BOWDENS SILVER

WATER SUPPLY SUBMISSIONS REPORT

State Significant Development No. 5765

October 2022

Prepared by: **R.W. CORKERY & CO. PTY. LIMITED**

Bowdens Silver Project

Water Supply Submissions Report

State Significant Development No. 5765

Prepared for:

Bowdens Silver Pty Limited
ABN: 37 009 250 051

Sydney Office
Level 11, 52 Phillip Street
SYDNEY NSW 2000

Telephone: (02) 8316 3997
Facsimile: (02) 8316 3999
Email: information@bowdenssilver.com.au

Operations Office
68 Maloneys Road
LUE NSW 2850
P.O. Box 1115
MUDGEE NSW 2850

Telephone: (02) 6373 6420

A Silver Mines Limited company

Prepared by:

R.W. Corkery & Co. Pty. Limited
Geological & Environmental Consultants
ABN: 31 002 033 712

Telephone: (02) 9985 8511
Email: admin@rwcorkery.com

Ref No. 429/43

October 2022

RWCorkery&co

This Copyright is included for the protection of this document

CONTENTS

CONTENTS

APPENDICES

CONTENTS

Page

FIGURES

TABLES

Acronyms

AEP	Annual Exceedance Policy
AMD	acid and metalliferous drainage
BoM	Bureau of Meteorology
BSAL	biophysical strategic agricultural land
CCC	Community Consultative Committee
DPE	Department of Planning and Environment
DPE – Water	Department of Planning and Environment - Water
DPIE – Water	(former) Department of Planning, Industry and Environment - Water
EEC	endangered ecological community
EIS	Environmental Impact Statement
EMM	EMM Consulting Pty Ltd
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence
EV	electric vehicle
GHG	greenhouse gas
HCN	hydrogen cyanide
LGA	Local Government Area
MWRC	Mid-Western Regional Council
NAF	non-acid forming
PAF	potentially acid forming
RLA	Richard Lamb and Associates
SCSC	*Specialist Consultant Studies Compendium*
SEARs	Secretary's Environmental Assessment Requirements
SILO	Scientific Information for Landowners

TSF	Tailings Storage Facility
TSP	total suspended particles
VLAMP	Voluntary Land Acquisition and Mitigation Policy
WM Act	*Water Management Act 2022*
WRE	Waste Rock Emplacement
WRM	WRM Water and Environment Pty Ltd

Executive Summary

Introduction

This *Water Supply Submissions Report* has been compiled to provide a response to the key matters raised in public submissions lodged with the Department of Planning and Environment (DPE) during and following the public exhibition period for the *Water Supply Amendment Report* for the Bowdens Silver Project (hereafter referred to as the "Project") proposed by Bowdens Silver Pty Limited (hereafter referred to as "Bowdens Silver").

The proposed amendment involved:

- removal of the previously proposed water supply pipeline as a Project component;
- amendment to the Mine Site layout to support the proposed integrated water management and supply strategy; and
- amendment to the alignment of the 500kV power transmission line to reduce the visual impact of the infrastructure.

Analysis of Submissions

A total of 275 submissions were received by DPE following public exhibition of the *Water Supply Amendment Report* for the Project. The public submissions may be separated into the following general categories.

- Supporting public submissions – 29 individual submissions from members of the general public supporting the Project.
- Opposing public submissions – 231 individual submissions from members of the general public opposing the Project.
- Commenting public submissions – one individual submission from a member of the general public commenting on the Project.
- Supporting organisation submissions – four submissions from organisations supporting the Project.
- Opposing organisation submissions – 10 submissions from organisations opposing the Project.

This is the third opportunity for community members to comment on the Project and while there were many comments on the proposed amendment, many submissions both in support of and objecting to the Project focused on the broader Project impacts and benefits. It is noted that the public response to the EIS was overwhelmingly supportive of the Project with support provided locally, regionally throughout the Mid-Western Local Government Area, across NSW and within Australia. The public responses to the two amendments to the Project that have been presented to the community since the submission of the EIS have mostly been objections either to the Project generally or the matters raised in the reports that were the subject of public exhibition.

