



McPhillamys Gold Project Environmental Impact Statement Executive Summary

Prepared for LFB Resources NL
August 2019





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Declaration

For submission of an environmental impact statement (EIS) under Part 4 of the NSW Environmental Planning and Assessment Act 1979.

EIS prepared by

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Description of development

McPhillamys Gold Project
Refer to Chapter 2 of this EIS for a description of the proposed development

Land to be developed

Refer to Appendix A of EIS

Declaration

We confirm that we have prepared this EIS in accordance with the Environmental Assessment Requirements issued for the McPhillamys Gold Project and that the:

- EIS has been prepared in accordance with Schedule 2 of the EP&A Regulation 2000;
- EIS contains all available information that is relevant to the environmental assessment of the proposed development; and
- Information in the EIS is neither false or misleading.



Janet Krick

Senior Environmental Planner
27 August 2019



Nicole Armit

Associate Director
27 August 2019

McPhillamys Gold Project

Environmental Impact Statement

Report Number

RP#1

Client

LFB Resources NL

Date

27 August 2019

Version

Final

Prepared by



Janet Krick
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27 August 2019

Approved by



Nicole Armit
Associate Director
27 August 2019

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.

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Executive Summary

ES1 Introduction

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), as shown in Figure ES1. The project comprises two key components:

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

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. Water will be supplied to the mine site via an approximate 90 kilometre (km) long pipeline, transferring surplus water from Centennial Coal's Angus Place Colliery (Angus Place) and Springvale Coal Services Operations (SCSO), and Energy Australia's Mount Piper Power Station (MPPS) near Lithgow, to the mine.

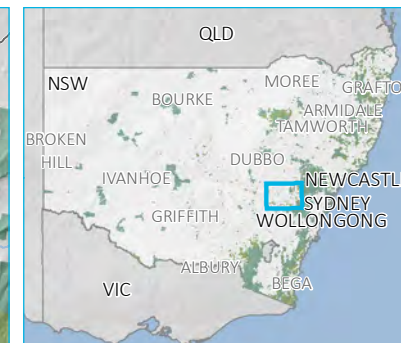
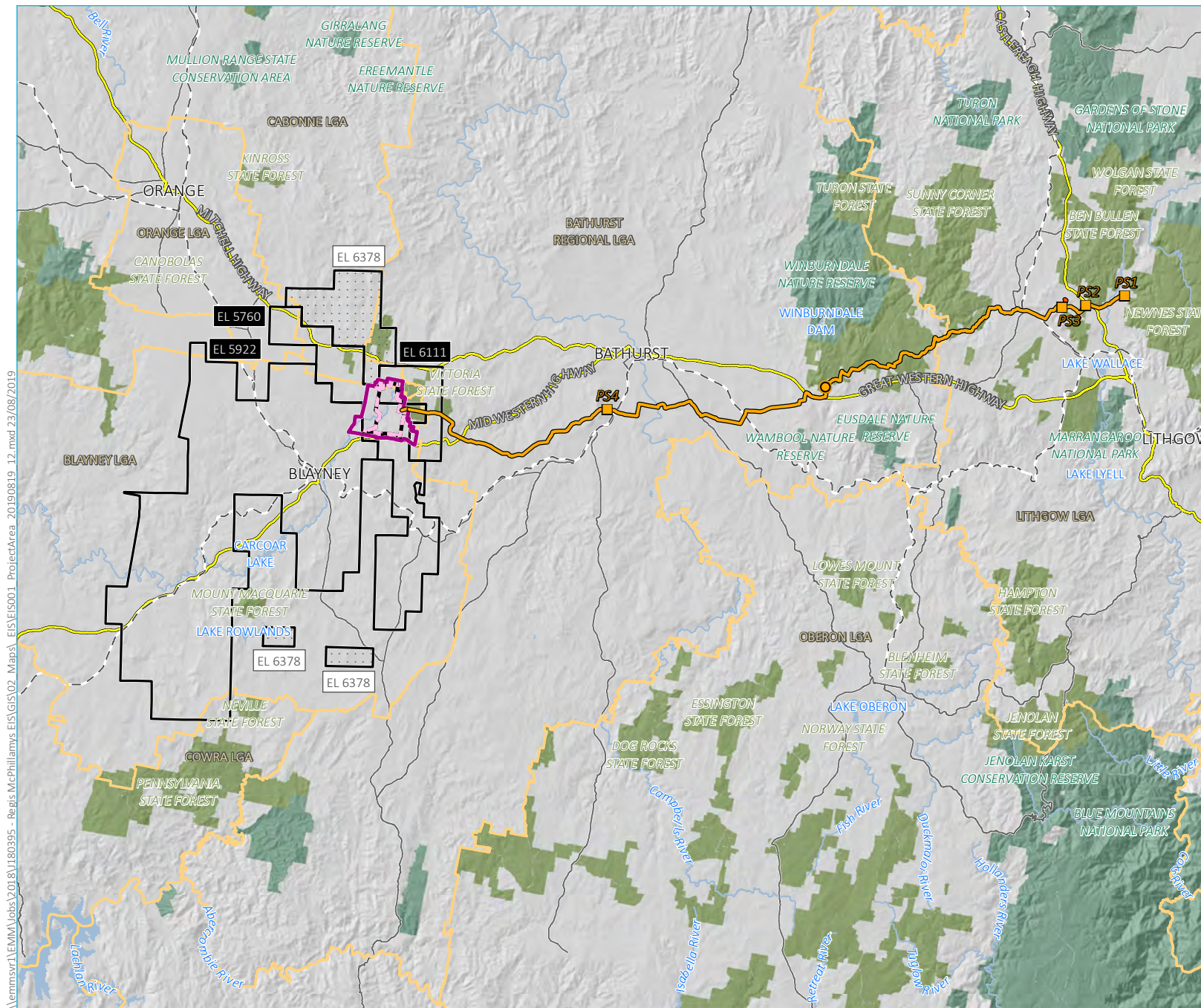
LFB Resources NL is a 100% owned subsidiary of Regis Resources Limited (herein referred to as Regis). Regis is an Australian gold miner with a proven record of developing gold mining operations and is one of the top five Australian gold companies by market capitalisation and production. Regis acquired Exploration Licence (EL) 5760 in November 2012 and has since conducted detailed geological, environmental, financial and other technical investigations to define the McPhillamys resource and to identify and address environmental and other constraints. The large investment proposed to construct and operate the project will provide substantial economic stimulus and benefits to the Australian, NSW and local economies.

ES2 Project application area

The area in its entirety to which the McPhillamys Gold Project development application (SSD 9505) relates is defined in this Environmental Impact Statement (EIS) as the project application area; comprising the mine development project area and the pipeline corridor as illustrated in Figure ES1. The project application area totals approximately 2,640 hectares (ha) (comprising the mine project area of 2,513 ha and pipeline corridor of 127 ha). The disturbance footprint within the mine project area is approximately 1,135 ha to accommodate the mine development, which includes the open cut mine, tailings storage facility (TSF), waste rock emplacement, Run-of-Mine (ROM) pad, processing plant, administration area and workshop, water management facilities, topsoil stockpiles, roads and other ancillary areas. The indicative layout of the mine development is illustrated in Figure ES3.

The mine development project area is in the Central Tablelands region of NSW, approximately 8 km north-east of Blayney, 20 km west of Bathurst and 27 km south-east of Orange (refer to figure ES2). The mine development is mostly within the Blayney local government area (LGA), with a small portion extending into the Cabonne LGA. The mine project area is zoned RU1 Primary Production under both the *Blayney Local Environmental Plan 2012* and *Cabonne Local Environmental Plan 2012*. The mine development is in the upper reaches of the Belubula River catchment, within the greater Lachlan River catchment.

The mine project area is surrounded by a variety of land uses, predominately agriculture, as well as scattered rural residences, forestry and natural areas. It is bounded by the Vittoria State Forest to the north-east and east, and the Mid-Western Highway to the south. The land adjacent to the north and west comprise mainly agricultural areas and rural residences. The Kings Plains settlement is directly south of the mine project area on the southern side of the Mid Western Highway, with a small population of approximately 45 people (Hansen Bailey 2019).

