BOWDENS SILVER

ABN: 37 009 250 051

Preliminary Environmental Assessment

for the

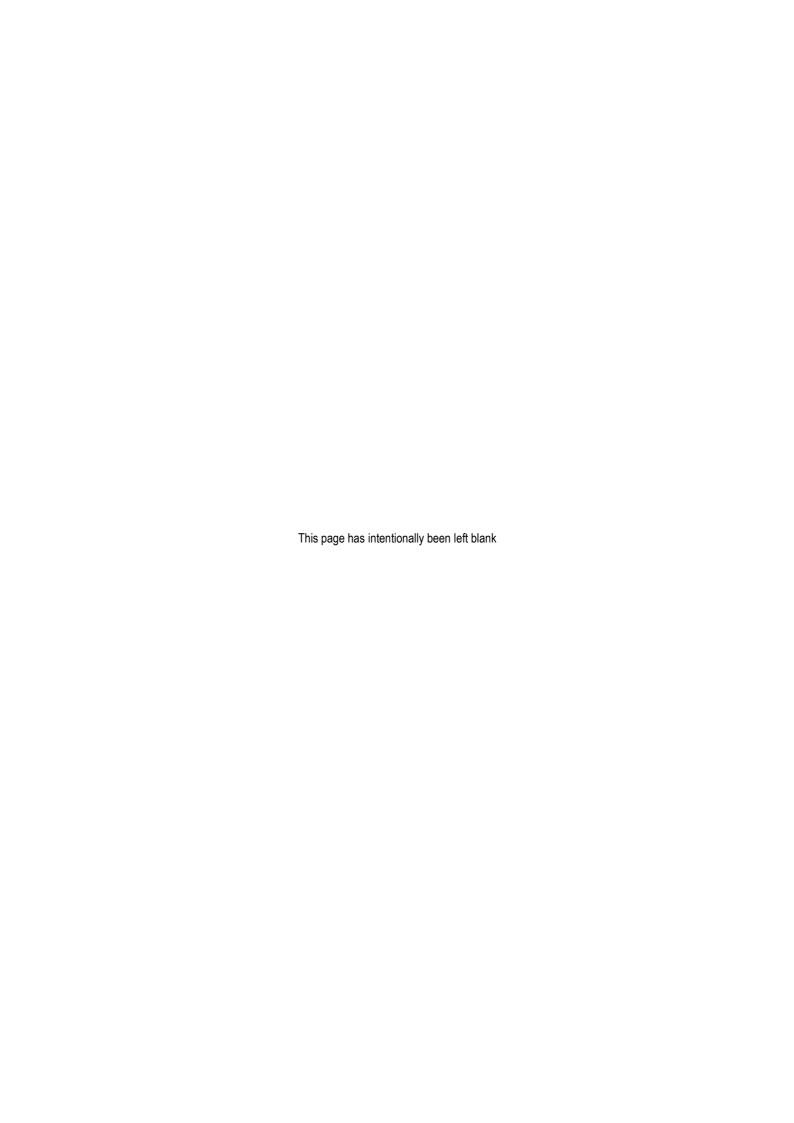
Bowdens Silver Project

State Significant Development No. 5765

Prepared in conjunction with:

R.W. CORKERY & CO. PTY. LIMITED

November 2016





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COMMONLY USED TERMINOLOGY AND ACRONYMS

The Applicant Bowdens Silver Pty Limited (BSPL)

The Project Incorporates the mining and processing of silver, zinc and lead ore, on-site

management of waste rock and process tailings and despatch of silver/zinc

and silver/lead concentrates.

Indicative Mine

The boundary of the area in which all mine-related components and

Site Boundary disturbance are currently planned to be located.

Re-located Maloneys Road A 5.3km section of road from Lue Road to the retained section of

Maloneys Road, approximately 2.5km northwest of the proposed open cut

pit.

Mine Access

Road

A 1.8km road from the re-located Maloneys Road to the processing plant.

BSAL Biophysical Strategic Agricultural Land

EIS Environmental Impact Statement

NAF Non Acid Forming (waste rock)

PAF Potentially Acid Forming (waste rock)

ROM Run-of-Mine

SEARs Secretary's Environmental Assessment Requirements

TSF Tailings Storage Facility

¹ The boundary presented in this document is indicative at present and will be reviewed and, if necessary, adjusted and finalised for inclusion in the EIS.



R.W. CORKERY & CO. PTY. LIMITED

PREAMBLE

This document has been prepared to accompany a request for updated Secretary's Environmental Assessment Requirements (SEARs) for the Bowdens Silver Project (hereafter referred to as the "Project"). The request is being submitted for two key reasons.

- i) The Environmental Impact Statement (EIS) will not be completed by 6 February 2017, the date being two years after the previous SEARs were issued to Kingsgate Bowdens Pty Limited (Kingsgate).
- The Project is now fully owned by Bowdens Silver Pty Limited (BSPL), a Company owned by Silver Mines Limited, i.e. a Company focussing on the exploration, development and operation of silver mining projects. Silver Mines Limited fully acquired the Project from Kingsgate Consolidated Limited on 29 June 2016 through the acquisition of Kingsgate Bowdens Pty Limited which changed its name to Bowdens Silver Pty Limited on 30 June 2016.

The change in project ownership has resulted in the following key changes to the design of the Project.

- i) Annual ore production is expected to be in the order of approximately 2 million tonnes of ore per year, i.e. compared to the previously proposed annual production level of approximately 4 million tonnes of ore per year. The actual production level is yet to be finalised but will be confirmed for inclusion in the EIS.
- ii) BSPL intends to source the water requirements for the Project from surface water and groundwater sources within and surrounding the indicative Mine Site, subject to the acquisition of the required licences. In this regard, BSPL has purchased a further approximately 618ha of land beyond that acquired by Kingsgate in late 2014. This additional land will assist to increase the quantity of surface water that can be harvested in dams on the Company's landholdings together with increasing the area of land available for a biodiversity offset.
- Road access to the indicative Mine Site would be via a new road to be constructed from Lue Road approximately 1km west of the western outskirts of Lue. The road which would replace the existing Maloneys Road that traverses the proposed open cut pit would be constructed largely through one of the recently purchased properties to the west of the indicative Mine Site.

EXECUTIVE SUMMARY

The Project was acquired by Silver Mines Limited through the purchase of Kingsgate Bowdens Pty Limited from Kingsgate Consolidated Limited in mid-2016. Kingsgate Bowdens Pty Limited was subsequently renamed to create Bowdens Silver Pty Limited (BSPL).

BSPL proposes to construct and operate an open cut mine to recover mineralised rock (ore) containing silver and small percentages of zinc and lead to depths of at least 180m. The indicative Mine Site is located approximately 2.5km northeast of Lue village in the Mid-Western Region Local Government Area. The Project would comprise an open cut pit, processing plant, waste rock emplacements, tailings storage facility, as well as ancillary components and associated infrastructure that would extract and process approximately 2 million tonnes of ore per year over an anticipated project life of 17 years. The EIS will include an update on the likely quantity of ore that could be mined and any changes to the project mine life.

The indicative Mine Site lies within Exploration Licences (EL) 5920 and EL 6354, both of which are held by BSPL.

The Project is classified as a State Significant Development in accordance with Paragraph 5 of Schedule 1 of *State Environmental Planning Policy (State and Regional Development) 2011* (State and Regional Development SEPP) because the capital investment value would be more than \$30 million. This document has been prepared in conjunction with R.W Corkery & Co. Pty. Limited in support of a request for updated Secretary's Environmental Assessment Requirements (SEARs) for the EIS to accompany the application to develop and operate the proposed mine.

This document introduces and provides the following information.

- 1. Description of the Project
- 2. The Project's strategic context
- 3. Project rationale
- 4. Preliminary environmental impact assessment
- 5. Consultation

The information presented in this document will ultimately be incorporated into a comprehensive *Environmental Impact Statement*, to be prepared in accordance with the provisions of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the SEARs being requested.

This document has been prepared for circulation to the Department of Planning and Environment, other relevant State government agencies, the Mid-Western Regional Council and the local and wider communities.