Public submissions received following public exhibition of the *Water Supply Amendment Report* that were in support of the Project reiterated the economic benefits to the township of Lue and the surrounding community including Rylstone, Kandos and Mudgee. Submissions also noted the employment opportunities generated by all stages of the Project as the principal reason for their support. Several supportive submissions also noted the comprehensive assessments of environmental impacts undertaken by Bowdens Silver, along with the positive influence of Bowdens Silver upon the local community through their existing Community Investment Program.

The key matters raised in submissions that relate to water supply for the Project and associated environmental impacts include the risk to water supply availability for local water users and the risk of water supply constraints for the Project which may lead to production uncertainty. Other water-related matters included water management risks including dust suppression for the Mine Site and TSF, risks to local agricultural production and groundwater quality and availability risks. Visual amenity impacts associated with the proposed realignment of the 500kV power transmission line, which was the subject of the *Amendment Report* and *Amendment Submissions Report*, were also raised in some submissions. A range of matters were raised in submissions that did not relate to water supply for the Project or the 500kV power transmission line. The majority of these were issues reiterated from previous submissions or concerning matters that have been comprehensively addressed elsewhere.

Actions Since Exhibition

The principal activities undertaken since the public exhibition of the *Water Supply Amendment Report* involved:

- ongoing consultation with the local community and NSW government authorities;
- a review of site water balance modelling in response to a change to protocols regarding NSW harvestable rights dam use; and
- a review of greenhouse gas emissions prompted by internal Company objectives for this aspect of environmental management for the Project.

In May 2022, the Harvestable Rights Orders were amended to prohibit the transfer of water from harvestable rights dams to excluded works or other dams within the landholding. The new Harvestable Rights Orders have necessitated a change to management strategies described in the integrated water management and supply strategy and further water balance modelling to test the updated strategy. While Bowdens Silver had proposed to transfer water between harvestable rights dams, the contribution of these dams to the overall water balance was relatively minor. It is also noted that water may be transferred from harvestable rights dam to water tanks as these are not excluded works under the *Water Management Act 2000*. Regardless, the integrated water management and supply strategy has been updated to remove the 130ML water storage dam, noting that this dam would be retained in the water management system but likely used for transfer of water from the open cut pit or from groundwater production bores.

As a result of the updated site water balance modelling, WRM has demonstrated that under average modelled climate conditions and during periods of low rainfall, the Project would continue to have a reliable supply of water for both processing operations and dust suppression activities. In addition, it is noted that the updated modelling does not change the previous conclusions to the Surface Water Assessment of the Project. That is, the Project would marginally

reduce downstream flows in both Hawkins and Lawsons Creeks through the interception and retention of runoff within the Mine Site and a reduction in baseflow in both creeks. The potential for impacts to surface water quality would be managed over the life of the Project and monitored in accordance with an approved Water Management Plan.

Bowdens Silver, and its parent company Silver Mines Limited, are committed to responsible environmental management, including where this relates to the greenhouse gas (GHG) emissions from its activities. Recent public debate on emissions generation, especially as it concerns resource projects in Australia, has prompted internal review of the Company's commitments relating to the Bowdens Silver Project.

Given that Scope 2 emissions were predicted to be the largest source of emissions for the Project (57% of the total), Bowdens Silver has considered opportunities to reduce these emissions. EMM Consulting Pty Ltd (EMM) were commissioned to review the Scope 2 emission generation for the Project and to provide updated GHG emission estimates. The below table provides an updated estimate of GHG emission generation for the Project under three future scenarios.

