for Mine Closure*.

CMW Geosciences 26 July 2020, *Technical Review, TSF Design, McPhillamys Gold Project.*

Commonwealth of Australia 2006, *Mine Closure and Completion – Leading Practice Sustainable Development Program for the Mining Industry.*

Commonwealth of Australia 2006, *Mine Rehabilitation – Leading Practice Sustainable Development.*

Department of Environment and Climate Change, 2008 *Managing Urban Stormwater – Soils and Construction Volume 2E Mines and Quarries.*

Department of Primary Industries – Agriculture NSW Water unit 2014, *Primefact 326 Water requirements for sheep and cattle* 3rd edition.

EMM Consulting Pty Limited 2019 *McPhillamys Gold Project, Environmental Impact Statement*.

- 2020a *McPhillamys Gold Project, Amendment Report.*
- 2020b *McPhillamys Gold Project, Submissions Report.*
- 2020c *McPhillamys Gold Project, Amendment Report – Groundwater Assessment Addendum.*

HEC 2020, *McPhillamys Gold Project, Revised Surface water Assessment,* prepared by Hydro Engineering & Consulting.

Land and Water Resources Research and Development Corporation (LWRRDC) 2000, *A Rehabilitation Manual for Australian Streams.*

Landcom 2004, *Managing Urban Stormwater Soils and Construction Volume 1* 4th edition.

Landloch 2019, *Conceptual Waste Landform Design, McPhillamys Gold Project.*

Loch,. R, Slater, B.K, and Devoil,. 1998, C *Soil erodibility (K_m) values for some Australian soils* Australian Journal of Soil Research.

NSW Department of Industry, Skills and Regional Development - Division of Resources and Energy, March 2016, *Guideline for mineral exploration drilling; drilling and integrity of petroleum exploration and production wells.*

NSW Department of Trade and Investment – Division of Resources and Energy, September 2013, ESG3 *Mining Operations Plan (MOP) Guidelines*.

Office of Environment and Heritage 2012, 2nd Edition, *The land and soil capability assessment scheme: second approximation.*

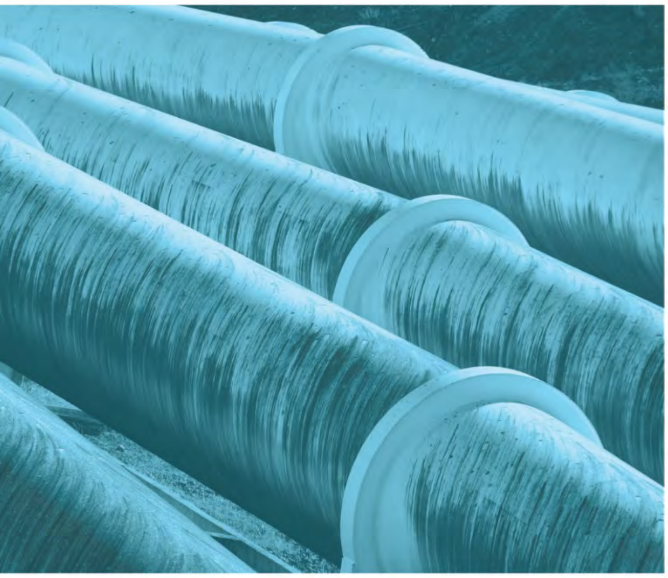
SRK Consulting 2019, *McPhillamys Gold Project: Geochemical characterisation.*

Sustainable Soils Management Pty Ltd 2019, *McPhillamys Gold Project Land Capability and Soil Assessment.*

Sustainable Soils Management Pty Ltd 2020, *McPhillamys Gold Project Land Capability and Soil Assessment Addendum.*

Williams, D, 2020, *Independent Expert Technical Review: Regis – McPhillamys Gold Project Tailings Solution Design, Operation and Closure.*



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