BOWDENS SILVER PTY LIMITED

PRELIMINARY ENVIRONMENTAL ASSESSMENT

Bowdens Silver Project

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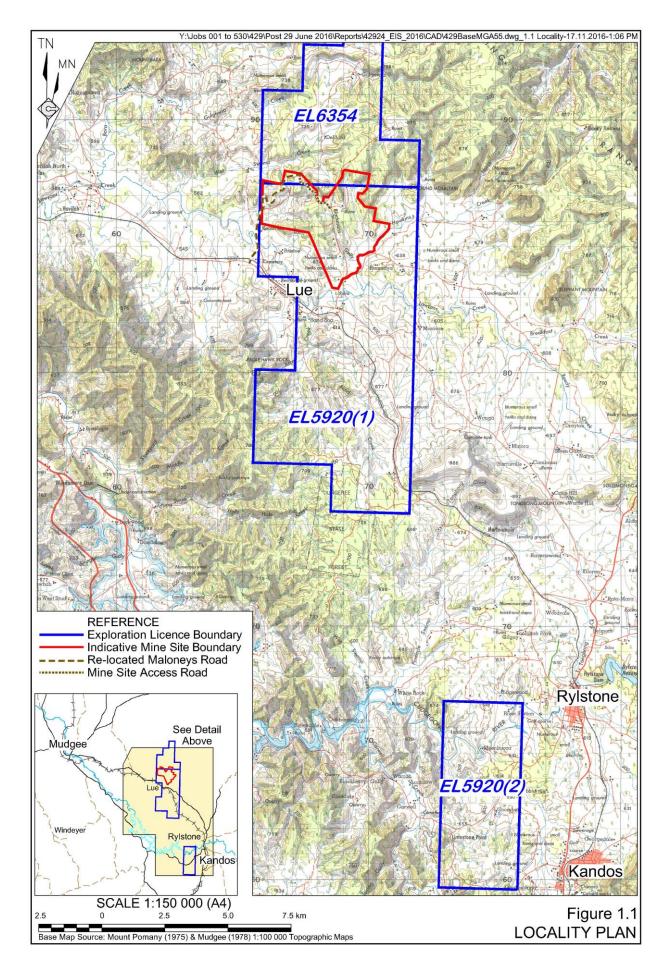
1. PROJECT SUMMARY

Bowdens Silver Pty Limited is proposing to develop and operate an open cut mine approximately 2.5km northeast of Lue village to recover principally silver with a proportion of accompanying lead and zinc. **Table 1.1** presents the status of the planning for the indicative key project components.

Table 1.1 Indicative Key Project Components

Project Component	Summary of the Project			
Mining Method	Open Cut mining in a single pit covering up to approximately 68ha.			
Resource	Mining of mineralised rock (ore) containing silver and small percentages of zinc and lead to depths of at least 180m.			
Disturbance Area	Disturbance of approximately 550ha.			
Total Recoverable Resource	At least 34 million tonnes of ore – current drilling is likely to increase this quantity and potentially its grade.			
Annual Production	Approximately 2 million tonnes per year of ore and between 3 and 4.5 million tonnes per year of waste rock.			
Mine Life	Construction stage: approximately 18 months and mining / processing for at least 17 years.			
Processing	Crushing, grinding, flotation and filtration to yield two concentrates, a silver/zinc concentrate and a silver/lead concentrate.			
Management of Waste Rock and Process Residue	Waste rock will be used to construct the embankment of the Tailings Storage Facility (TSF) (in stages) and other site infrastructure (e.g. runof-mine (ROM) pad). All remaining waste rock would be incorporated in at least two waste rock emplacements. All tailings would be contained in a single storage facility.			
General Infrastructure	A new site access road would be constructed from west of Lue to the indicative Mine Site. On-site infrastructure would include electricity supply and distribution, fuel storage, administration, workshop, stores and amenities building.			
Product Transport	Silver/zinc concentrate transported by road in sealed containers to the Port of Newcastle (for export and smelting off-shore) and silver/lead concentrate transported by road in sealed containers to Port Pirie (for smelting) or the Port of Newcastle (for export and smelting off-shore).			
Water Management and Use	Water for processing and dust suppression would be sourced from on- site groundwater and surface water subject to the acquisition of the required licences. All defined sources are under two water sharing plans. Considerable emphasis would be placed upon recycling water from the processing plant.			
Workforce	Construction: approximately 200 persons.			
	Operational: approximately 150 persons.			
Hours of Operation	Mining initially day and evening, increasing to night-time once sufficiently deep in open cut pit. Processing to be undertaken 24hrs/day, seven days a week.			
Key Environmental Impacts and Mitigation Measures	The key environmental impacts requiring management relate to: acid rock drainage; noise (particularly at night); air quality; surface water; and traffic on local roads.			
Capital Investment Value	\$150 million.			





2. PROJECT DESCRIPTION

This section provides an overview of the Project in sufficient detail to enable the reader to understand the type and scale of activities proposed. A more detailed description of the Project will be included in the EIS. It is noted that during the preparation of the EIS, further testing and design work is proposed which will assist to select the preferred option for specific components and may result in minor modifications to the layout and project components presented throughout this document.

2.1 THE INDICATIVE MINE SITE

Table 2.1 lists the title details of all land within the indicative Mine Site boundary. **Figure 2.1** displays the locations of all titles listed on **Table 2.1**.

Table 2.1 Indicative Mine Site Land Titles

Lot/DP Number	1/814633, 2/814633, 2/776858, 3/776858, 11/810747, 1/835810, 25/755435, 26/755435, 86/755435, 118/755435, 119/755435, 121/755435, 122/755435, 127/755435, 140/755435, 143/755435, 161/755435, 168/755435, 1/1171691, 132/1050074, 11/1118167, 102/1124638, 3/755412, 42/755412, 73/755412, 74/755412, 76/755412, 107/755412, 178/755412, 2/572701, 3/572701, 4/572701, 102/1124638
Crown Land Lot/DP Number	149/755435, 7007/1029353, 7008/1029652
Roads	Public Roads vested in Mid-Western Regional Council, miscellaneous road reserves

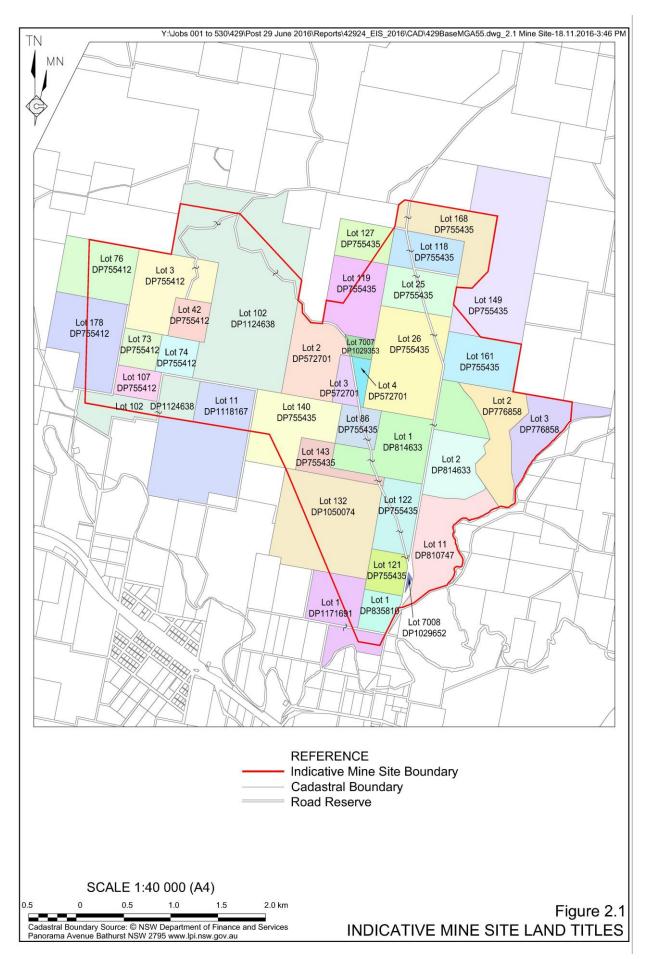
2.2 DEVELOPMENT DESCRIPTION

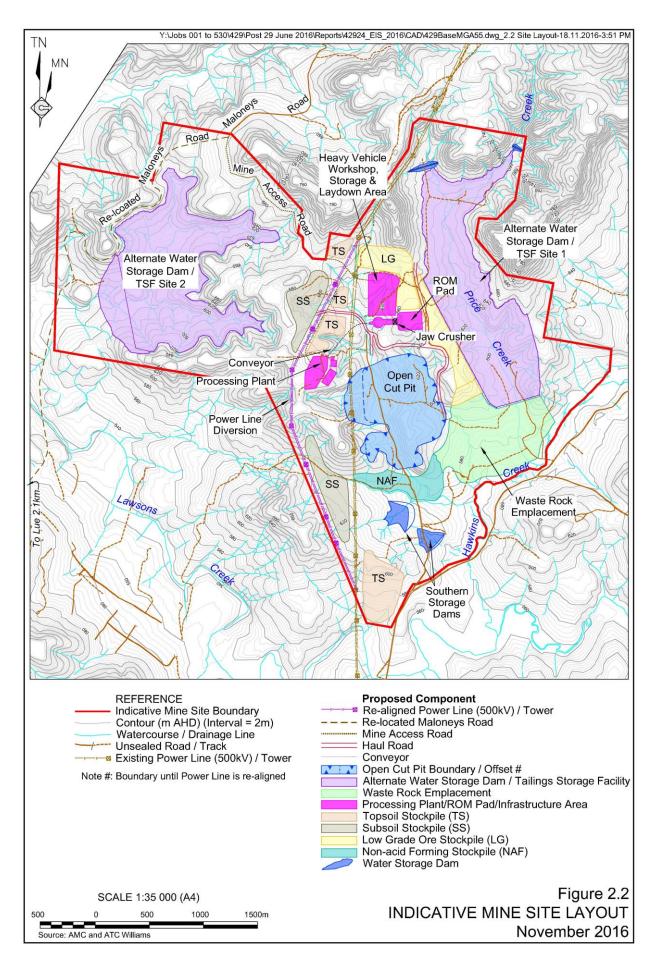
The Project comprises four principal components, namely:

- i) an open cut pit covering approximately 68ha;
- ii) a waste rock emplacement covering approximately 60ha, a low grade ore stockpile (LG) covering approximately 19ha and a stockpile of non-acid forming (NAF) waste rock covering approximately 16ha;
- iii) a processing plant and related infrastructure covering an area of approximately 7ha; and
- iv) a water storage dam / tailings storage facility (TSF) covering approximately 122ha (Site 1) or 140ha (Site 2).