Scope 2 Greenhouse Gas Generation by Mitigation Scenario

Scenario	Scope 2 GHG Emission Generation (CO_2-e)	Emission Reduction (%)
As presented in the EIS	812,319	0
Net zero 2050 pathway	372,926	54
12.4MW Solar farm option	227,673	72
Purchase of 35% green power	242,402	70

The current expectations for decarbonisation of grid electricity would see sources of electricity for the Project becoming more reliant on renewable sources and therefore reduce the Scope 2 GHG emissions related to the Project. This change is projected to occur without any input by Bowdens Silver. A scenario has been considered that includes a possible 12.4MW solar farm. A feasibility study of the solar farm option has been undertaken, but Bowdens Silver is not seeking approval for a solar farm as part of its State Significant Development application, with any application for a solar farm likely to be submitted to the relevant consent authority in a separate application. That said, the review of GHG emission generation under this scenario indicates it would provide a substantial reduction in GHG emission generation. For comparison the solar farm provides the same benefit as the Company sourcing 35% green power on top of the current decarbonisation pathway.

Response to Matters Raised

It is noted that several of the individuals and organisations providing objections to the Project took the opportunity to reiterate their previous concerns. Accordingly, a large proportion of the matters raised in opposing public and organisation submissions in response to the *Water Supply Amendment Report* have previously been comprehensively addressed in other documents. It is noted that the assessment outcomes for these issues is unchanged following public exhibition of the *Water Supply Amendment Report*.

A detailed response has been provided to the matters raised in the *Independent Review of the Bowdens Silver Pty Limited Surface Water Assessment – Updated*, prepared by S. Baguley on behalf of the Lue Action Group. This review was provided as Attachment 2 of the Lue Action

Group's submission lodged with the DPE following the public exhibition period for the *Water Supply Amendment Report.* The key matters raised in Baguley (2022) that relate to water supply for the Project and associated environmental impacts include:

- the suitability of data used for the assessment;
- the risk to water supply availability for local water users; and
- the risk of water supply constraints for the Project which may lead to production uncertainty.

Other water-related matters included water licensing, risks to local agricultural production and risks to groundwater springs and wetlands.

The key matters raised in the submissions and response to the matters raised is provided as follows.

- **The suitability of data used for the assessment** – Comments on the data used in assessment of water supply reliability principally focused on the rainfall data applied in site water balance modelling. In summary, the 130-year rainfall dataset used in the Surface Water Assessment (WRM, 2022) is considered appropriate for capturing historical variation in local rainfall and suitable for assessing the Project's potential surface water impacts and water supply reliability.

  Accurate and efficient modelling and assessment results from the use of complete and accurate rainfall and climate data. The site water balance modelling used data sourced from the Queensland Department of Environment and Science, Scientific Information for Landowners (SILO) data service. The SILO climate dataset is considered the best approach to achieving complete and accurate climate data. For this reason, SILO is commonly used by hydrological consultants, research agencies such as CSIRO and the Murray-Darling Basin Authority and State agencies. When compared to locally available data there is some variance in individual monthly averages, however there is no significant difference between the SILO or BoM data that might substantially influence assessment outcomes.

- **The risk to water supply availability for local water users** - A key objective in developing the Project's integrated water management and supply strategy was to increase the security of the Project's water supply without impairing water availability for other users. This would be achieved by reducing the Project's water demand, limiting evaporative losses from water storages and supplementary supply from advanced dewatering (production) bores. The additional assessment of the integrated water management and supply strategy demonstrates that even during low rainfall periods, the Project would result in a negligible cumulative change in water availability for other water users. When considering cease to flow conditions, the Project would only slightly increase the frequency of cease to flow conditions by 0.6%, even under drought conditions. It is also noted that, as other downstream catchments contribute to streamflow in Lawsons Creek, the relative impact of the Project would reduce significantly with increasing distance downstream.