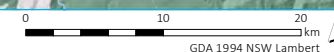


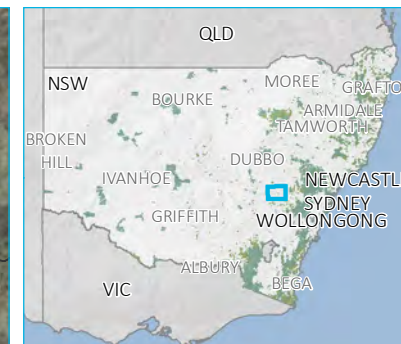
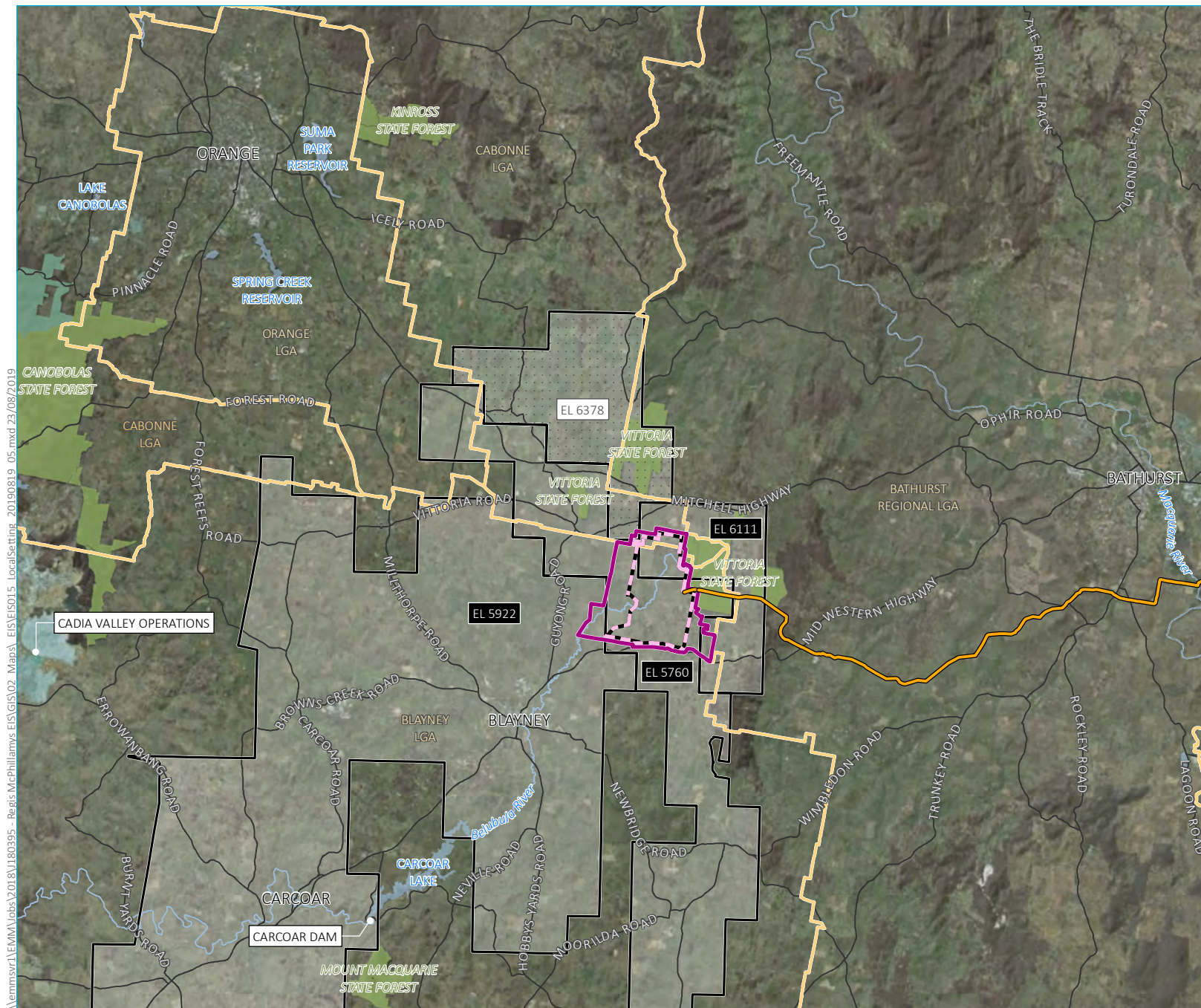
- KEY**
- Project application area
 - Mine development project area (2,513.47 ha)
 - Mining lease application area (1,812.99 ha)
(Note: boundary offset for clarity)
 - Pressure reducing system
 - Pumping station facility
 - Pipeline corridor
 - Pipeline corridor (Blowdown Pond)
 - Existing environment
 - 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

Regional setting - project application area

McPhillamys Gold Project
Environmental impact statement
Figure ES1

Source: EMM (2019); Regis Resources (2019); DPE (2018); DFSI (2017); GA (2011)





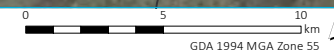
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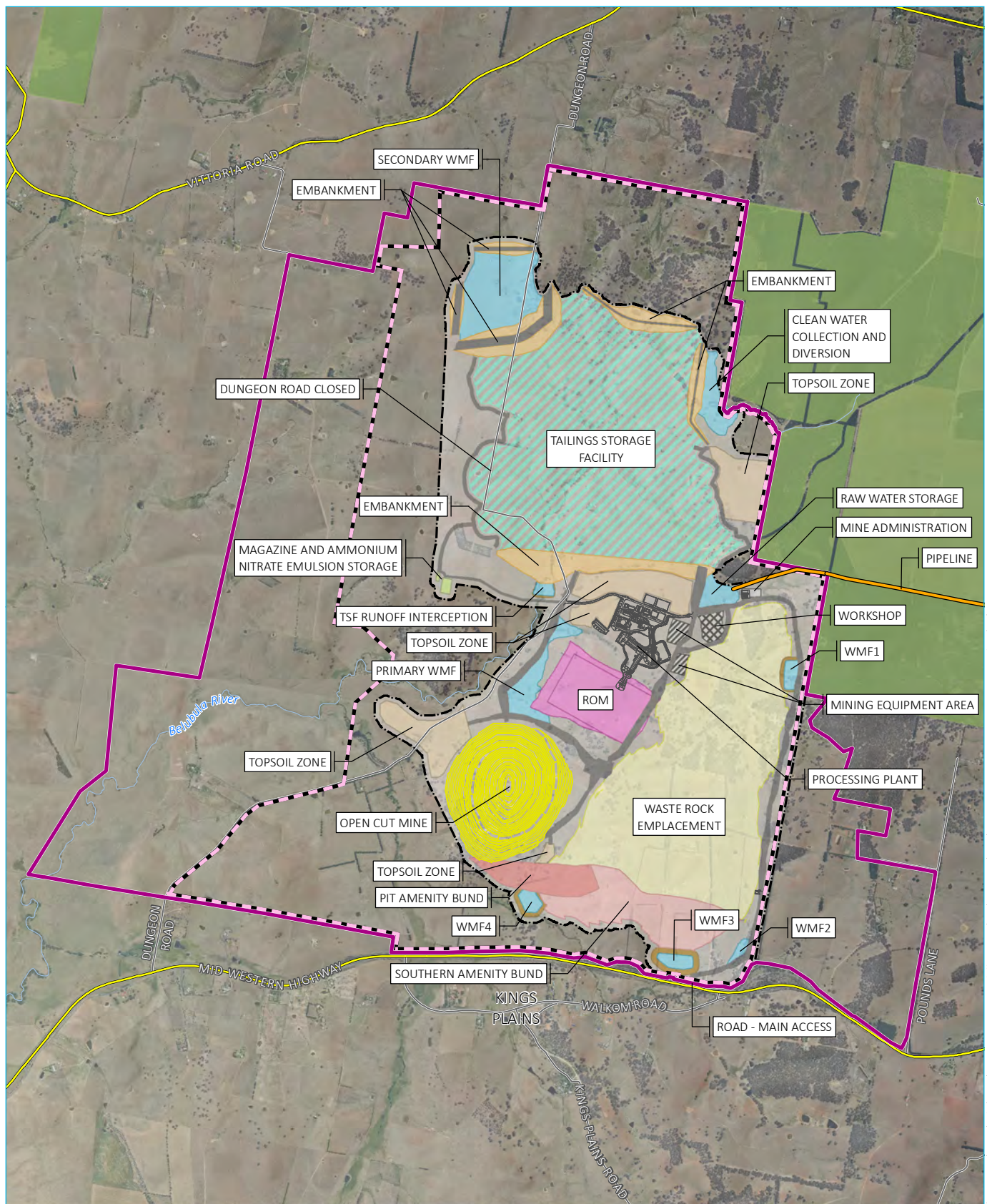
- Project application area
 - Mine development project area (2,513.47 ha)
 - Mining lease application area (1,812.99 ha) (Note: boundary offset for clarity)
- Pipeline corridor
- Existing environment
 - Main road
 - Named watercourse
 - Named waterbody
 - NPWS reserve
 - State forest
 - Local government area
- Exploration lease boundaries (of interest)
 - Held by LFB Resources NL (Regis)
 - Held by others