The above components are supported by a range of infrastructure including roads, offices, heavy vehicle workshop, storage and laydown area, amenities, water storage dams and a range of services. **Figure 2.2** displays the indicative location of the principal mine components.







The definition of the footprints for the open cut pit and processing plant and related infrastructure is sufficiently advanced based upon a range of technical and practical factors. However, the definition of the location of the footprints of the waste rock emplacements and stockpiles and the TSF is still subject to further investigations. These investigations will centre principally upon a range of technical issues with input where possible through consultation with the Lue and district community. Emphasis will be placed upon constructing the mine components in a manner that minimise visual impacts and the creation of landforms that blend into the surrounding topography.

Figure 2.2 identifies the two alternate sites being considered for the main water storage or TSF, i.e. Site 1 being the location originally proposed by Kingsgate and Site 2, a new site to the northwest of the proposed processing plant. The selected sites for the main water storage and TSF will be described and evaluated in full in the EIS. The site not used as a site for a TSF will then become (potentially with a smaller footprint) the main water harvesting and storage facility for the proposed mine. Clean water harvested around the indicative Mine Site would also be collected in the dams at the southern side of the open cut pit.

The Project would incorporate a conventional open cut pit where overburden or waste rock is removed from above the silver-zinc-lead ore and placed in out-of-pit waste rock emplacements. The ore would be mined and transported by haul trucks to the primary crusher near the run-of-mine (ROM) pad where it would be crushed, stockpiled in a surge stockpile and then conveyed to the processing plant where it would be ground and processed to liberate the silver, zinc and lead minerals. These minerals would be collected by conventional froth flotation to form concentrates that are dewatered and transported off site by trucks in sealed containers. The residual materials from the processing (tailings) would be pumped in the form of a slurry to the tailings storage facility within 3km of the open cut pit.

It is noted that the western limit of the open cut pit would be constrained until the 500kV power line is re-aligned. The presence of the 500kV power line would also require the use of an enclosed conveyor between the run-of-mine (ROM) pad and the processing plant.

BSPL plans to undertake construction of the mine components in a manner that will be consistent with the long-term, post-mining landform, wherever possible. The final landform would incorporate a void created by the open cut pit.

2.3 ANCILLARY COMPONENTS

The three key ancillary components for the proposed mine would be:

- i) a new access road from Lue Road (west of Lue) to the indicative Mine Site, thereby replacing the existing public road (Maloneys Road) that traverses the proposed open cut pit;
- ii) several water storages within 3km of the indicative Mine Site to harvest runoff for on-site uses; and
- iii) a new power supply to provide the required energy principally for processing the mined ore.

It is proposed that approval for components i) and ii) would be sought concurrently with the overall mine development whereas the approval for the mine's power supply would be sought via an energy provider under Part 5 of the EP&A Act. Discussions with energy providers have confirmed a range of options largely involving the construction of a new power line originating from near Ilford may be available for the Project.

2.4 DEVELOPMENT SCHEDULE

The mine would require an 18 month site establishment and construction period during which the processing plant and all related infrastructure would be constructed. The waste rock materials initially removed from the open cut pit would be used to construct the first stage of the tailings storage facility.

2.5 MANAGEMENT COMMITMENTS

The indicative post-approval management commitments that the Company proposes to adopt to manage any adverse impacts upon the various components of the environment within and surrounding the indicative Mine Site are set out in Section 5 of this document.

2.6 MAPPING REQUIREMENTS

The design of the Project will be undertaken through the preparation of a series of plans displaying the key stages of development. These development stages would provide the basis for the operational scenarios used to assess noise, air quality and surface water impacts.

3. STRATEGIC CONTEXT

3.1 TARGET RESOURCE

3.1.1 Titles under the Mining Act 1992

The bulk of the indicative Mine Site lies within Exploration Licence (EL) 5920 with a small part of the indicative Mine Site located within EL6354, north of EL5920. Both ELs are held by BSPL. It is noted that EL 5920 is divided into two discrete areas, namely "EL 5920(1)" near Lue and "EL 5920(2)" located to the west of the townships of Rylstone and Kandos (see **Figure 1.1**). EL 5920(2) is not the subject of this Project.

3.1.2 Regional Geology

The indicative Mine Site is situated near the northeastern margin of the Lachlan Fold Belt, one of the main components of the Tasman Fold Belt System and the western edge of the Sydney Basin. **Figure 3.1** presents an extract of the geological map of the Mudgee to Rylstone district displaying the locations of the geological units of the Lachlan Fold Belt and the Sydney Basin.

3.1.3 Indicative Mine Site Geology

The Bowdens silver deposit is hosted by flat-lying to moderately dipping felsic volcanic rocks of the early Permian Rylstone Volcanics (approximately 280 million years old) that unconformably overlie a sequence of mafic volcanics of Ordovician age (approximately 460 million years old). The Rylstone Volcanics which range in thickness from 10m to 200m and comprise mainly breccias, ignimbrites and tuffs, are partially overlain by Shoalhaven Group sedimentary rocks of the Sydney Basin. **Figure 3.2** displays the local geology within and adjacent to the indicative Mine Site.

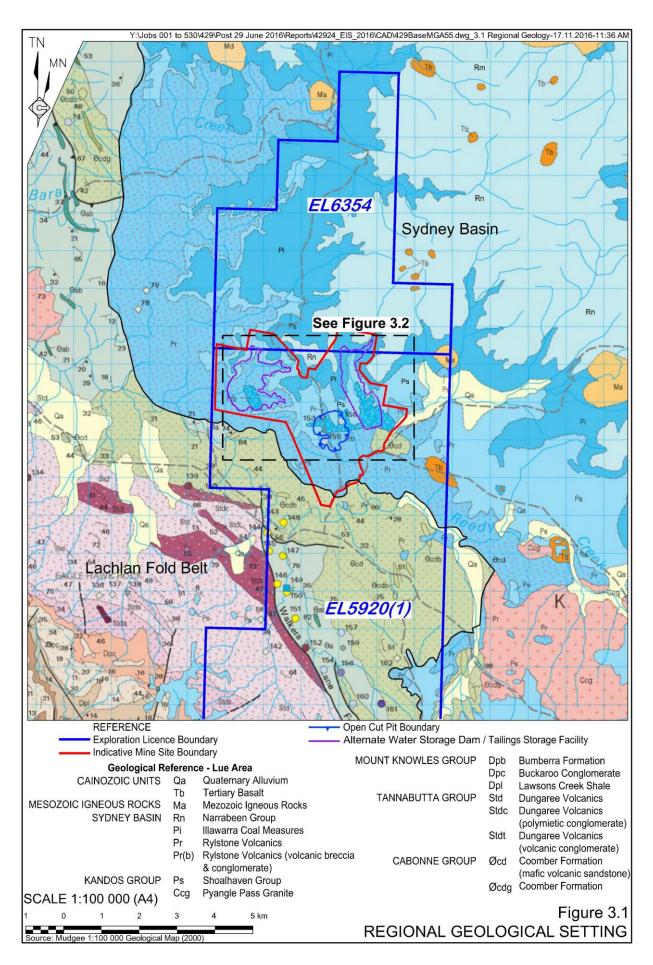
The silver mineralisation occurs within flat-lying to moderately-dipping zones in the Rylstone Volcanics and is primarily hosted by sulphides of iron, arsenic, zinc and lead. High grade silver mineralisation is also hosted in steeply-dipping fracture zones which host banded sulphide veins.