- **The risk of water supply constraints for the Project which may lead to production uncertainty** – Assuming the successful implementation of the integrated water management and supply strategy, the Project is predicted to have a secure and reliable water supply that no longer requires external input. Assessment of the integrated water management and supply strategy identified the Project as having an average volumetric water supply reliability of 99.6% for processing operations and 99.8% for dust suppression.
- **Water access licensing** – Bowdens Silver holds volumetric and landholder entitlements that fully account and exceed its predicted impacts on water sources. The Project does not require the transfer of water from any water source or management zone outside of those in which the Mine Site is located and has not moved licences upstream to the detriment of any users in other areas. Although the reference to "Sydney" within the naming of the Sydney Basin Groundwater Source of the NSW Murray Darling Basin Porous Rock Groundwater Sources Order 2020 is possibly misleading for some community members, it should be recognised that it does not lie within WaterNSW's drinking water catchment for Sydney. The same applies for any reference to the Murray-Darling Basin in groundwater sharing plans. The naming of groundwater sources and water sharing plans relates to the host geology of the aquifer system and not the geographical location of a surface water catchment.
- **Risks to local agricultural production** – Bowdens Silver recognises the agricultural history and productivity of the locality and the ongoing use of land within and surrounding the Mine Site. Assessment of the potential impacts of the Project on the availability of water resources to other users determined these impacts were consistent with those previously predicted. Therefore, the conclusions of the Agricultural Impact Statement prepared for the EIS are reiterated. That is, the Project would have negligible to minor impacts upon the agricultural resources and enterprises throughout the region.
- **Risks to groundwater including springs, peatlands and wetlands** – As identified in Section 4.5.15 of Jacobs (2022) water quality data from springs included in the water quality sampling program does not closely correlate with that of regional groundwater. Rather, much of these areas were inferred by Jacobs (2022) to be reliant on rainfall recharge and sub-flow, rather than regional groundwater and not anticipated to be impacted by the Project. Bowdens Silver does not dispute that the Montane Peatlands and Swamps Endangered Ecological Community may occur in the wider local setting. However, the terrestrial ecology surveys commissioned for the Project and undertaken by EnviroKey did not identify it within the Mine Site or the relocated Maloneys Road.
- **Water from the landscape** – It is acknowledged that the Project would capture runoff from within the 5.5km^2 Mine Site catchment. This area includes the containment zone, clean water zone and the erosion and sediment control zone and was used to assess impacts to streamflow and downstream water users. Under existing conditions which include a predominantly vegetated landform, an average contribution of 177ML/year to local streamflow is predicted over the catchment

area. However, following Mine Site development, the volume of water that runs off this landscape would be higher as the result of disturbance. Therefore, an average of 856ML/year is predicted to run off from these disturbed catchments during the Project-life, with this water predominantly captured in the containment structures.

- **Groundwater and baseflow reduction** – Local residents have reiterated their concerns regarding impacts to local bores and baseflow reduction to Lawsons Creek, particularly in light of the proposal to source water from within the Mine Site. However, predicted impacts at private bores would only marginally change[1] and baseflow reduction would increase to an estimated peak of 14.0ML/yr during operations and 19.3ML/yr post-mining. This may be compared to the previously estimated peak in baseflow reduction of 12.9/ML/yr post-mining.
- **Water limitations and the effect of Aboriginal cultural heritage locations** – Concern was raised regarding the possible effect of additional dams and sources of water within the Mine Site on existing Aboriginal cultural heritage sites. Two of the sites previously identified for removal by Landskape (2020) are situated in areas that would be disturbed by the construction of two harvestable rights dams (WC South and BG Centre). Therefore, the amended Mine Site layout (including the turkeys nest dam) would not require the removal of additional items of Aboriginal cultural heritage significance and no changes to the management of Aboriginal Cultural Heritage would be required.
- **Reliability of water for dust suppression and dust generation on the TSF** – Concerns were raised about the reliability of water for dust suppression when reliant on on-site sources. Similarly, the strategy of reducing water on the TSF to limit evaporative losses was queried in relation to the risk of tailings material becoming dry and leading to dust lift-off from the TSF as possible pollution. A priority in planning the integrated water management and supply strategy for the Project was ensuring that sufficient water would be available for dust suppression. The Project has a secure and reliable water source that includes requirements for on-site management. Dust suppression activities can be maintained, with 99.5% supply reliability predicted during low rainfall periods. Furthermore, any exposed tailings beach would remain partially wetted via interstitial pore water within the deposited tailings. Whilst the integrated water management and supply strategy increases the efficiency of water recovery from the TSF and the leachate management dam, it would not result in the complete removal of water from either structure. Deposited tailings would still contain moisture, it is more that the water level on the TSF would be maintained lower to limit evaporative loss.
- **Social impacts of the proposed integrated water management and supply strategy** – Some submissions raised concerns about the social impact of a water supply strategy focused on sources within the Mine Site and the social licence to use this water. Bowdens Silver understands that ongoing and transparent consultation with all stakeholders is vital in gaining and maintaining a social licence