Local setting of the mine development

McPhillamys Gold Project
Environmental impact statement
Figure ES2

Source: EMM (2019); Regis Resources (2019); DFSI (2017); GA (2011)





Source: EMM (2019); Regis Resources (2019); Survey Graphics (2019); DPE (2018); DFSI (2017); GA (2011)

0 1 2 km
GDA 1994 MGA Zone 55

KEY

- Project application area
- Mine development project area (2,513.47 ha)
- Mining lease application area (1,812.99 ha) (Note: boundary offset for clarity)
- Disturbance footprint
- Pipeline corridor
- Project general arrangement
- Plant layout

- Road
- Water management facility (WMF)
- Sediment basin structure
- Existing environment
- Main road
- Local road
- Belubula River
- Vittoria State Forest

Mine development general arrangement

McPhillamys Gold Project
Environmental impact statement
Figure ES3

The pipeline corridor traverses the LGAs of Lithgow, Bathurst and Blayney, extending for approximately 90 km from Angus Place, SCSO and MPPS at its eastern extent in the Blue Mountains to the mine development at its western extent. The pipeline corridor alignment primarily traverses land used for agriculture, consisting of mostly cleared, open paddocks used for sheep and cattle grazing. The alignment of the pipeline has been carefully planned to utilise disturbed ground, such as existing road easements and tracks, as much as possible. The pipeline corridor also travels through the Vittoria State Forest, Sunny Corner State Forest, Ben Bullen State Forest, and a number of road reserves.

The corridor will accommodate all components of the pipeline development including pumping station facilities and associated pipeline infrastructure. The pipeline corridor ranges in width along its length from 6 m to 20 m, excluding the four pumping stations facilities. At these facilities, the corridor width extends to an area of up to 75 m by 75 m to accommodate the construction and operation of these facilities. The width of the corridor has been carefully defined in consideration of property, infrastructure and environmental constraints.

ES3 Project overview

Regis is seeking SSD consent under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to develop and operate the project.

Regis also referred a proposed action to the Commonwealth Minister for the Environment (Commonwealth Minister) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This referral (EPBC Act referral 2019/8421) only related to the mine development: the referral did not include the pipeline development. On 28 May 2019, a delegate of the Commonwealth Minister determined under section 75 of the EPBC Act that the proposed action is a controlled action. As such, the proposed action will also need to be assessed and approved under the EPBC Act.

The key aspects of the project are summarised below.

- Development and operation of an open cut gold mine, comprising approximately one to two years of construction, approximately 10 years of mining and processing and a closure period (including the final rehabilitation phase) of approximately three to four years, noting there may be some overlap of these phases. The total project life for which approval is sought is 15 years.
- Development and operation of a single circular open cut mine with a maximum diameter at the surface of approximately 1,050 metres (m) and a final depth of approximately 460 m, developed by conventional open cut mining methods encompassing drill, blast, load and haul operations. Up to 8.5 Million tonnes per annum (Mtpa) of ore will be extracted during the project life.
- Construction and use of a conventional carbon-in-leach processing plant with an approximate processing rate of 7 Mtpa to produce approximately 200,000 ounces, and up to 250,000 ounces, per annum of product gold. The processing facility will comprise a run-of-mine (ROM) pad and crushing, grinding, gravity, leaching, gold recovery, tailings thickening, cyanide destruction and tailings management circuits. Product gold will be taken off-site to customers via road transport.
- Placement of waste rock into a waste rock emplacement which will include encapsulation of material with the potential to produce a low pH leachate. A portion of the waste rock emplacement will be constructed and rehabilitated early in the project life to act as an amenity bund.
- Construction and use of an engineered tailings storage facility to store tailings material.
- Construction and operation of associated mine infrastructure including:

- administration buildings;
 - workshop and stores facilities, including associated plant parking, laydown and hardstand areas, vehicle washdown facilities, and fuel and lubricant storage;
 - internal road network;
 - explosives magazine and ammonium nitrate emulsion (ANE) storage;
 - topsoil, subsoil and capping stockpiles;
 - ancillary facilities, including fences, access roads, car parking areas and communications infrastructure; and
 - on-site laboratory.
- Establishment and use of a site access road and intersection with the Mid Western Highway.
 - Construction and operation of water management infrastructure, including raw water storage dam, clean water and process water diversions and storages, and sediment control infrastructure.
 - A peak construction workforce of approximately 710 full-time equivalent (FTE) workers. During operations, an average workforce of around 260 FTE employees will be required, peaking at approximately 320 FTEs in around years four and five of the project.
 - Construction and operation of a water supply pipeline approximately 90 km long from Centennial's Angus Place and SCSO; and Energy Australia's MPPS operations near Lithgow to the mine development project area. The pipeline development will include approximately four pumping station facilities, a pressure reducing system and communication system. Approximately 13 ML/day (up to a maximum of 15.6 ML/day) will be transferred for mining and processing operations.
 - Installation and use of environmental management and monitoring equipment.
 - Progressive rehabilitation throughout the mine life. At the end of mining, mine infrastructure will be decommissioned, and disturbed areas will be rehabilitated to integrate with natural landforms as far as practicable. The final landform, apart from the final void, will support land uses similar to current land uses or land uses consistent with land use strategies of the Blayney and Cabonne LGAs.

ES4 Impact assessment

Thorough technical assessments have been undertaken of all potential environmental and social impacts associated with the project. As explained in Chapter 6 of this EIS, project planning included multiple rounds of design, assessment and refinement based on the results of these technical assessments to avoid impacts or, if unavoidable, minimise and/or offset them.

The findings of the detailed technical assessments are provided in the body of this EIS and the appendices. The following sub-sections provide an overview of the main findings; however, to gain a proper understanding of the project, the detailed assessments should be read in their entirety.

ES4.1 Mine development

ES4.1.1 Soil and land resources

A land capability and soil assessment was undertaken, including a baseline assessment across the mine project area, involving a biophysical strategic agricultural land (BSAL) verification assessment, a detailed soil survey and a land and soil capability assessment. The assessments involved a desktop review of existing land and soil data, a field assessment and laboratory analysis of collected soil samples.

The BSAL assessment was undertaken in accordance with the requirements of the *Interim protocol for site verification and mapping of biophysical strategic agricultural land* (NSWG 2013) (the interim protocol). The BSAL assessment verified the mining lease application area as 'non-BSAL' and a Site Verification Certificate (SVC) was subsequently issued for the mine development by the Department of Planning and Environment (DPE – now the Department of Planning, Industry and Environment (DPIE)) on 18 June 2019.

Up to 1,135 ha of land will be disturbed to develop and operate the mine. This will result in some changes to the land and soil capability (LSC) class across the mine project area compared to the existing landscape; primarily a reduction in LSC class 5 land and an increase in land with an LSC class of 6. The mine project area currently comprises mostly LSC class 4 (moderate capability) and LSC class 5 land (moderate-low capability land). This is reflective of the existing land use in the project area, which is mainly agriculture, consisting of mostly cleared open paddocks utilised for cattle grazing.

Upon completion of mining all surface infrastructure will be removed and the area rehabilitated to a condition that is stable and supports the post mining land use, which will typically be grazing. Post mining, the rehabilitation landform will predominantly be a combination of class 4, class 5 and class 6 land. Notably, the LSC class across parts of the TSF footprint will be improved from a pre-mining LSC class 5 to a post-rehabilitation LSC class 4. This commitment to rehabilitating the TSF final landform to achieve an LSC class of 4 means that there will be only a minimal change in class 4 land across the disturbance area as a result of the mine development.

The change in LSC classes in the mine project area post-mining will be as follows: a reduction in LSC class 4 by 12 ha, a reduction in LSC class 5 by 411 ha, an increase in LSC class 6 by 336 ha, an increase in LSC class 7 by 17 ha and an increase in LSC class 8 by 70 ha (associated with the open cut void). Therefore, the majority of the site will be suitable for the continuation of agricultural land use post mining.

Soil erosion minimisation practices will be adopted during earthworks required for the mine development, in accordance with the Landcom (2004) publication *Managing Urban Stormwater: Soils and Construction – Volume 1* and DECC (2008) *Volume 2E – Mines and Quarries* (the Blue Book). In addition, drainage structures such as sediment dams will be constructed and maintained as part of the water management system as required throughout the project life, also in accordance with the Blue Book.

ES4.1.2 Agricultural resources

An agricultural impact statement was prepared for the mine development, which assessed the potential impacts of the mine on agricultural resources within and surrounding the mine project area. The assessment involved detailed database searches and mapping review, such as ABS Agricultural Census Data, review of public information, consultation with relevant technical specialists and the review of other relevant assessments supporting the EIS.