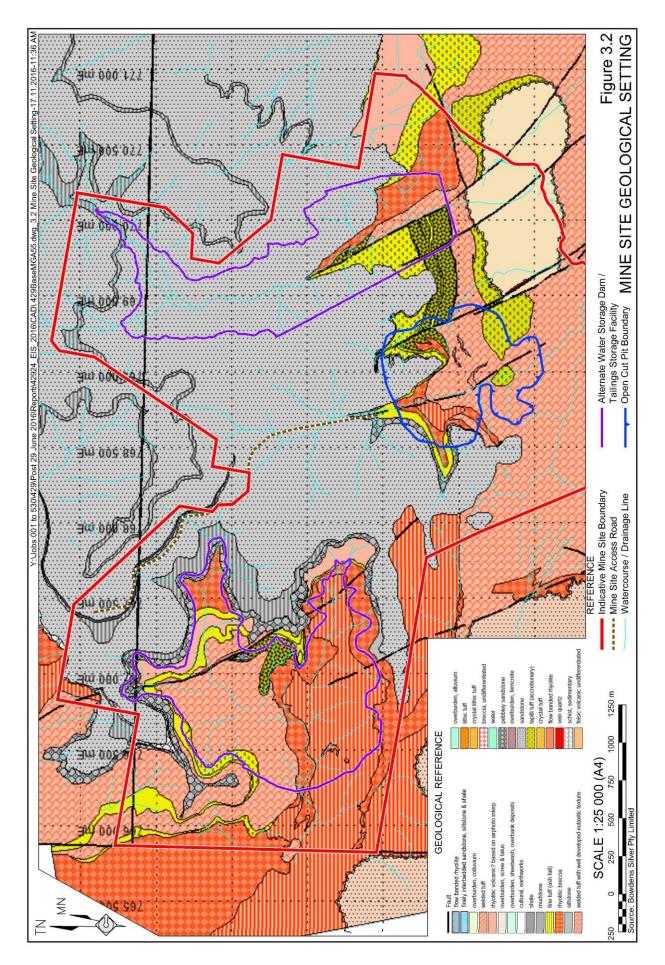
The bulk of the mineralisation within the indicative Mine Site occurs as a thick zone extending from surface to vertical depths of approximately 180m.

3.1.4 Mineral Resources and Reserves

A JORC-compliant Mineral Resource Statement was completed for the Bowdens silver deposit by Kingsgate in November 2012. The key statistics from the statement are reproduced in **Table 3.1**.

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Bowdens Silver Project

		Grade			Silver Contained Ounces
Resource Category	Tonnes (Million)	Silver (g/t)	Zinc (%)	Lead (%)	Silver (M Oz)
Measured	23.6	56.6	0.41	0.31	43.0
Indicated	28.4	48.0	0.36	0.27	43.8
Meas. + Ind	52.0	51.9	0.38	0.29	86.8
Inferred	36.0	41.0	0.40	0.30	47.5
TOTAL	88.0	47.4	0.39	0.29	134.1

Table 3.1
Defined Resources – Bowdens Silver Deposit

This resource dataset is based on data from approximately 63 000m of drilling in 567 drill holes that comprise aircore, reverse circulation and diamond drill hole information sourced from previous drilling undertaken by Kingsgate, Silver Standard Australia Pty Limited and other previous explorers. Additional exploration drilling, being undertaken by BSPL, is ongoing at this time and is aimed at increasing the confidence in the definition of the project ore zone and increasing the confidence level of the resource from the Inferred category to Indicated and Measured categories.

The open cut optimisation studies completed to date indicate the mineable ore within the preliminary open cut pit is estimated to be approximately 34 million tonnes although this quantity has the potential to increase as a result of the current exploration studies.

3.1.5 Constraints on Resource Recovery and Resource Development

The target resource is not related to any existing mine operations and, to date, no component of the identified resource has been excluded due to impacts on sensitive areas with the economic ore to be recovered to the greatest extent possible. As discussed in Section 2.1, it would be necessary to re-align the 500kV power line to enable the full extent of the defined ore to be mined. A program of sterilisation drilling has previously been undertaken to ensure that the construction of the mine-related infrastructure would not adversely impact the potential future development of the identified resource. This also includes the proposed route for the re-aligned 500kV power transmission line.

Whilst development of the Mine is expected to provide substantial benefits to local businesses that support the mining industry, no other industries or projects are considered to be dependent on the development of the target resource.

3.2 REGIONAL CONTEXT

A summary of the principal local and regional sensitivities / constraints is provided as follows. A full review of the local and regional context and constraints will be provided in the EIS.

Land Use Constraints

- There is no biophysical strategic agricultural land (BSAL) mapped within the
 indicative Mine Site. BSAL is mapped to the west of the indicative Mine Site,
 principally adjacent to Lawsons Creek. BSPL has commissioned a detailed soils
 assessment to establish whether there is any BSAL within the indicative Mine Site
 boundary.
- Within the indicative Mine Site, the land has previously been used (and is still being used) for cattle and sheep grazing albeit at very low stocking rates. A verification of BSAL will be completed prior to the completion of the EIS.
- The village of Lue is located approximately 2.5km southwest of the boundary of the open cut pit. Given the proximity of the village, potential constraints include noise and air quality.
- Whilst the indicative Mine Site is surrounded by rural land uses, no specific sensitive land uses have been identified to date that are likely to pose a constraint.
- There are no known competing industries within the surrounding area.
- The indicative Mine Site is not located within a defined drinking water storage area or town water supply.
- Further assessment of surface water and groundwater interception, storage, and usage will be undertaken as part of the EIS, however, there are currently no significant practical water constraints identified.

Biophysical, Environmental, and Heritage Constraints

- Ecological surveys completed to date indicate the presence of White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grasslands, listed as a Critically Endangered Ecological Community and therefore a matter of national environmental significance. The threatened Regent Honeyeater may frequent parts of the indicative Mine Site. Whilst presenting a potential constraint, the likely presence of the community within the local and regional area also provides opportunities for biodiversity offsets, particularly on land already purchased by BSPL.
- No protected areas or other areas of high environmental value have been identified to date.
- Heritage surveys to date have identified a number of Aboriginal heritage sites within and surrounding the indicative Mine Site. The management of these sites will be addressed as part of the EIS.

Economic Considerations

• The indicative Mine Site is located in an area sufficiently close to Mudgee, Rylstone, Kandos and Lue to benefit from (and contribute to) the local economies.

These potential constraints will be further considered within the EIS which will outline appropriate management and mitigation measures to avoid or minimise the potential for impacts.

3.3 PERMISSIBILITY AND STRATEGIC PLANNING

3.3.1 Permissibility

Within the *Mid-Western Regional Local Environmental Plan 2012* (LEP), the indicative Mine Site is located within Zone RU1 – Primary Production with 'open cut mining' indicated as permissible with consent within this zone.

The Project is also permissible under Part 2 of the *State Environmental Planning Policy* (*Mining, Petroleum Production and Extractive Industries*) 2007. Clause 7(1)(b) identifies that mining may be carried out on land where development for the purposes of agriculture or industry may be carried out. Within Zone RU1, 'extensive agriculture' is permitted without consent.

3.3.2 State Planning Matters

A range of State legislation, regulation and policies apply to the Project. The following presents a brief overview of the principal State planning matters relevant to the Project.

State Environmental Planning Policy (State and Regional Development) 2011

This SEPP was gazetted on 28 September 2011 and applies to all projects satisfying nominated criteria made following that date. The purpose of this SEPP is to define those projects of State Significance or proposed on State Significant Sites and therefore requiring Ministerial approval under the provisions of the EP&A Act 1979.

The Project currently satisfies the threshold capital investment value for a mining project of greater than \$30 million as nominated in Clause 5(1)(a) within Schedule 1 of the SEPP. Therefore, the Project is a State significant development to which Part 4, Division 4.1 of the EP&A Act 1979 applies.

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

This SEPP was gazetted on 17 February 2007 in recognition of the importance to NSW of mining, petroleum production and extractive industries.

The SEPP specifies matters requiring consideration in the assessment of any mining development including:

- compatibility of the proposed mine with other land uses;
- compatibility of the proposed mine with other mining, petroleum, or extractive industries;
- natural resource management and environmental management;
- resource recovery;
- transportation;
- rehabilitation; and
- biophysical strategic agricultural land.



Whilst these matters have been considered during the preliminary assessment stages, the EIS will provide a full assessment of all matters identified under the SEPP, including those identified in Parts 1, 3 and 4AA of the SEPP.

State legislation and other SEPPs to be addressed in the EIS includes the following.

- Environmental Planning and Assessment Act 1979.
- *Mining Act 1992.*
- Protection of the Environment Operations Act 1997.
- Water Act 1912.
- Water Management Act 2000.
- Roads Act 1993.
- Heritage Act 1977.
- Dams Safety Act 1978.
- Fisheries Management Act 1994.
- Threatened Species Conservation Act 1995
- State Environmental Planning Policy (Infrastructure) 2007.
- State Environmental Planning Policy No. 33 Hazardous and Offensive Development (SEPP 33).
- State Environmental Planning Policy (No. 44) Koala Habitat Protection
- State Environmental Planning Policy No. 55 Remediation of Land.

3.3.3 Commonwealth Planning Matters

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) covers 'matters of national environmental significance', which among other things, includes listed threatened species and communities. Ecological surveys completed to date indicate the presence of White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grasslands, listed as a Critically Endangered Ecological Community and therefore a matter of national environmental significance. The Company plans to commission further ecological surveys and assessment and will submit a referral to the Commonwealth Department of the Environment and Energy.

The Project does not trigger the water trigger under the EPBC Act as it is neither a coal seam gas nor a large coal mine.

4. PROJECT RATIONALE

4.1 INTRODUCTION

Planning for the development of the Project focused initially upon identifying the extent of mineralisation that could be economically mined and processed to yield silver/zinc and silver/lead concentrates. Mining can only proceed in the area where the defined ore body occurs. The Company has a very good understanding of the extent of mineralisation through the previous and current drilling programs.

It is proposed to develop the open cut pit commencing near its eastern margin and progressively advancing downwards and westwards throughout the life of the Project. Prior to advancing towards the western boundary of the open cut, it will be necessary to re-align the 500kV power transmission line. The exact timing for this activity has not yet been established.