[1] It is noted that bore GW802888 is now Project-related, the owner having signed an agreement with Bowdens Silver. Bore GW061475 remains privately-owned but is understood this bore is damaged and not relied upon by the owner.

to operate the Project. Acknowledgement of Bowdens Silver's current engagement and support is evidenced by the substantial number of positive submissions received for the Project from local and regional community members as well as the outcomes of the Social Impact Assessment prepared by Umwelt.

Bowdens Silver has focused considerable effort in planning and justifying its water supply strategy. Translating predictions of modelling to the certainty of practice is something that will take time and consistent demonstration that outcomes align with predictions. By continuing to meet the expectations and commitments made to the community Bowdens Silver will continue to build trust with its neighbours and those that currently oppose the Project. With this approach, Bowdens Silver is confident that it will continue to earn and maintain its social licence as operator of the Project.

Some submissions raised matters that were not related to the integrated water management and supply strategy but related to other matters including the re-location of the 500kV powerline, planning and application matters and sewage management. The following presents a summary and response to the matters raised.

- **Relocation of the 500kV power transmission line** – Some submissions referred to a perceived negligible change in perspective afforded by the re-location of the power transmission line towards the Mine Site and queried the assessment of visual amenity accompanying the *Water Supply Amendment Report*. While it is noted that Bowdens Silver was not able to completely remove the power line from possible view, it is reiterated the alignment as presented in the *Water Supply Amendment Report* was an improvement on the original re-alignment with modelling of the powerline undertaken to estimate the possible location of transmission towers and the wires. RLA (2022) assessed views in terms of the character and quality of the visual landscape and not simply whether it might be seen. It was concluded that the 500kV power transmission line is part of the current setting and that power lines are a common feature in rural landscapes. The assessment concluded that the character and quality of the visual landscape would not change significantly.
- **Planning Matters** – Several submissions commented on the late changes to the Project and consider this reflects poorly on Bowdens Silver. Similarly, some submissions questioned the ability to amend the Project without re-submitting a complete EIS. While it is acknowledged that the recent amendment to the Project has created confusion for some in the community, it is reiterated that the outcomes of the *Water Supply Amendment Report* reflect a vastly simplified Project with less physical disturbance (and possible biodiversity and heritage impacts) and reduced the number of landowners directly engaged in the development process. The amendment also removed several infrastructure components (the pipeline, water treatment and pumping stations) that no longer form part of the Project. While Bowdens Silver presented the water supply pipeline in the EIS with the full intention of constructing it, the outcomes of the amendment are considered to be of

benefit to the Company and the community. As iterated in the *Water Supply Amendment Report*, any development application may be amended prior to determination.

- **Sewage Management** – A submission queried the ability of local sewage treatments plants to manage sewage that would be generated at the Project. It is considered that all sewage generated would be appropriately managed over the life of the Project. The Project would only rely on a pump-out system during the approximately 18-month Site Establishment and Construction stage of the Project. During this stage, an on-site sewage management system for managing sewage from up to 150 persons daily would be constructed for use during operations.

  MWRC maintains sewage treatment plants at Mudgee, Gulgong, Kandos and Rylstone, each of which could accept pumped out sewage from the Project. Bowdens Silver has consulted with Council on this matter and notes that MWRC is constantly reviewing and considering its requirements to manage the growing permanent and visitor population in the region. The current arrangements for sewage removal from the property is undertaken by a contractor. Whilst waste is currently removed to the sewage treatment plant at Mudgee, it may be taken to other sites within the LGA (Gulgong, Kandos or Rylstone). However, in its general operations, the contractor also disposes of waste at Lithgow, Orange or Cowra where it is accepted without application or to Dubbo, where prior application is required. The contractor also has their own treatment facilities to process waste with a capacity of 20,000 tonnes per annum, if this is needed.