All identified potential risks to agricultural resources were assessed as being low, provided the specified mitigation measures are implemented. Importantly, as described above there is no BSAL located in the mining lease application area and proposed disturbance area associated with the mine development.

The financial impact to the agricultural industry income of the proposed disturbed land in the mine project area was calculated to be a reduction of \$406,193 /year during the mine life and \$95,373 / year upon rehabilitation, which equates to approximately 1% and 0.2% respectively, of the total \$42.7 million of income from agriculture within the Blayney LGA.

ES4.1.3 Water resources

Water-related technical studies included development of a water balance and numerical groundwater model for the mine development, and assessments of surface water quality, surface water flow and geomorphology, flooding, groundwater and hydrochemistry.

The mine development water management system has been designed to avoid discharge of process affected water offsite. The system includes a series of clean water diversions to minimise the volume of clean water flowing into the mine disturbance footprint, and a series of water management facilities to effectively contain and manage sediment laden/process water. Numerical modelling and analytical techniques have been used to develop the site water balance and predict water quantity and quality changes to surface water and groundwater resources. The impacts on surface water and groundwater as a result of the mine development are predicted to be minimal and impacts to downstream water users are predicted to be minor, as described further below.

i Groundwater

The mine development is within the Lachlan Fold Belt Murray Darling Basin (MDB) Groundwater Source. Groundwater in this source is managed by the Water Sharing Plan for the *NSW Murray-Darling Basin Fractured Rock Groundwater Sources 2011*. The groundwater source is generally not highly productive and groundwater abstraction within the Silurian and Ordovician formations is generally for stock and domestic purposes.

The mine development will result in a decline in groundwater levels in a localised area surrounding the open cut mine. The *NSW Aquifer Interference Policy (AIP)* requires 'make good' provisions to be made for landholder bores affected by a greater than 2 m drawdown as a result of the project; however, no third party bores are predicted to experience a drawdown in excess of 2 m as a result of the project.

Based on the results of the groundwater model, the maximum take of groundwater as a result of open cut mining which will need to be accounted for by water access licences (WALs) is 890 ML/yr, which is predicted occur in around mining Year 2. The ongoing groundwater inflow to the pit void which will need to be accounted for by WALs post mining is predicted to be around 200 ML/yr.

The groundwater inflow will be from the Lachlan Fold Belt MDB Groundwater Source, with a very minor contribution over time from the overlying water source. Regis has secured approximately 45% of the required groundwater licence volume. Application for the remaining 490 ML of groundwater licence requirements from the Lachlan Fold Belt MDB Groundwater Source through controlled allocation and/or water trades is proposed to obtain the remaining groundwater licence volume, to secure the total required volume of 890 ML.

The design of the TSF includes multiple features to manage seepage including lining/conditioning of the TSF storage area to meet EPA's permeability requirements and the construction of a seepage collection drain at the toe of the main embankment. Seepage is predicted to remain within the saprock zone, flowing in a horizontal direction. Some of the seepage that migrates south from the TSF is predicted to seep towards the pit. A percentage of the seepage is predicted to move towards the Belubula River at a rate of approximately 50 m in 100 years. Importantly, the results of the groundwater assessment indicate that even without all seepage management measures in place, any seepage that may migrate through the hydrostratigraphic units (units that act as aquifers or aquitards) towards the Belubula River will have concentrations below the observed baseline surface water quality concentrations, ANZECC (2000) livestock drinking water and ANZECC (2000) 80% protection level for freshwater aquatic ecosystem guideline values (for analytes with elevated concentrations in the tailings liquid fraction results).

Mine development activities are not anticipated to result in a lowering of the beneficial use category of the groundwater source beyond 40 m from the mine development, provided the mitigation measures discussed in Chapter 9 are implemented.

ii Surface water

The mine development is in the upper reaches of the Belubula River catchment, within the greater Lachlan River catchment. The Belubula River has its headwaters immediately north-east of the mine project area and flows to the south-west into Carcoar Dam (approximately 26 km south-west of the mine development).

A temporary reduction in the inflow to Carcoar Dam (4%) will occur as a result of construction and operation of the mine. Permanently, after mine closure and rehabilitation, the reduction in flows will be much smaller (0.5% reduction). This level of change is expected to be within the current natural variability of catchment conditions.

Currently, flow in the Belubula River between the mine project area (ie downstream from the project area boundary) and above Carcoar Dam ranges from around 697 ML/yr to 1,436 ML/yr under low rainfall (95th percentile) conditions. When the mine is at its maximum disturbance footprint, it will decrease surface water flows by around 61 ML/yr, so that flow in the Belubula River between the mine project area and Carcoar Dam will range between at least 636 ML/yr and 1,402 ML/yr under these same low rainfall conditions. This represents between a 9% and 4% reduction, respectively. During these low rainfall periods when downstream users are most reliant on water within the Belubula River, groundwater discharge as baseflow in the Mid Western Highway area is predicted to remain unchanged from current conditions.

In relation to flooding, as the mine development is in the headwaters of the catchment, localised flooding impacts will be confined to land owned by Regis. Changes to flood levels and flood peak velocities are predicted to be minimal and construction of a flood levee is not warranted.

The TSF has been designed to avoid adverse impacts to the surrounding environment and is large enough to contain all water from sustained rainfall events with minimal spill risk. The mine development is not anticipated to result in a lowering of the beneficial use category of local surface water sources. Water quality effects will be able to be mitigated and/or managed appropriately.

In relation to the final void, once mining has ceased the open cut (or pit lake) will slowly fill with water, recovering to an elevation of around 902 m AHD. The pit lake is predicted to take around 400 years to reach this elevation. The results of the final void water balance model predict that the pit lake water level will remain below ground surface and will not spill.

ES4.1.4 Noise, vibration and blasting

The mine design and indicative schedule for which approval is sought has been developed through an iterative process, largely in consideration of the outcomes of noise modelling for both construction and operation of the mine. Given the close proximity of the mine project area to a number of residences, particularly in the Kings Plains locality, some key design changes were incorporated into the project where reasonable and feasible to do so, so that noise emissions can be managed effectively at these nearest residences (referred to as sensitive receptors in this EIS), and minimised as much as possible.

Noise levels during the initial site establishment period (ie the first 6 months or so) are predicted to exceed the relevant noise management level (NML) (as defined in the *Interim Construction Noise Guideline*, (DECC 2009) at one residential receptor, which is R17, by 5 dB(A). This is attributed to the construction of the new mine site intersection on the Mid Western Highway in the vicinity of this residence. Considering this, it is important to note that NMLs are not a criterion (as are operational noise limits), but a trigger for when construction noise management is to be considered and implemented.

Construction management and mitigation measures will be detailed in the Construction Environmental Management Plan (CEMP) to be prepared for the mine development.

Following site establishment, the initial development of the mine will include the construction of two amenity bunds at the southern end of the project area; the pit amenity bund, and the southern amenity bund, which is the southern face of the waste rock emplacement (refer to Figure ES3). The amenity bunds will be constructed during Year 1 to Year 4 of the project and will serve as both noise and visual barriers between the mine development and residential receptors in Kings Plains. The time to construct these bunds will be dependant in part on weather conditions during their construction.

Where noise enhancing weather conditions occur, particularly at night-time, operations may be limited on the southern face and will have to move to the northern end of the emplacement. Regis will proactively manage activities on these amenity bunds in consideration of real-time noise monitoring and weather conditions so that the bunds can be constructed as quickly as possible and in accordance with the noise predictions in the noise and vibration impact assessment of the project. Once constructed, the bunds will effectively shield the Kings Plains settlement from views of active mining operations.

Notwithstanding, the operational noise assessment predicts that 15 residences in Kings Plains will experience noise levels that exceed the Project Noise Trigger Levels¹ (PNTLs) during the early few years of the mine development, such that they will be entitled to the implementation of voluntary mitigation measures upon request. These residences are R17, R19, R21, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, and R34, as shown in Figure 10.1 (refer to Chapter 10). Alternatively, Regis may enter into an agreement with these landholders. Importantly, these exceedances will be temporary, and will reduce to within 2 dB of the PNTLs by Year 4, as a result predominantly of the amenity bunds being in place by this time. It is noted that receptor R38 is also predicted to experience noise levels such that voluntary mitigation rights will apply, taking the total to 16 residences; however, Regis have negotiated an option with the landholder to purchase this property upon receipt of project approval.

The sleep disturbance assessment concluded that the predicted noise levels at sensitive receptors are below those likely to cause awakenings. In relation to the proposed blasting activities at the mine, blasts will be limited to a maximum instantaneous charge (MIC) of 300 kg, so that no exceedances of the relevant criteria for air blast overpressure and ground vibration are predicted to occur at any nearby residential receivers or heritage items.