With the knowledge of the defined limits of mineralisation, the planning for the remainder of the mine focused on the other three main components namely:

- the waste rock emplacement(s);
- processing plant; and
- tailings storage facility (TSF).

The rationale behind the planning for each of these components is as follows.

4.2 WASTE ROCK EMPLACEMENTS

Approximately 60 million tonnes of waste rock would be mined in order to recover the 34 million tonnes of ore. Geochemical testing of the waste rock is ongoing to enable the characterisation of potentially acid forming (PAF) material so that this material is encapsulated, either in dedicated waste rock emplacements or within other structures across the indicative Mine Site, e.g. TSF embankments, run-of-mine pad, etc. The component of waste rock that is not acid forming (NAF) will be an important component in the construction of these structures as part of their encapsulation. Ideally, waste rock needs to be placed close to the exit point of the open cut pit in order to limit transportation costs.

The design of the waste rock emplacements will be undertaken early during the overall mine design with emphasis placed upon progressively constructing (and revegetating) landforms that blend with the surrounding natural topography. Consideration will also be placed upon maximising the setback of the emplacements from local watercourses.

4.3 PROCESSING PLANT

The processing plant would be placed in an area sufficiently close to the open cut pit, again to minimise transportation costs. Insufficient area is available for the entire processing plant to be constructed on the eastern side of the 500kV power transmission line, hence, it is proposed to position the primary crushing component on the eastern side of the power transmission line (adjacent to the ROM pad) and the processing plant (involving grinding, flotation and concentrate production area) on the western side of the power transmission line.

The Company intends to ultimately re-align the 500kV power transmission line to the west of the processing plant and the proposed western limit of the open cut pit.

Given it is essential that the bulk of the processing plant operates 24hrs a day, seven days a week, the plant would be located as far as practicable from the Lue village and surrounding residences and in an area that provides topographic protection for the attenuation for noise.

4.4 TAILINGS STORAGE FACILITY (TSF)

The Company proposes to store all the finely ground rock from which the minerals are removed in a single storage facility located in a valley either to the east or west of the processing plant. Tailings (a slurry) from the plant will be pumped / gravity fed to the TSF with the excess water draining from the tailings returned for use in the processing plant. Detailed investigations are currently underway to establish whether Site 1 or Site 2 (**Figure 2.1**) is the preferred location for the TSF.

4.5 OTHER COMPONENTS

Other project components such as water storage dams would be positioned in optimum locations within the valleys within the indicative Mine Site. The dams would be constructed to harvest surface runoff collected from above and throughout the undisturbed areas of the indicative Mine Site. Other dams would be constructed to control sediment-laden runoff and/or potentially contaminated water.

Topsoil and subsoil stockpiles would be positioned either near the area stripped or area to be ultimately rehabilitated with the subsoil and topsoil.

The Company intends to construct the access road from Lue Road to the indicative Mine Site across the property recently purchased to the west of the indicative Mine Site. The rationale behind this road alignment (compared to that previously proposed by Kingsgate) is that the Company anticipates a greater proportion of traffic travelling to and from the indicative Mine Site would originate from the Mudgee area and with lesser volumes of traffic originating from or travelling to the east, i.e. Kandos and Rylstone areas.

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5. PRELIMINARY ENVIRONMENTAL IMPACT ASSESSMENT

Figure 5.1 displays an aerial photograph of the indicative Mine Site within its local setting, including Lue village. Reference data relied upon for the environmental impact assessment for the Project includes details of surrounding land ownership and residences (**Figure 5.2**) and local topography and drainage (**Figure 5.3**).

Table 5.1 presents a summary of the existing environment within and surrounding the indicative Mine Site, management commitments that would be implemented, potential Project-related impacts and the proposed assessment approach to that which has been or will be implemented.

An understanding of the existing environment has been developed via a number of studies commissioned by Kingsgate. BSPL and the Specialist Consultant Team proposes to utilise these studies and collected data to facilitate and inform further studies and assessments throughout the preparation of the EIS.

It is noted that the physical extents of the future environmental assessments and studies will need to be expanded in a number of cases in order to cover the additional landholdings acquired by BSPL.