Evaluation of Merits

The amendment to the Project that was presented in the *Water Supply Amendment Report* demonstrated that the Project may rely upon on-site water supply sources to support water use requirements principally for processing and dust suppression. Consequently, the water supply pipeline has been removed from the Project. This has resulted in a vastly simplified Project in terms of:

- reduced scale of physical disturbance which includes biodiversity and cultural heritage impacts;
- the elimination of the need to reach agreements and construct a water supply pipeline on third party owned land; and
- avoidance of complex arrangement for easements, water treatment facilities, construction planning and management.

New Harvestable Rights Orders for NSW have necessitated a minor change to the integrated water management and supply strategy, however this has not materially changed the Project or altered environmental assessment outcomes. In fact, an update to the site water balance modelling has further supported the water supply reliability of the integrated water management and supply strategy.

A new alignment for the 500kV power transmission line has been proposed with a lower overall visual impact. While individual views towards the Mine Site would change, it is concluded that the proposed re-alignment to the 500kV power transmission line would not significantly change the character and quality of the visual landscape in the village of Lue.

The assessment of the potential environmental impacts of the Project concludes that although there would be impacts experienced in the local setting, these would satisfy all relevant NSW guidelines and policies. Environmental risks would be subject to active management and mitigation over the life of the Project and when considered from both a stand-alone and cumulative impact perspective are concluded to be acceptable. Detailed assessment of the Mine's proposed integrated water management and supply strategy first presented in the *Water Supply Amendment Report* has demonstrated that water use for the Mine would not have a significant impact on local water supply quality or reliability, even during times of drought.

While the social setting of Lue would change with an approval of the Project, and these changes may not be welcomed by some in the community, it is believed that the changes would bring benefits to the community that would contribute to the long-term sustainability of Lue. These include the benefits of employment opportunities, population growth, economic growth and opportunities for training and education. Detailed assessment of risks to the community from the implementation of the integrated water management and supply strategy has concluded that the Project would not impact the ongoing local use of water that currently supports lives and livelihoods.

When considered on balance, the predicted outcomes of the Project are considered to be justified and would be in the public interest.

1 Introduction

1.1 Scope

This document has been compiled to provide a response to the key matters raised in public submissions lodged with the Department of Planning and Environment (DPE) during and following the public exhibition period for the *Water Supply Amendment Report* for the Bowdens Silver Project (hereafter referred to as the "Project") proposed by Bowdens Silver Pty Limited (hereafter referred to as "Bowdens Silver").[2]

The *Water Supply Amendment Report* presented an amendment to the Project relating to Bowdens Silver's intention to rely on water sources within the Mine Site for the Project's water supply requirements. This enabled the removal of the previously proposed water supply pipeline and required Mine Site layout amendments to support the proposed integrated water management and supply strategy. A further amendment to the alignment of the 500kV power transmission line was also presented. All other matters relating to the environmental, social and economic outcomes of the Project are presented in the *Environmental Impact Statement* (EIS), *Submissions Report, Amendment Report* and *Amendment Submissions Report* for the Project.[3]

The *Water Supply Amendment Report* was publicly exhibited from 25 March 2022 to 7 April 2022 and submissions received during and after that period were collated by DPE and provided to Bowdens Silver for review and response. The majority of submissions from public organisations and individuals expressed opposition to the amendment or to the Project more broadly (241 or 88% of submissions objected). However, the Project continued to receive support with 33 submissions provided in support of the amendment and the Project broadly. Each of the relevant NSW Government agencies have provided further feedback on the Project following review of the *Water Supply Amendment Report* and *Amendment Submissions Report* with no further matters outstanding with any agency consulted through DPE. There have been no objections to the Project raised from any agency including Mid-Western Regional Council (MWRC).