Road traffic noise relating to vehicle movements on Dungeon Road and the Mid Western Highway are not predicted to exceed the assessment or relative increase criteria at any of the houses near these roads.

ES4.1.5 Air quality

A network of air quality and meteorology monitoring equipment has been established by Regis within and around the mine project area. It consists of a High Volume Air Sampler (PM₁₀), dust deposition gauges and a meteorological monitoring station.

The design of the mine development incorporates a range of dust mitigation measures. A review of dust control measures was undertaken for the mine development, and this identified that the proposed mitigation and management measures will be in accordance with accepted industry best practice. Based on the modelling predictions, the proposed mitigation measures will effectively control emissions from the mine to minimise impacts on the surrounding environment.

¹ The Project Noise Trigger Level is defined in the NSW Environment Protection Authority's *Noise Policy for Industry* (2017) as the level that provides a *benchmark* or *objective* for assessing a proposal or site. It is not intended for use as a mandatory requirement. The project noise trigger level is a level that, if exceeded, would indicate a potential noise impact on the community, and so 'trigger' a management response; for example, further investigation of mitigation measures.

Dispersion modelling was undertaken for four stages over the proposed life of the mine. The results of the modelling show that, for all assessed stages of the mine development and operation, the predicted concentrations and deposition rates for particulate matter (TSP, PM₁₀, PM_{2.5}, dust deposition, metals and metalloids) and gaseous pollutants (NO₂ and HCN) are below the applicable impact assessment criteria at neighbouring privately owned residences.

Cumulative impacts were assessed by combining modelled mine-related impacts with recorded ambient background levels. The cumulative results also demonstrated compliance with applicable impact assessment criteria, despite a range of conservative assumptions in the emission calculations and dispersion modelling techniques, at all receptors apart from R38 which indicated one exceedance in Year 4 of the project. As noted, Regis have negotiated an option with the landholder to purchase this property upon receipt of project approval.

ES4.1.6 Greenhouse gas

The likely greenhouse gas (GHG) emissions from the mine development will be minimal, only making minor contributions to the total GHG emissions from NSW and Australia. Annual average total GHG emissions (Scope 1, 2 and 3) to be generated by the mine represent approximately 0.095% of total GHG emissions for NSW and 0.026% of total GHG emissions for Australia, based on the National Greenhouse Gas Inventory for 2017.

ES4.1.7 Terrestrial biodiversity

Vegetation within the project area, which has experienced a long history of pastoral use, mainly comprises open paddocks with some fragmented patches of timbered natural vegetation scattered throughout.

The terrestrial biodiversity assessment included preliminary vegetation mapping and surveys carried out by Envirokey between May 2013 and April 2017. EMM completed additional detailed tasks to further inform the terrestrial biodiversity assessment which included vegetation mapping, additional plot and transect data and completion of targeted flora surveys.

The majority of the project area was found to be dominated by open grasslands of varying condition and quality. Most of these areas have been heavily impacted by pastoral activities and are dominated by exotic plant species. Notwithstanding, four Plant Community Types (PCTs) were identified across the mine disturbance footprint:

- PCT 1330: Blakely's Red Gum Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion, which is listed as an Endangered Ecological Community (EEC) under the NSW *Biodiversity Conservation Act 2016* (BC Act);
- PCT 727: Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands Bioregion;
- PCT 951: Mountain Gum - Manna Gum open forest of the South Eastern Highlands Bioregion; and
- PCT 766: Carex sedgeland of the slopes and tablelands.

Avoidance and minimisation of impacts on biodiversity have been applied as guiding principles in the design of the mine development. Ecological investigations completed between 2013 and 2019 have enabled a comprehensive knowledge of the project area's biodiversity and areas of low constraint to be identified.

Following all measures to avoid, minimise and mitigate impacts, the mine development will result in the following residual impacts:

- removal of 132.36 ha of native vegetation and fauna habitat, of which:

- 129.3 ha comprises habitat for the Squirrel Glider, listed as Vulnerable under the BC Act listed;
- 75.77 ha comprises habitat for Koala, listed as Vulnerable under the BC Act and EPBC Act;
- 44.22 ha (PCT 1330) represents White Box Yellow Box Blakely's Red Gum Woodland EEC listed under the BC Act; and
- 18.5 ha represents White Box Yellow Box Blakely's Red Gum Woodland and Derived Native Grasslands CEEC listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The area of White Box Yellow Box Blakely's Red Gum Woodland to be cleared by the mine development represents a 3.9% reduction in this vegetation community listed under the BC Act, and a reduction in 1.68% of CEEC listed under the EPBC Act, within a 5 km buffer of the mine project area. These impacts will be compensated through the implementation of the project's biodiversity offset strategy.

Offset calculations have been undertaken in accordance with *Framework for Biodiversity Assessment: NSW Biodiversity Offsets Policy for Major Projects* (OEH 2014) (FBA) to determine the number of credits required to compensate for the mine development's residual impacts and enable a net positive effect on biodiversity.

The mine development requires 5,927 ecosystem credits to compensate for residual impacts on plant community types (PCTs) and their associated threatened species. In addition to ecosystem credits, the mine development also requires 1,970 species credits for the Koala and 2,845 species credits for the Squirrel Glider. Regis will compensate for these residual impacts through the implementation of a biodiversity offset strategy developed in accordance with the FBA.

Regis will meet the offset obligation through one, or a combination of, the following actions:

1. establishment of a biodiversity stewardship site, managed under a stewardship agreement; and/or
2. purchase and retire credits available on the biodiversity credit register; and/or
3. payment into the Biodiversity Conservation Trust.

Regis is currently completing preliminary assessments of a property which it has recently purchased to determine its suitability as a biodiversity stewardship site. The potential stewardship site is located approximately 3 km south-west of Blayney. The site provides good value as a potential stewardship site, with large areas supporting Box Gum Woodland that meet the condition criteria in the Commonwealth listing advice for the community (PCT condition code high). This site would provide a suitable offset for the project and satisfy the requirements for a direct offset in accordance with the EPBC Act Environmental Offsets Policy (DSEWPac 2012).

ES4.1.8 Aquatic ecology

The aquatic assessment involved detailed desktop review, literature review and field surveys. It included the assessment of 15 sites across four waterways, including the Belubula River and associated tributaries. Twelve of these sites were in the mine project area and three outside of the project area, at the junctions of the Belubula River and the Midwestern Highway, Newbridge Road and Hobby Yards Road.

The mine development is unlikely to impact threatened aquatic species, populations or ecological communities listed under the *Fisheries Management Act 1994* (FM Act) and EPBC Act. This is because waterways in the mine project area are unlikely to contain habitat which support these fish species.

Additionally, impacts to riparian vegetation are anticipated to be minor and local to the project area. Although temporary erosion and degradation of riparian zones is anticipated, this is unlikely to impact significant riparian vegetation and habitat, including threatened riparian species or communities listed under the EPBC Act.

While the assessment found aquatic habitat in the mine project area is unlikely to support threatened species habitat, including habitat to support breeding or migration, due to low level of connectivity between pools and the highly disturbed condition of the aquatic environment, the majority of surveyed sites were still classified as Type 1 highly sensitive key fish habitat due to the presence of aquatic habitat features such as instream aquatic vegetation and in channel debris. The mine development will result in the direct impact of removal of key fish habitat associated with the Belubula River within the disturbance footprint.

An aquatic ecology offset program will be prepared and implemented to offset the loss of key fish habitat in the mine disturbance footprint, so that there is a net gain in aquatic biodiversity outcomes of the mine development.

ES4.1.9 Aboriginal heritage

An Aboriginal cultural heritage assessment was carried out by Landskape (2019), finding a total of 38 aboriginal heritage sites in the mine project area. Twenty three of the sites found are in the footprint of either the open cut area, tailings storage facility, waste rock emplacement area or surface infrastructure and therefore will be directly impacted by land disturbance. These sites will be salvaged prior to land disturbance. Disturbance to a further 10 sites may occur as they are within close proximity to these areas and sit within the overall disturbance footprint identified for the project.

Landskape (2019) assessed the scientific, educational and aesthetic significance of the sites as low and the significance to the Aboriginal community as moderate. Disturbance to these sites will not greatly impact the Aboriginal heritage value of the mine project area or region or cause cumulative impact, considering the implementation of management measures outlined in Chapter 15.

A Cultural Heritage Management Plan (CHMP) will be prepared to guide the mitigation and management of sites in the mine project area and to avoid inadvertent impacts. The CHMP will also outline the protocol for unanticipated finds such as artefacts and skeletal remains.