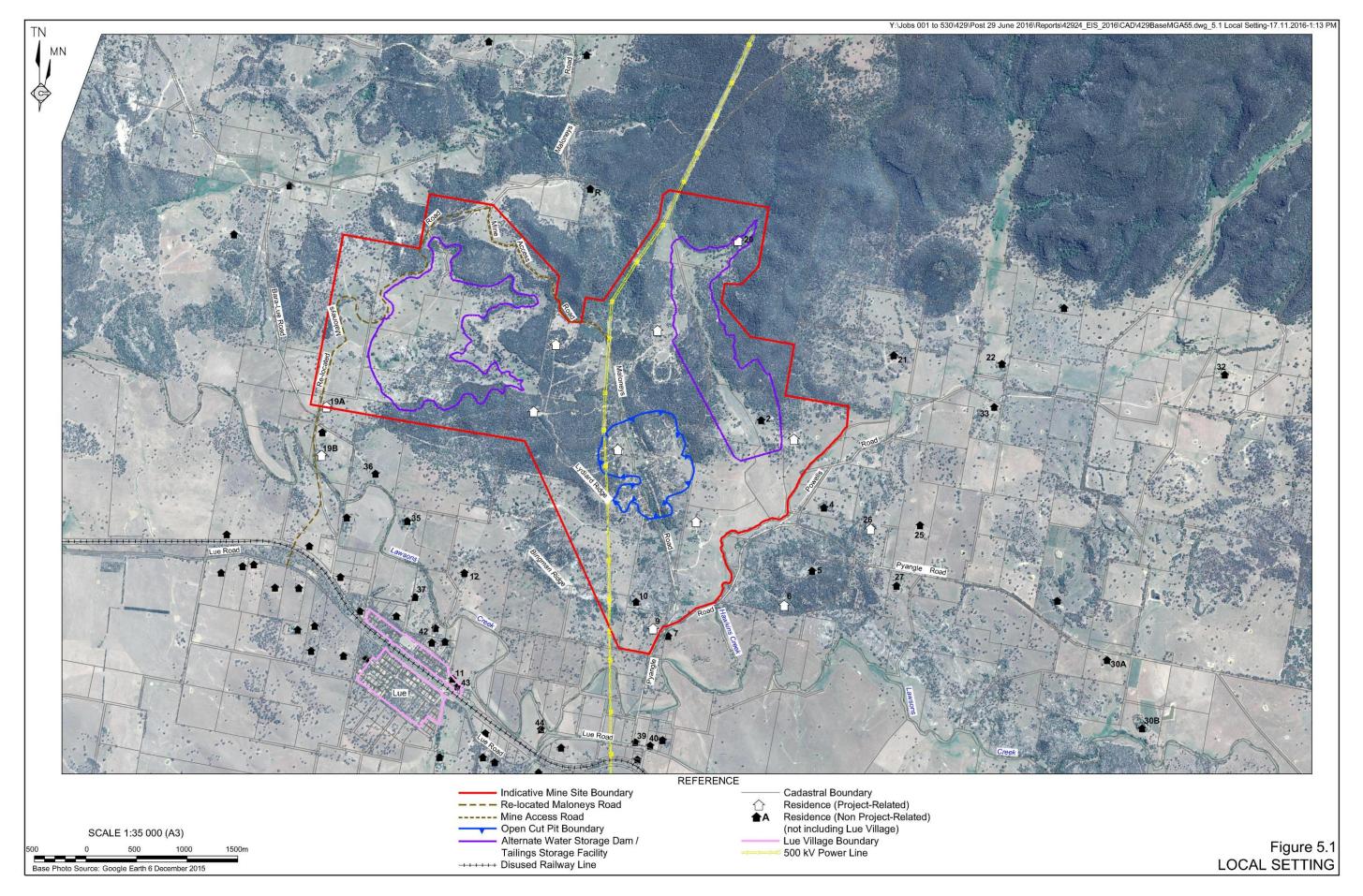
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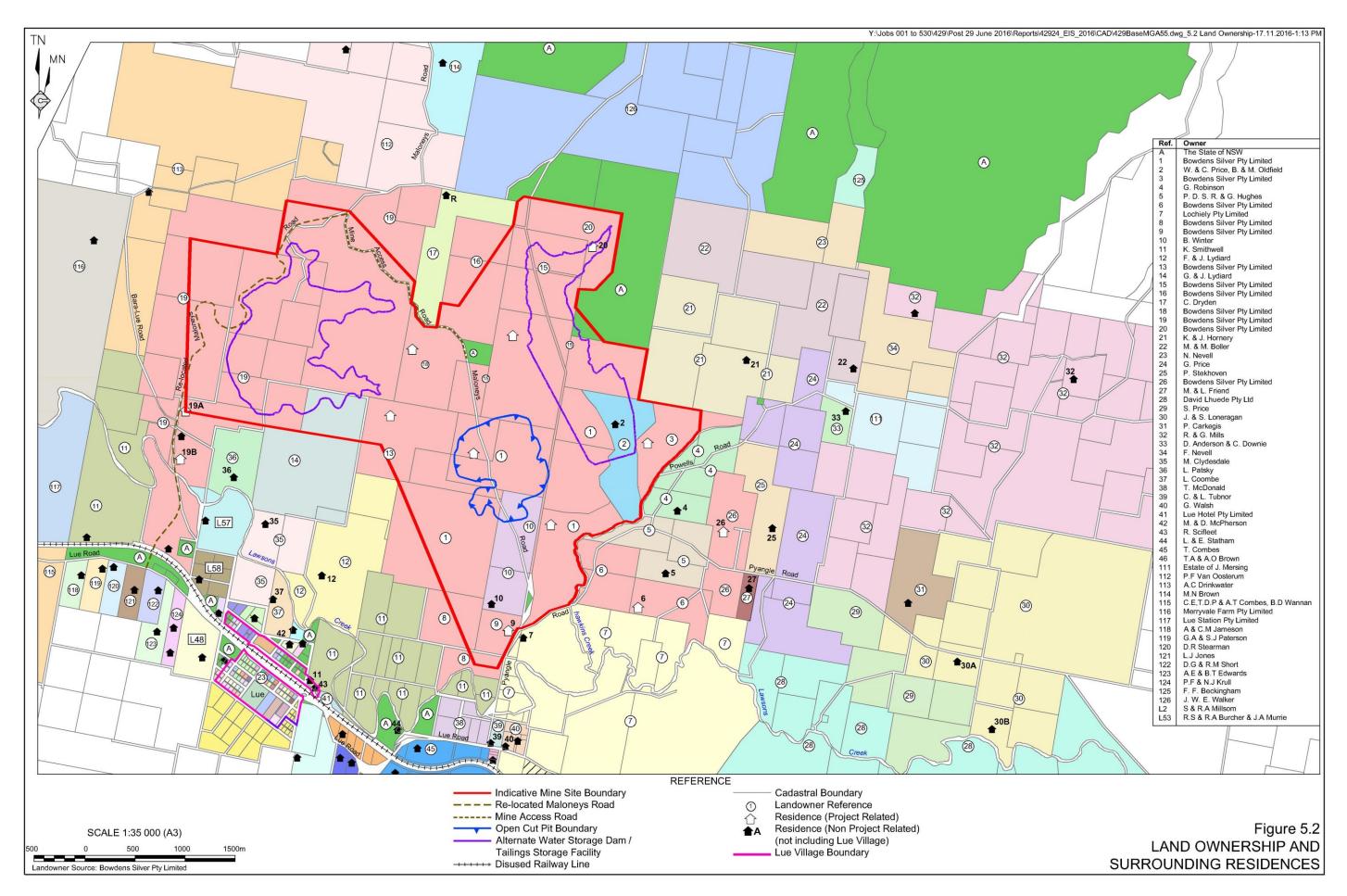
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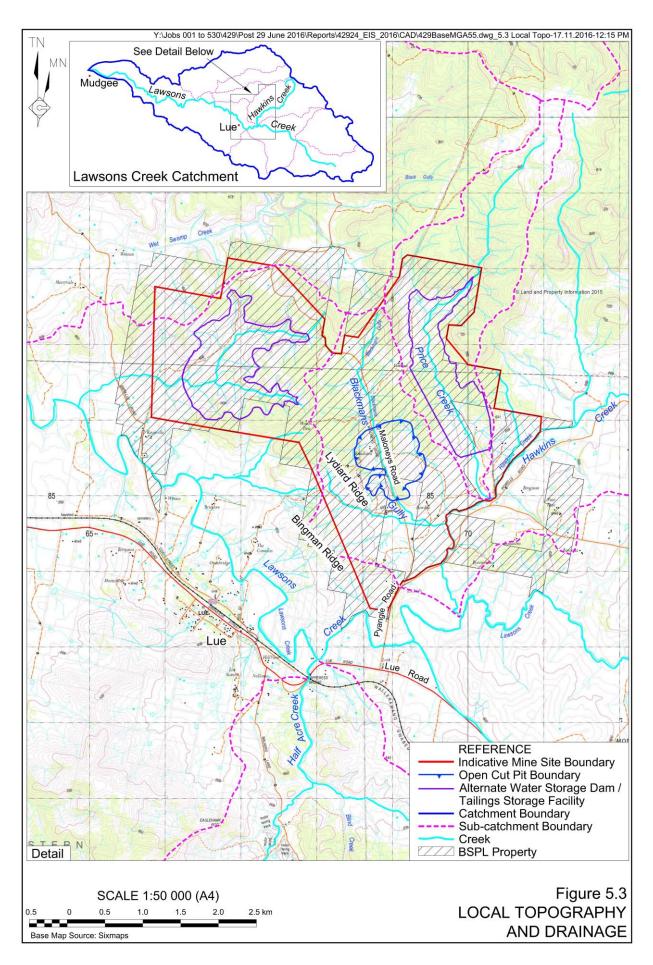
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Table 5.1
Preliminary Environmental Impact Identification and Management Commitments

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Issue	Existing Environment	Further Investigations	Potential Impacts	Management Commitments (post approval)	Proposed Assessment
Aboriginal Cultural and Historic Heritage	Most of the indicative Mine Site has been the subject of previous cultural heritage surveys undertaken since 2003. The most recent survey was undertaken in conjunction with Aboriginal stakeholders in November 2011 to identify any areas of cultural significance and to establish the most appropriate means to manage the Aboriginal heritage sites located during previous surveys and the November 2011 survey. The following sites have been identified in all surveys.	A further cultural heritage survey is planned within the area of the proposed access road and project-related infrastructure that may be located to the northwest of the proposed open cut pit.	The approach to the management of the previously identified sites will be developed in consultation with the Aboriginal Stakeholders. Project-related activities would result in the loss of the heritage sites identified within the proposed area of disturbance.	Ensure that the outer limit of the proposed disturbance is accurately marked on the ground. Ensure that all surface disturbing activities are undertaken within the marked disturbance footprint or previously disturbed areas only. Arrange for the salvage of any artefacts in accordance with an approved Aboriginal Cultural Heritage Management Plan prepared in consultation with Aboriginal Stakeholders.	A detailed Cultural Heritage assessment of the entire proposed disturbance footprint will be undertaken and an assessment of the significance of any identified objects assessed in accordance with the relevant guidelines. The approach to the salvage and curation of the artefacts within areas to be disturbed would be discussed with all registered Aboriginal stakeholders.
	25 Aboriginal heritage sites were identified comprising 17 stone artefact scatters and 8 isolated finds of stone artefacts.				
	3 European heritage features are present within the indicative Mine Site comprising two historic mine shafts and hut ruins.				
	All of the Aboriginal heritage sites are registered on the AHIMS database with the exception of two, Sites BL2 and BL20, both artefact scatters from which all artefacts were recovered on 1 July 2013, in accordance with an Aboriginal Heritage Impact Permit.				
Transportation	The indicative Mine Site is currently accessible from its intersection with Lue Road via Pyangle Road and Maloneys Road. Lue Road connects the village of Lue with Mudgee, located 26km by road to the west and Rylstone 24km to the southeast. Lue Road typically consists of a single travel lane in each direction with a sealed surface. Speed limits range from 40km/hr through the centre of Lue (during school zone hours) up to 100km/hr for sections of road that pass through	Further traffic counts are proposed in early 2017 together with the preparation of a preliminary design of the proposed new access road with its intersection with Lue Road and crossing of Lawsons Creek.	Traffic generated by the Project would impact the design life of the local road network as well as affect the capacity, efficiency and safety of the existing road network. This traffic has the potential to impact upon the amenity of residents in the village of Lue. Existing Maloneys Road alignment traverses the proposed open cut pit and the construction of an alternate route to Maloneys Road could impact travel times of existing Maloneys Road users.	Upgrade of Bara-Lue Road intersection west of Lue. Re-locate the section of Maloneys Road between Pyangle Road and existing section Maloneys Road northwest of the indicative Mine Site to facilitate all weather access to the indicative Mine Site and avoids traffic from Mudgee to the indicative Mine Site traveling through Lue. Upgrade of Bara-Lue Road and re-located	A traffic assessment will be undertaken to determine the adequacy or otherwise of the surrounding road network. The extent of upgrading works would be identified through consultation with the Mid-Western Regional Council. Indicative layouts of the re-located roads and upgrading works will be included in the EIS.
	rural areas. B-Doubles are permitted on Lue Road at a speed limit of 80km/hr and only outside school bus operating times.	peed limit of 80km/hr and only outside		Maloneys Road conducted in accordance with established design and construction standards to safely accommodate the largest Project related vehicles.	
Noise	The noise environment surrounding the indicative Mine Site is typical of a rural area and is dominated by traffic on local roads, domestic noises, rural noises such as tractors, pumps, dogs, birds etc. and wind generated noises. Motorbike noise also occurs in association with	No further investigations are planned given the extensive background noise measurements taken to date and the fact that there has been initially no substantial changes in land uses in those	Activities within the indicative Mine Site and on local roads would result in increased received noise levels at surrounding residences. It is likely that activities within the indicative Mine Site would be audible at various locations within surrounding areas under cortain metacrological.	sound power levels of each item remains at or below the nominated values relied upon in noise modelling.	A noise assessment will be undertaken to predict the received noise levels under different operational scenarios and under predominant meteorological conditions. A range of design and operational safeguards will be incorporated into the Project in order to achieve compliance with
	the 'Louee Enduro and Motocross Complex' to the south of Lue.	areas where background noise levels have been previously undertaken.	been previously sufforming areas under certain meteorological conditions, particularly temperature inversions. However, the Company would design the Project to ensure noise levels are compliant with applicable noise criteria.	Install frequency modulated reversing alarms to all mobile equipment.	applicable noise criteria.
	Background noise levels were established at a representative range of locations through numerous unattended and attended background noise monitoring programs undertaken between			Ensure all truck drivers comply with a Drivers Code of Conduct which outlines procedures for reducing noise impacts during transportation on and off site.	
	September 2011 and August 2014 at residences surrounding the indicative Mine Site. Background noise levels typically ranged from 25dB(A) to 33dB(A) L _{A90(15minute)} between September 2011			Maintain an open dialogue with the surrounding community and neighbours to address any concerns over noise are addressed.	
	and August 2014.			Implement additional noise mitigation measures as determined through noise modelling.	