This document provides an analysis of the submissions received relating to the water supply amendment, a summary of actions undertaken by Bowdens Silver since the public exhibition of the *Water Supply Amendment Report* and a review and response to the matters raised in submissions. The document concludes with an updated evaluation of the Project's merits that reflect all additional matters addressed in this document. A Register of Submitters and summary of the matters raised within the submissions is provided in **Appendix 1**.

[2] For clarity, this report is titled "*Water Supply Submissions Report*" in order to clearly distinguish it from the *Amendment Submissions Report* and *Submissions Report* for the Project.
[3] The EIS, *Water Supply Amendment Report*, *Amendment Report*, *Submissions Report* and *Amendment Submissions Report* are available from the Company website (https://bowdenssilver.com.au/) and the Major Projects Portal webpage for the Project (https://mpweb.planningportal.nsw.gov.au/major-projects/project/9641)

1.2 Project Documentation

The following subsection presents a summary of the documents that have been submitted to DPE regarding the Project since 2016, their purpose and a brief summary of the information that they contain. This is intended to provide clarity for the community when reviewing this document and identifying the information, assessment and discussions presented in each document.

Each of these documents are available from the NSW Major Project Portal webpage for the Project[4].

1. *Preliminary Environmental Assessment for the Bowdens Silver Project – November 2016.*

   This document is referred to as the *Preliminary Environmental Assessment.* This document provides a preliminary overview of the Project as originally envisaged in 2016 and presents the initial outcomes of mineral exploration, environmental assessments and the intended approach to environmental assessment for the Project for presentation in the EIS. Preliminary Environmental Assessments are now referred to by the DPE as Scoping Reports. The *Preliminary Environmental Assessment* was intended to assist the NSW Government in setting the Secretary's Environmental Assessment Requirements for the EIS for the Project (the SEARs) and to provide initial formal advice about the Project to all stakeholders including the community.

2. *Scoping Report for the Water Supply Pipeline for the Bowdens Silver Project – April 2019.*

   This document is referred to as the *Scoping Report*. This *Scoping Report* provides a preliminary overview of the intended construction and use of a water supply pipeline for the Project from the Ulan Coalfields. The report provided an update on the proposed Project to inform an update to the SEARs and to update stakeholders on the intended inclusion of this infrastructure within the Project. It presented the initial location of the water supply pipeline, outcomes of initial environmental assessments and the intended approach to environmental assessment.

3. *Environmental Impact Statement for the Bowdens Silver Project – May 2020.*

   This document is referred to as the *Environmental Impact Statement* (EIS). The EIS is the major supporting documentation for the development application and presents a complete description of the Project, the strategic, environmental and statutory context for the proposal and a thorough review of the outcomes of the range of environmental assessments. A summary of the management and mitigation measures that would be implemented during the construction and operation of the Project is also provided. The EIS concluded with a justification and evaluation of the Project in relation to the relevant legislative requirements in NSW, the principles of Environmentally Sustainable Development and the outcomes of all assessments. The EIS is supported by the *Specialist Consultant Studies Compendium* which presents the detailed technical environmental, economic and

[4] https://www.planningportal.nsw.gov.au/major-projects/projects/bowdens-silver-temp

social assessments undertaken for the Project as required by the *Environmental Planning & Assessment Act 1979*, the *Environmental Planning & Assessment Regulation 2000* and the SEARs.

4. *Submissions Report for the Bowdens Silver Project – June 2021.*

   This document is referred to as the *Submissions Report*. This report responds to the matters raised in the Government agency, organisation and public submissions received during the public exhibition of the EIS and *Specialist Consultant Studies Compendium*. The *Submissions Report* presents the outcomes of additional environmental, economic and social assessments undertaken in response to the submissions, a comprehensive response to the matters raised in the submissions and further evaluates the Project on the basis of the information presented.