ES4.1.10 Historical heritage

No listed heritage items occur within the mine project area. Notwithstanding, eight sites deemed to be of local significance were identified in the direct footprint of the mine development. A further four locally significant sites were found within buffer areas around the direct disturbance footprint and may therefore be subjected to some level of disturbance. The sites identified are representative of pastoral and mining activities of the late nineteenth century. They comprise historic dwellings and dwelling ruins, mining sites (shafts, an adit and a survey marker tree), domestic and pastoral refuse dumps, small bridges and pastoral sites (sheds, stockyards).

One site located in the disturbance footprint of the proposed secondary water management facility (MGP-H23, the Hallwood Farm Complex) has been identified as possibly holding high historical, associational, aesthetic and technical values.

Landskape (2019) concluded that with the exception of Hallwood Farm Complex, the disturbance to the sites in the mine project area would not greatly impact the historical heritage value of the project area or region or cause cumulative impact, considering the implementation of recommended management measures (described in Section 16.5). A range of mitigation and management measures will be implemented to appropriately manage the sites identified in the mine project area. These measures include some further subsurface testing at two sites, archival recording and/or salvaging for others, and the fencing of some sites outside of the disturbance footprint to ensure no inadvertent impacts occur.

A CHMP will be prepared to guide the mitigation and management of sites in the mine project area and to avoid inadvertent impacts. The CHMP will also outline the protocol for unanticipated finds such as artefacts and skeletal remains.

Further research will be conducted to confirm the significance of this site particularly in relation to the building fabric and technical details of the Hallwood dwelling, and the mitigation and manage measures for this site will then be updated accordingly as part of the preparation of the CHMP. Consultation with Cabonne Shire Council revealed that the Cabonne LEP includes heritage items based on a community-based heritage study in 2006 wherein Cabonne residents were invited to identify items of value to the community. This study and the subsequent LEP of 2012 did not receive any representations for Hallwood to be incorporated as a locally significant item.

ES4.1.11 Traffic and transport

The traffic assessment examined the potential impacts on the safety and efficiency of the local and regional road network as a result of the mine development. It identified no significant adverse impacts as a result of traffic movements to be generated by the mine development during both the construction and operation phases.

All vehicles will access the mine site via a new access road off the Mid Western Highway, which will be designed to safely accommodate project-related traffic volumes. The intersection will be designed and constructed with turn treatments to a greater standard than those determined using the Austroads Guide.

Fog-activated warning signs are proposed to be installed in consultation with NSW Roads and Maritime Services on the Mid Western Highway in advance of the new access intersection to reduce potential traffic conflicts/accidents. No other road or intersection upgrades will be required. A traffic management plan including a drivers' code of conduct will be developed to control project-related traffic movements and driver behaviour within the mine project area and on the surrounding road network.

ES4.1.12 Hazard and risk

The hazard and risk assessment considered if the mine development would be a hazardous or offensive development as defined under the *State Environmental Planning Policy No 33 (hazardous and Offensive Development)* (SEPP 33). A preliminary hazard analysis workshop and subsequent assessment was therefore carried out for the project in accordance with clause 12 of SEPP 33 (Risk Mentor 2019, refer to Appendix R). This assessment concluded that the development does not constitute a hazardous or offensive development in accordance with SEPP 33.

The assessment considered the likely risks to public safety and provides measures to the mine development design to minimise and avoid impacts to people, property and the environment. The assessment evaluated several items associated with the project including storage and transport of dangerous goods and materials, bushfire risks and geochemical hazards and risks.

All potentially hazardous materials will be stored onsite away from disturbance boundaries to prevent any impact to members of the public. The magazine is located more than 2,200 m from the nearest sensitive receiver (ie privately owned dwelling) and over 1,000 m from the open cut, processing plant and administration areas. The diesel and LPG storages will be located separately to prevent unwanted interaction. These storages will also be located away from ignition sources, including machinery and vegetation.

Explosives will be stored in a magazine facility designed to meet the separation and design requirements in *AS2187.2 2006 Explosives – Storage, Transport and Use*. Sodium cyanide will be stored in accordance with the International Cyanide Code. The compound will be dry, banded, locked and remote from any flammable materials. Liquid form sodium cyanide will be stored in banded tanks and rated and labelled pipelines.

Regis will prepare a hazardous materials management plan which will describe the measures that will be implemented to ensure the safe handling, storage and transportation of hazardous materials used onsite. This plan will also document appropriate emergency procedures.

In relation to bushfire risk, the eastern boundary of the mine project area and the Vittoria State Forest, north-east of the project area, are mapped as bushfire prone. A bushfire management plan will be prepared and implemented for construction, operation and decommissioning, which will govern the implementation of the above listed management measures.

ES4.1.13 Visual amenity

Generally, there will be a high level of visual impact as a result of the mine development to sensitive receptors in the Kings Plains settlement, rural residences and the Mid Western Highway up to Year 4 following the completion and progressive rehabilitation of the southern amenity bund. A number of rural residences to the east and west of the mine project area will also experience high levels of visual impact during the initial stages of the mine development.

Following completion of a number of strategic on-site mitigation treatments and rehabilitation establishment, visual effects will be reduced but will remain moderate to high for many components over the life of the mine where there are direct views onto operational components. This reduction will be significant in the long term as the new post mining landforms become integrated with surrounding rural landscape character via micro-topographic design and careful rehabilitation tree planting patterns.

Importantly, the mine schedule has been designed to construct to the southern face of the waste rock emplacement as quickly as possible, so that this face will act as a bund to shield views of the active mining operations from the closest residence to the mine project area in Kings Plains.

Night-lighting from the mine infrastructure area and movement of mine fleet will contribute significantly to the sky glow in this existing dark sky locality. Distance will reduce the visual impacts from more distant sensitive view locations in the west as it becomes part of the greater sky glow prevalent around Blayney.

ES4.1.14 Social impact

A social impact assessment (SIA) was prepared by Hansen Bailey for the project in accordance with the *Social Impact Assessment Guidelines for State Significant mining, petroleum and industry development* (DPE 2017) (the SIA guidelines). The assessment identified the potential impacts and opportunities associated with both the construction and operational phases of the development, as well as appropriate measures for managing adverse social impacts and enhancing potential benefits.

The mine development will result in benefits to the local and regional communities, as well as resulting in a number of social impacts. The SIA found that the most significant social impacts predicted to occur will accrue to residents in closest proximity to the mine project area, particularly within the settlement of Kings Plains. The potential significant opportunities associated with the mine development will accrue largely to the broader Blayney LGA.

The SIA found that the area within around 2 km of the mine development, and particularly the Kings Plains locality, will experience a number of social impacts as a result of the construction and operations phases of the mine development. These impacts relate to a range of factors including changes in rural amenity and potential outmigration of residents. The most significant social impact of the mine development on the residents close to the mine project area is anticipated to be elevated noise levels particularly during the first few years (from Year 1 up to Year 4 of the project) prior to the completion of the southern amenity bund, and a change in the landscape due to the construction of the waste rock emplacement and the removal of the top of McPhillamys Hill as the open cut is mined.

As described in Chapter 6 (project evolution), Chapter 10 (noise) and Chapter 19 (visual), an extensive amount of work has been undertaken to ensure all reasonable and feasible measures have been implemented into the project design to avoid and/or reduce amenity related impacts on the Kings Plains community.

A range of mitigation measures have been proposed to mitigate and or manage the social impacts associated with the mine development, as described in Chapter 20.

The mine development will provide substantial direct and indirect employment opportunities, which will in turn provide a significant boost to the regional economy. The Blayney LGA in particular will benefit from investment in community infrastructure and services made possible through a Voluntary Planning Agreement (VPA) between Regis and the council, investment in education and training as Regis seeks to build a local skill base to support labour supply for the project, project procurement spend as Regis is committed to supporting local businesses to participate in the project procurement process, and direct and indirect population growth.

ES4.1.15 Rehabilitation

The areas to be disturbed by mining and infrastructure use will be progressively rehabilitated to a range of LSC classes, from class 4 to class 8. The majority of rehabilitation will target an agricultural (grazing) final land use. The upper slopes of the final void will be battered back to ensure a safe and stable landform remains post mining.

Progress on rehabilitation will be monitored annually and the results will be reported within the annual review. Final rehabilitation and closure requirements will ultimately be developed as part of a detailed closure plan, which will be produced within five years of closure in consideration of input from key government agencies, relevant stakeholders (including the nearby community) and applicable guidelines and standards at the time.

ES4.2 Pipeline development

ES4.2.1 Soil and land resources

The soil and land assessment for the pipeline involved a desktop assessment of potential impacts including erosion and sedimentation, acid sulphate soils, salinity, disturbance of contaminated soils, and naturally occurring asbestos.