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Table 5.1 (Cont'd) **Preliminary Environmental Impact Identification and Management Commitments**

	P					
Issue	Existing Environment	Further Investigations	Potential Impacts	Management Commitments (post approval)	Proposed Assessment	
Air Quality, Lead, and Health Risk	The area surrounding Lue and the indicative Mine Site lies within a rural setting used primarily for rural lifestyle dwellings with minor agriculture and other low impact land uses. Consequently, the impact from these minor sources of air pollutants results in low emission levels and good air quality.	The existing program of deposited dust and suspended particulate monitoring will continue during the preparation of the EIS.	The Project would result in an increase in received particulates and emissions in areas surrounding the indicative Mine Site. The potential impacts would relate to particulate in various size ranges and potentially their chemical composition, particularly lead.	Apply water to roads and trafficked areas using water trucks to minimise the generation of dust. Install and operate water sprays on crushing equipment. Water stockpiles to maintain moisture content and minimise the generation of dust. Undertake regular monitoring of deposited dust and suspended particulates. Progressively rehabilitate interim or final landforms or disturbed areas no longer required.	Air quality, lead, and health risk assessments will be undertaken by suitably qualified consultants. The assessments will include modelling of received air contaminants under a range of operational scenarios and under prevailing meteorological conditions. The wind data collected at the meteorological stations within the indicative Mine Site and Lue village will be used in the air quality modelling.	
Hazardous Materials	The environment within and surrounding the indicative Mine Site has low exposure to hazardous materials. The only materials would include agricultural chemicals.	A comprehensive list of all potential hazardous materials that would be used on site throughout the life of the Mine would be assembled for consideration in the EIS.	Emphasis will be placed upon avoiding any impacts of hazardous materials on the workforce and persons living/travelling in the vicinity of the indicative Mine Site. All chemicals would be transported, stored and used in accordance with manufacturers' specifications.	Impacts would be considered upon the workforce and surrounding residents, stock and native wildlife if chemicals enter natural water bodies. Some chemicals could be odorous.	A detailed Preliminary Hazard Assessment would be undertaken for inclusion with the EIS to outline the risks and management measures required through the transportation, storage, use and management of waste products, where appropriate.	
Visual Amenity	Within the areas surrounding the indicative Mine Site, the existing visual setting is primarily associated with its rural nature which includes elevated rocky and often tree lined ridges interspersed with cleared broad alluvial valleys with scattered paddock trees.	Further observations are planned to assess potential viewing locations.	Due to the undulating topography within the local area, visual exposure of the proposed areas to be disturbed within the indicative Mine Site is limited principally to views from local roads and some areas on adjoining properties, principally to the east of the indicative Mine Site. The indicative Mine Site is not visible from Lue due to a substantial intervening ridge line. The planned re-alignment of the 500kV power transmission line would slightly change the views of this infrastructure from both local roads and adjoining properties.	Design and construct waste rock emplacements to create landforms that blend with the surrounding environment and that the extent and type of revegetation is consistent with the adjoining landforms. Paint all potentially visible items of fixed plant and equipment in a colour to minimise the contrast within the surrounding landscape. Continue the roadside tree planting program to provide visual screening from the public road network. Construct visibility barriers in strategic locations to prevent visibility of various on-site activities and vehicle headlights on site after dusk.	A visual amenity assessment will be undertaken by specialist consultant and include a detailed evaluation of potential viewing locations, identification of mitigation measures and the presentation of photo montages throughout the life of the mine.	
Surface Water	The indicative Mine Site is situated within the Lawsons Creek catchment which enters the Cudgegong River. The Cudgegong River and its tributaries (such as Lawsons Creek) are managed as a regulated river under the Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source 2016. The Cudgegong River is hydraulically controlled by Windemere Dam and is a major tributary of the Macquarie River which flows into Burrendong Dam. A comprehensive set of water quality data has been assembled to date that has identified that water quality in the Lue area is influenced by the surrounding agricultural land use.	Monitoring of surface water quality and natural flows in Hawkins Creek will continue.	Reductions in surface water runoff reporting to the surrounding creek and river system as a result of catchment reduction as a consequence of catchment disturbance, surface water harvesting to meet process water demand and/or management of mine affected runoff therefore reducing the availability of water resources to the natural environment and downstream users. Reduction in water quality of receiving system as a consequence of the discharge of mine affected water or sediment-laden runoff therefore reducing the quantity of the water resource for downstream users. A key factor that could potentially influence the water quality would be the oxidation of sulphides within the excavated waste rock which could lead to acid rock drainage. Reduction in the quality and quantity of flow in the receiving system has the potential to influence the physical characteristics of existing watercourses by reducing the magnitude and frequency of high flow events and altering the existing sediment budgets.	Divert clean water around catchments disturbed by mining activity to maintain flows in receiving watercourses. Secure surface water allocations and licences beyond those provided under maximum harvestable rights from existing surface water resources within the Water Sharing Plan where possible and therefore not place additional demand on the existing surface water resources. Ensure that all water management infrastructure is designed, constructed, managed and maintained in accordance with all design standards and hydraulic performance criteria. Implement a Water Management Plan and an Erosion and Sediment Control Plan. Implement waste rock and tailings management measures to minimise the potential for contamination of land, surface water and groundwater.	The surface water assessment compiled to date will be received and updated in light of the variations to the Project. The assessment would incorporate preliminary designs of the water management infrastructure and required operational safeguards. A detailed water balance will be assembled together with an ongoing surface water quality monitoring plan.	

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Table 5.1 (Cont'd) **Preliminary Environmental Impact Identification and Management Commitments**

Issue	Existing Environment	Further Investigations	Potential Impacts	Management Commitments (post approval)	Proposed Assessment	
Groundwater	Four groundwater systems occur beneath the indicative Mine Site associated with the four main geological units within and surrounding the indicative Mine Site: 1. Alluvium. 2. Sydney Basin Sedimentary Fractured Rock. 3. Rylstone Volcanics. 4. Ordovician Bedrock. The primary aquifers are associated with the alluvium and the Rylstone Volcanics. The groundwater environment is best described as a fractured rock system with superficial layers of alluvial sediments located along 1st and 2nd order watercourses. The effective porosity of the geological units beneath the indicative Mine Site is controlled by the density and connectivity of fractures and faults that are present. It is conceptualised that the permeability of the fractured rock aquifers will decrease with depth as the weight of overburden rocks close the fractures thus inhibiting the movement of water. The indicative Mine Site straddles two Water Sharing Plans; NSW Murray Darling Basin Fractured Rock Groundwater Sources (Lachlan Fold Belt), 2011 and the NSW Murray Darling Basin Porous Rock Groundwater Sources, 2011.	the indicative Mine Site will continue.	Mining operations and associated dewatering operations are anticipated to influence local hydraulic gradients leading to possible drawdown at existing bores into the fractured rock aquifers in the local area. This may impact existing groundwater users by either limiting access and/or volumes available for abstraction. It is unlikely the existing bores in the alluvium would be affected. In addition, pit dewatering may influence flow conditions in 1 st and 2 nd order watercourses as a result of baseflow reduction. Groundwater quality may also be influenced by any chemical changes arising from the oxidation of the natural sulphides present on site and/or seepage from tailings storage facility.	Secure groundwater allocations and licences to account for pit dewatering and process water supply (if required) from existing water resources within the respective Water Sharing Plans where possible thereby preventing additional demand on the existing groundwater resources. Instigate 'make-good' arrangements with existing groundwater identified as being potentially impacted by the Project. Monitor the volumes of all water pumped from the proposed open cut pit and reuse to optimise use of the groundwater resource. Implement waste rock and tailings management measures to minimise the potential for contamination of land or water (groundwater). Design, construct, manage and maintain all tailings storage infrastructure in accordance with all design standards and hydraulic performance criteria. Implement a Water Management Plan that includes provision for ongoing monitoring, data collection and reporting of groundwater quality, groundwater standing levels and groundwater flow conditions at bores surrounding the indicative Mine Site.	A transient groundwater model to identify potential impacts to the four groundwater systems under the NSW Aquifer Interference Policy. Model development will be in accordance with the Australian Groundwater Modelling Guidelines and subject to Peer Review.	
Blasting and Vibration	A small hard rock rhyolite quarry is located approximately 5km to the northwest of the proposed open cut pit. Blasts are comparatively infrequent at this quarry.	No further investigations are required.	Whilst blasts are likely to be heard at surrounding locations, with the implementation of appropriate blast design and management measures, compliance with applicable criteria is considered highly likely, particularly given the considerable distance to non-project related residences.	Strictly comply with the approved blasting hours. Ensure the burden distance, hole spacing and stemming depth are carefully designed to be just sufficient to break the rock to the required size and then implemented precisely. Avoid initiation of blasts when other adverse weather conditions exist, e.g. temperature inversion, rain, fog, mist and thunderstorms.	Assessment of potential blasting impacts will be undertaken by suitably qualified specialist consultants with respect to ground vibration, airblast overpressure and blast fume.	
Terrestrial Ecology	A number of ecological surveys have previously been completed across parts of the indicative Mine Site. To date a total of 11 plant community types have been identified, a number of which meet the classification of White Box Yellow Box Blakely's Red Gum Woodland, listed as an Endangered Ecological Community (EEC) under the <i>Threatened Species Conservation Act 1995</i> (TSC Act) and a Critically Endangered Ecological Community (CEC) under the (EPBC Act). One threatened flora species has also been identified, <i>Pomaderris cotoneaster</i> , listed as endangered under both the TSC Act and EPBC Act. A total of 22 native mammals (including 12 bat species), nine introduced species, 104 bird, 13 reptile and five amphibian species have been located during the surveys, of which 13 are listed as threatened. The most notable threatened species is the Regent Honeyeater.	Further ecological surveys are proposed in areas not previously surveyed. Follow up surveys in previously surveyed areas are also proposed. Investigations will also be undertaken to identify suitable biodiversity offset areas.	Impacts would principally occur as a result of clearing vegetation removing both individuals and habitat area. The potential significance of these impacts has yet to be determined.	 Throughout the life of the mine, measures to be adopted would include: progressive clearing to provide sufficient areas for the next 12 months of operation; implementation of pre-clearance inspections; progressive rehabilitation; and ongoing weed management and control. The principal long-term management measure would be the development of a biodiversity offset strategy to secure in perpetuity areas around the indicative Mine Site with similar vegetation to that which would be cleared within the indicative Mine Site. 	A comprehensive ecological impact assessment will be completed to identify the presence and status of the EECs and individual species within the area to be disturbed. Appropriate design and operational safeguards will also be investigated. The potential impacts upon groundwater dependent ecosystems will also be assessed.	

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Table 5.1 (Cont'd) Preliminary Environmental Impact Identification and Management Commitments

Issue	Existing Environment	Further Investigations	Potential Impacts	Management Commitments (post approval)	Proposed Assessment
Aquatic Ecology	A previous aquatic ecology assessment, supported by field inspections and stygofauna survey were undertaken to describe the existing aquatic habitats, water quality and flows and the aquatic flora and fauna in the vicinity of the indicative Mine Site. Hawkins and Lawsons Creeks flow through disturbed habitat of relatively low ecological value as a result of historical clearing of the native riparian vegetation. Whilst these creeks support a diverse range of macroinvertebrate fauna, the observed assemblages were dominated by pollution tolerant species. Several native and introduced fish species were sampled in Hawkins and Lawsons Creeks with none of the native species being listed as threatened. The results of stygofauna sampling suggested that the stygofauna assemblage present appears	Further ecological studies are planned in Lawsons Creek in the vicinity of the proposed bridge crossing for the proposed new access road from Lue Road to the indicative Mine Site.	Changes to flow levels within Hawkins and Lawsons Creeks due to the removal and / or realignment of connected watercourses in the open cut pit area. Impacts to the water quality of Hawkins and Lawsons Creeks due to possible sediment inputs linked the removal / realignment of connected watercourses, the water quality of surface runoff, runoff from disturbed areas (including areas of waste rock) and discharges may influence receiving systems. However, the existing environment is presently degraded and influenced by historic disturbance.	The adoption of the management commitments for both surface water and groundwater would be fundamental to the protection of the aquatic flora and fauna within and surrounding the indicative Mine Site.	A comprehensive aquatic ecological assessment will be undertaken to review the impacts of predicted changes in stream flows and possible water quality around the indicative Mine Site.
	to consist of relatively common and widespread taxa.				
Land and Soils Capability	Soils within the indicative Mine Site Area have been described and four Soil Management Units [SMUs] have been identified. Thirty six soil pits were dug to a depth of 2.5m or to a point where bedrock was encountered. The physical and chemical attributes of the soils within much of the indicative Mine Site have been quantified through a combination of field assessment and laboratory testing. All horizons in all profiles were field and laboratory tested. The results indicate that the soils are relatively stable but have a high dispersibility rating. Soil structure is generally good with a topsoil profile between 12cm to 22cm and subsoil depth up to 250cm. None of the soils sampled had salinity issues. Based on the results of the test pits and analyses, the pre-mining Land and Soil Capability Classes have been identified as being 5 and 6.	Further soil testing is proposed in areas of the indicative Mine Site not yet investigated. Particular emphasis will be placed on the collection of data for the BSAL verification process.	Soil resources are limited within the footprint of the proposed open cut pit, However, the proposed mining operations would involve the removal and transfer/storage of as much topsoil and selected subsoil from operational areas as possible. Progressive and final rehabilitation would be undertaken wherever possible using the previously stripped topsoil and subsoil. As a proportion of the indicative Mine Site is currently used for grazing, the potential impact of the Project would have on any BSAL would require assessment and site verification.	Minimise land and soil degradation through the implementation of appropriate soil management measures. Implement a Rehabilitation Management Plan that establishes timing and final land use objectives of the progressive rehabilitation activities during the operational life of the Project and post closure.	A soil and land capability assessment has previously been conducted to develop further understanding of the local soils. That study will be reviewed and updated, reflecting the additional data assembled and the proposed areas of disturbance. BSPL would commission further studies to quantify the impact the Project would have on the agricultural suitability and productivity of the areas to be disturbed with this information to be included within a BSAL site verification and certification assessment.
Social and Economic Appraisal	Lue is located within the Mid-Western Regional Local Government Area together with the towns of Gulgong, Kandos, Mudgee and Rylstone and other smaller rural villages. Lue has a population of approximately 450 persons with the Lue Public School providing a key focus for many of those living in the village. In 2011, the industries that employed the most working residents in Lue were Agriculture, Forestry and Fishing, followed by Retail Trade, then Education and Training. In the MWRLGA, the industries that employed the largest workforce was Mining followed closely by Retail Trade as well as Agriculture, Forestry and Fishing.	the Lue and district community.	The Project would provide direct and indirect employment opportunities to the local and regional area leading to increased economic activity and benefits to the broader community. Additional demand may be placed on local and regional housing with potential for further housing to be constructed within Lue village. It remains BSPL's commitment to ensure the Project supports the sustainability of Lue village and the village community.	Utilise the existing local and regional workforce and service providers where practical to avoid placing additional strain on housing supply. Contribute to the enhancement of the Lue community through targeted programs developed with the community. Maintain a proactive role as a good corporate citizen in the Mudgee, Rylstone and Kandos Area.	An economic consultant will be commissioned by BSPL to establish the extent of economic impacts (positive of negative) that would occur as a result of the Project. BSPL will commission a consultant to undertake an independent assessment of the social characteristics and views of the local community and recommend measures for BSPL to adopt.

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6. CONSULTATION

6.1 GOVERNMENT AGENCIES

Consultation with relevant government agencies has been ongoing since a Planning Focus Meeting was held on 6 February 2013 to support a request for Director-General's Requirements (DGRs) for the Environmental Impact Statement. A request for revised Secretary's Environmental Assessment Requirements (SEARs), formerly known as DGRs was submitted in December 2014. Further consultation is planned with all agencies to inform and discuss BSPL's plans for the Project.

6.2 LOCAL COMMUNITY

BSPL has developed a community and landholder liaison plan (CLLP) with the objectives of establishing and maintaining BSPL's social licence to operate through:

- 1. identifying, building and maintaining effective relationships with stakeholders;
- 2. engaging with the local community;
- 3. investing within the local community;
- 4. communicating and consulting with identified community members and groups.

The CLLP utilises the information gathered from the community and details stakeholder individuals and groups, and outlines engagement activities, timing of consultation events and responsibilities. BSPL is developing the plans for the proposed mine with the knowledge of a range of factors raised during the community consultation undertaken to date.

BSPL has also supported the formation of an Exploration Community Consultation Committee under the provisions of the *Mining Act 1992* to enable a structured approach to a range of issues raised by the local community.

BSPL has actively encouraged feedback with BSPL senior management, community liaison team members and other BSPL staff such as environmental and geological team members.

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