The pipeline development will temporarily impact on soil and land resources along the 90 km corridor, predominantly through the excavation of soils for the laying of pipe in a trench. Erosion and sediment control practices will be adopted during construction of the pipeline in accordance with the Blue Book, Volume 1 (Landcom 2004) and Volume 2 (DECC 2008). These measures will be documented in the CEMP for the pipeline.

ES4.2.2 Water resources

The water assessment conducted for the pipeline development involved a desktop assessment to collate water quality, flow, groundwater and flooding data, which was used to prepare a surface water, groundwater and flooding assessment of the pipeline development. A geomorphology assessment was also conducted, involving a field assessment of 20 watercourse crossings to assess geomorphic attributes and stability.

The pipeline corridor traverses seven water catchments, with eight permanent watercourses crossed by the pipeline in six of the eight catchments. The pipeline will cross a total of 112 drainage lines, most of which are ephemeral minor streams and gullies that only flow after large rainfall events.

The potential for impacts to major watercourses traversed by the pipeline corridor has been avoided through design of the pipeline construction methodology; Macquarie River and Queens Charlottes Creek (Vale Creek) will be underbored to protect stream flows and to minimise disturbance to shallow groundwater.

Construction activities are not expected to interfere with groundwater resources or quality as trenching will typically be relatively shallow (1.3 m to 2 m) compared to the likely depth of the water table (generally >10 mbgl). It is unlikely then that the work will intercept groundwater aquifers or their flow systems.

The exception to this is the quaternary sandy alluvium associated with major river and creek crossings. The alluvium is unconsolidated and relatively thin (less than 15 m thick) but groundwater levels can be high with water tables generally 1.5–3 mbgl. Consequently, and as mentioned, underboring of the pipeline is proposed at the Macquarie River and Queens Charlottes Creek (Vale Creek). Underboring will allow the pipeline to be specifically positioned at the base of the alluvium or into the weathered rock profile so as to not affect groundwater flows or water quality.

The construction of the pipeline is expected to have negligible impacts on water flows due to the immediate backfill and rehabilitation of disturbed areas once the pipeline is laid. To avoid impacts to surface water quality, and as described above in ES4.2.1, erosion and sediment controls will be installed and maintained prior to the start of the construction activities in accordance with the Blue Book to protect local watercourses from impacts relating to erosion and the resulting sedimentation.

During commissioning, the pipeline will be pressure tested and monitored for any leaks. To minimise the risk of uncontrolled discharge to the environment only high-quality water will be used for pressure testing. Emptying of the pipeline will occur at scour valves located at intermediate low points along the alignment. Water will be removed via tanker trucks and taken to an appropriate storage location within the pipeline corridor or to the McPhillamys mine project area at Blayney.

Periodic monitoring of water quality is proposed along the pipeline corridor at permanent stream crossings. During operation, isolation or section valves will isolate the pipeline into discrete sections and allow individual sections to be dewatered for maintenance, or to provide security in an event such as a pipeline leak. Isolation valves will be installed on either side of major watercourse crossings.

The likelihood of a pipeline leak will be reduced through detailed modelling of pipeline pressures during detailed design, together with quality assurance and checking during the post construction. Periodic inspections and leak detection monitoring will be part of the ongoing operation and maintenance procedures.

ES4.2.3 Noise, vibration and blasting

The majority of the pipeline corridor traverses rural and rural residential land, with the potential for low levels of background noise. It also travels through a number of State Forests and some areas of native woodland vegetation. At the eastern extent of the pipeline development the corridor passes through highly disturbed land used for mining and power generation at Angus Place, SCSO and MPPS.

Potential noise sensitive receivers for the pipeline development are considered to be the receivers within 1 km of the pipeline corridor. Approximately 297 noise sensitive receivers have been identified along the pipeline corridor, the majority of which are residential properties. Noise levels at the identified receivers were calculated for a worst-case scenario of all construction equipment operating simultaneously. In reality this is unlikely to occur, and therefore the results presented in this EIS for noise predictions along the pipeline corridor during construction are conservative.

The construction noise levels for most activities associated with the pipeline installation have the potential to be above the relevant noise criteria (or noise management levels (NMLs)) at most receivers in close proximity to the corridor, although for the most part is expected to be only for a short duration. Assuming a construction rate of 40 - 80 m per day in rocky conditions (such as forestry tracks) and up to 600 - 650 m per day in open farmland, the potential for noise impacts at each identified receiver is not expected to occur for more than two weeks. Given the mobile nature of construction activities for the majority of the corridor, it is expected that sensitive receptors will only be exposed to elevated noise levels for relatively short periods.

Negotiation and notification with landholders, proactive management and adoption of specific onsite construction noise attenuation measures, limiting or staggering hours of construction, avoidance of out-of-hours work and / or adoption of alternative construction methods for managing and minimising impacts (including out-of-hours impacts) in accordance with the Noise and Vibration Assessment (Appendix AA) will be required.

The highly affected NML specified in the *Interim Construction Noise Guideline* (ICNG) (DECC 2009) of 75 dBA is expected to be satisfied at all receivers except at one (R48 on Pipers Flat Road in Portland) during transient pipeline construction activities, which will include clearing, grading, trenching and backfilling. This house is within 50 m of the pipeline corridor. In accordance with the requirements of the ICNG, respite periods may be required for this property.

Although construction noise will generally be temporary and localised in nature, the potential impacts will be managed through the implementation of noise control measures outlined in Chapter 25, particularly during noise intensive works when they are in close proximity to houses (<200 m).

Operational noise emissions from the pumping station facilities and pressure reducing system are anticipated to be negligible at adjacent receivers to each site, although this assumes some form of container or enclosure is adopted for each pumping station facility.

Noise management and mitigation measures will be implemented during the construction of the pipeline development. These measures will be documented in the CEMP.

ES4.2.4 Air quality and greenhouse gas

In relation to air quality, impacts will be minimal and temporary; generally limited to around 1-2 days at each location during the laying of the pipeline.

In order to assess the air quality impact potential of the proposed construction phase of the pipeline, a qualitative impact assessment has been undertaken. While no specific methodology for such an assessment is available in Australia, the United Kingdom-based Institute of Air Quality Management (IAQM) has prepared the *Guidance on the Assessment of Dust from Demolition and Construction* (hereafter GADDC, IAQM 2014). The GADDC has been applied for construction projects in NSW and accepted by the EPA as a progressive approach to assessing the particulate matter impact risk associated with short-term construction and demolition projects.

The assessment found the risk of dust impacts to human health and ecological receptors from the demolition, construction and truck trackout phases of the pipeline construction, prior to the application of dust mitigation measures, ranges between negligible and low. The assessment found there was a medium risk of dust soiling impacts as a result of earthworks without the implementation of mitigation measures. Accordingly, dust management measures will be documented in the CEMP.

GHG emissions from the pipeline development will principally be associated with energy consumption, specifically diesel combustion during the construction phase and consumption of purchased electricity by pumping stations during the operational phase. Due to the temporary nature of construction and the relatively small power requirements during operation, the GHG emissions from the pipeline will be negligible.

ES4.2.5 Biodiversity

The biodiversity assessment was initially conducted using desktop database searches, literature reviews, photographs and maps, previous studies carried out in the locality and consultation with representatives of relevant government, landowners and other stakeholders. The results of this desktop assessment were used to plan the initial route of the pipeline corridor.

The information available on biodiversity values was then supplemented by field surveys which were carried out in August, September, October and December 2018, and January and May 2019. The results of these field surveys resulted in many changes to both the route and the width of the pipeline corridor.

The pipeline route was originally planned to largely follow the APA gas pipeline easement and Transgrid easements; however, once the utilities advised that the pipeline development would need to lie beyond the boundaries of their easements, it became clear that this would involve significant removal of native vegetation. In addition, part of the route near the Sunny Corner State Forest which would have provided better gradients for the pipeline was abandoned due to the significant presence of the host plants (*Bursaria spinosa*) of the Purple Copper Butterfly. The final selection of the pipeline route has therefore been an iterative process informed by field surveys and landscape and habitat values to avoid impacts as far as possible.

The final alignment chosen means that the pipeline corridor generally traverses large extents of cleared agricultural land and timber plantations of Radiata Pine. Where possible, the pipeline will be trenched into existing roads and tracks, minimising impact to native vegetation and threatened species habitat. Further, impacts to threatened fish distribution and key fish habitat in the Macquarie River and Queen Charlottes Creek will be avoided by underboring rather than trenching.

Twelve Plant Community Types (PCT) have been identified within the proposed alignment of the pipeline corridor, totalling 8.51 hectares in extent. Vegetation conditions range from poor to good along the corridor, with several PCTs occurring in three condition states.

One BC Act listed threatened ecological community (EEC) was identified in the corridor; White Box Yellow Box Blakely's Red Gum Woodland EEC. Clearing at pumping station facility No.4 will permanently remove 0.175 ha of this vegetation type. With about 66.88 ha within the study area, this represents approximately 1.7 % of the known EEC within the study area being directly impacted and 0.3 % being permanently cleared.

One EPBC Act listed critically endangered ecological community (CEEC), White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Grassland community, comprising an area of 0.28 ha of moderate condition vegetation also occurs within the pipeline corridor at the site of pumping station facility 4. With about 33.3 ha of the CEEC in the study area, this represents a 0.8 % removal of the CEEC in the study area.

Six threatened species listed under the BC Act were recorded during the field survey: Gang Gang Cockatoo; Dusky Woodswallow; Spotted Harrier; Little Eagle; Flame Robin; and Capertee Stringybark.

Seven BAM species credit species were also assumed to be present within the pipeline corridor for the purposes of impact assessment and the calculations of required biodiversity offset credits, where targeted surveys were not conducted in suitable habitat or due to the low likelihood of detection based on climatic conditions at the time of the survey. These species are: Eastern Pygmy Possum; Southern Myotis; Purple Copper Butterfly; Squirrel Glider; Brush-tailed Phascogale; Silky Swainson-pea; and Austral Toadflax.

The assessment also identified that one threatened fish species (Purple spotted Gudgeon) could be impacted by the pipeline development. However, the BC Act test of significance for this species indicates that there will be no significant impact as a result of the pipeline development. Furthermore, the EPBC Act significant impact guidelines were applied to one EPBC listed CEEC and ten EPBC listed threatened species. The pipeline development will not have a significant impact on any of these species or communities.

To offset the impacts of the pipeline development on native vegetation and threatened species, a total of 139 ecosystem credits and 293 species credits will be required. Accordingly, a biodiversity offset strategy will be prepared for the pipeline development, which will be included in the overarching biodiversity offset strategy for the project, including the mine development.

ES4.2.6 Aboriginal heritage

The Aboriginal Cultural Heritage Assessment identified seven Aboriginal heritage sites within the pipeline corridor. OzArk (2019b) assessed the archaeological/scientific, aesthetic and historical value of these sites as low. Based on feedback from the RAPs, the social or cultural value of all sites has been assessed as high.

All sites within the corridor will be salvaged by a surface collection of all visible artefacts prior to disturbance in the area.

An Aboriginal Cultural Heritage Management Plan (ACHMP) will be prepared to guide the management of sites in the pipeline corridor and avoid inadvertent impacts on sites located outside of the corridor. The ACHMP will also outline the protocol for unanticipated finds such as artefacts and skeletal remains.

ES4.2.7 Historic heritage

The historic heritage assessment for the pipeline development found that no historic heritage items will be directly impacted by the pipeline development. Desktop searches of heritage databases identified 20 locally listed heritage items within 1 km of the pipeline corridor. None of these listed items are within the pipeline corridor; however, two of these items are directly adjacent to the pipeline corridor being:

- Leeholme Homestead and outbuildings listed on the Bathurst Regional LEP 2014; and
- Portland General Cemetery listed on the Lithgow LEP 2014.

The pipeline corridor does not intersect the curtilages of these heritage listed items and there will be no ground disturbance impacts outside of the pipeline corridor. There is the potential for these items to be indirectly impacted during construction without the implementation of appropriate management measures.

No visual impacts will occur on historic heritage items. The pipeline will be buried, except for the pumping station facilities and the pressure reducing system. The above ground structures of the pipeline development will not be within the visual curtilage of any listed heritage items.

ES4.2.8 Traffic and transport

The traffic assessment examined the potential impacts on the safety and efficiency of the local and regional road network as a result of the pipeline development. No significant impacts during construction are anticipated to occur on the operation or capacity of key regional, urban, local or unsealed roads and intersections providing access to each of the pipeline development construction sites.

Key regional roads will be underbored to avoid any impact to traffic using these roads. Queuing or delays may be associated with partial road closures to accommodate trenched road crossings; however, impacts will be limited to a duration of up to two days at any one location.

To mitigate any potential impacts on the road network, a Construction Traffic Management Plan (CTMP), will be prepared prior to construction of the pipeline as part of the CEMP.

ES4.2.9 Visual amenity

The visual assessment for the pipeline development included identification of key viewpoints (potentially affected receptors) based on site observations, aerial photography and mapping and analysis of the existing visual character in the vicinity of permanent infrastructure.

The visual assessment concluded that the pipeline development will not have significant visual impacts along the pipeline corridor. During the construction phase, impacts will be temporary and will move progressively along the corridor. The pipeline corridor will be mostly below ground once constructed, with only the pumping station facilities, pressure reducing system and valves visible above ground during the operational phase.

The pumping station facilities No.1, No.2 and No.3 will be located on existing mine and infrastructure sites which have a high visual absorption capacity. Pumping station facility No.4 will be near the Bathurst Bike Park and will be visible from public viewpoints in the area; however, it will be located within existing screening vegetation. Any further impacts during the construction and operation phase will be managed with additional mitigation measures.

ES4.2.10 Rehabilitation

The rehabilitation and closure strategy for the pipeline development is to ultimately create safe, stable and non-polluting landforms that are consistent with agreed post development land uses. Regis will ensure land disturbed by the pipeline is rehabilitated to an appropriate standard and representative of surrounding vegetation communities (including pasture) and is compatible with pre-disturbance and surrounding land uses. Rehabilitation will occur progressively and as soon as practical following completion of pipeline construction.

ES4.3 Economic assessment

The project is estimated to bring significant net social benefits to NSW of \$141 million to \$232 million (present value at 7% discount rate), the latter being inclusive of employment benefits. Therefore, the project is highly desirable and justified from an economic efficiency perspective.

The key driver of the net social benefits to NSW is revenue (reflecting production levels, the value of gold in USD and the AUD/USD exchange rate). Forecasts suggest that revenue estimates may be conservative in the economic assessment of the project, and hence the estimate of net social benefits may be conservative.

The relative magnitude of net production benefits and residual environmental, cultural and social impacts indicates that even with large changes to the assumed gold price, the net production benefits of the project to NSW are likely to still far outweigh any residual impacts of the project.

At a local level (within the Blayney, Cabonne, Bathurst and Orange LGAs), and based on the conservative assumption of full regional employment and no in-migration of labour, it is estimated that the project will contribute 136 direct local jobs (\$12 million in income) to residents of the region during the peak year of construction and 89 direct local jobs (\$8 million in income) annually during operation.

With flow-on effects included, the peak year of construction will contribute up to 337 in regional jobs and \$24M in regional income to existing residents, and the project operation will contribute up to 263 regional jobs and \$18M in regional net income to existing residents.

Allowing for less conservative employment assumptions (ie less than full employment in the region, job chain effects and in-migration of labour to the region), the project is anticipated to contribute 1,289 direct and indirect jobs during construction, and 788 direct and indirect jobs during operation.

From a national perspective, the net production benefits that are predicted to accrue to Australia are estimated at \$347 million (present value at 7% discount rate), comprising \$47 million in royalties, \$98 million in company tax and \$202 million in residual producer surplus. When environmental, social and cultural costs are accounted for, the project is estimated to provide net social benefits to Australia of between \$345 million and \$437 million (the latter incorporating the benefits of employment) and therefore, as is the case at the state level, is desirable and justified from an economic efficiency perspective.

ES5 Justification and conclusion

The McPhillamys Gold Project will provide a range of direct and indirect benefits to the local, regional and State economies over its 15 year life.

A number of technical investigations have been carried out to support this EIS. These assessments identified residual impacts of the project and appropriate mitigation measures to address these impacts. The residual impacts identified will mostly accrue to the residences closest to the mine project area, particularly in the settlement of Kings Plains. Mitigation measures for these impacts have been proposed particularly for noise, air and visual amenity, so that these residual impacts are reduced to an acceptable level.

The Blayney LGA in particular will benefit from the project as a result of investment in community infrastructure and services made possible through a VPA, investment in education and training as Regis seeks to build a local skill base to support labour supply for the project, and project procurement spend as Regis is committed to supporting local businesses to participate in the project procurement process.

Numerous alternative designs have been evaluated for both the mine and pipeline developments, based on extensive geological, environmental, financial and other technical investigations that have been undertaken over a number of years. This process has facilitated the development of a considered, well-designed project that will efficiently recover a highly valuable resource, while minimising environmental impacts and potential land use conflicts while delivering socio-economic benefits. The project has been assessed in accordance with the principles of Ecologically Sustainable Development in order for it to be considered for approval.