5. *Amendment Report for the Bowdens Silver Project – July 2021.*

   This document is referred to as the *Amendment Report*. During the review of Government agency submissions, it was identified that the relevant regulatory authority for the 500kV power transmission line that traverses the Mine Site (TransGrid) had expressed a preference that the re-alignment of the line be included within the development application for the broader Project. This required an amendment to the Project to incorporate this aspect within the Project as presented for approval under State Significant Development Application 5765. The *Amendment Report* presented the context and assessment of the proposed re-alignment of the 500kV power transmission line. An amended Project Description was included as an Appendix to the *Amendment Report* to clearly describe the Project, as amended.

   Development applications in NSW may be amended at any time prior to determination with the agreement of the consent authority. This is permitted so that minor changes to development may occur without the need to repeat the entire EIS process. An Amendment Report is required to clearly describe what aspects are proposed to be amended.

6. *Amendment Submissions Report for the Bowdens Silver Project – March 2022*

   This document is referred to as the *Amendment Submissions Report*. During the public exhibition of the *Amendment Report* from 20 July 2021 to 16 August 2021, Government agencies, organisations and public stakeholders were invited to provide submissions commenting on the proposed amendment to the Project, i.e. regarding the re-alignment of the 500kV power transmission line. This document provides a response to matters raised in submissions received during this period. In addition, the *Amendment Submissions Report* also incorporates additional information sought by some Government agencies following their review of the *Submissions Report* dated June 2021. The *Amendment Submissions Report* also includes responses to other matters raised in submissions that are not related to the 500kV power transmission line. The document concludes with a further evaluation of the Project in light of the information presented in the *Amendment Submissions Report*.

7. *Water Supply Amendment Report for the Bowdens Silver Project – March 2022*

   This document is referred to as the *Water Supply Amendment Report* and was submitted concurrently with the *Amendment Submissions Report*. As Bowdens Silver has decided to defer the option to use a pipeline to supply water to the Mine Site, this aspect of the Project must be formally removed from the development application. Bowdens Silver has presented this update to the Project as an amendment and presented the context and environmental outcomes of the removal of the proposed water supply pipeline in a *Water Supply Amendment Report*. In response to community feedback, Bowdens Silver proposed a further alternate alignment to the 500kV power transmission line that would be relocated within the Mine Site Project. This alignment and the anticipated impacts of the change were also presented in the *Water Supply Amendment Report*. This report includes an amended Project Description that removes the water supply pipeline and incorporates minor infrastructure intended to replace the function of the water supply pipeline. The *Water Supply Amendment Report* concludes with an evaluation of the Project in light of the information presented in that document.

8. *Water Supply Submissions Report for the Bowdens Silver Project – June 2022* (this document).

   This document is referred to as the *Water Supply Submissions Report*. During the public exhibition of the *Water Supply Amendment Report* from 25 March 2022 to 7 April 2022, Government agencies, organisations and public stakeholders were invited to provide submissions commenting on the proposed amendment to the Project. This document provides a response to matters raised in submissions received during this period.

1.3 Document Format

This report has been compiled in eight sections with four appendices.

Section 1: introduces the report and presents an overview of Project documentation and Bowdens Silver's approach to consultation.

Section 2: provides an analysis of the submissions received from Government agencies and from organisations and individuals in the community who either support or oppose the amendment or the Project in general.

Section 3: describes the consultation that has been undertaken since exhibition of the *Water Supply Amendment Report*, either directly arising from the content of some of the submissions or as a result of ongoing routine tasks undertaken for the Project.

Section 4: provides a review of matters raised in submissions that have comprehensively addressed in previous documentation and includes a brief response to the matters raised.

Section 5: provides a response to a peer review of the Surface Water Assessment prepared by Ms S. Baguley on behalf of the Lue Action Group.

Section 6: provides comprehensive responses to the matters raised by organisations/individuals relating to the proposed water supply for the Project.

Section 7: provides comprehensive responses to other matters raised in submissions that not been previously addressed in other documentation.

Section 8: provides an updated evaluation of the Project taking all received submissions into account.

A set of appendices is provided to support this report, comprising the following.

Appendix 1: Register of Submitters.

Appendix 2: Bowdens Silver Water Balance - Impact of May 2022 amendment to Harvestable Rights Order on water supply reliability prepared by WRM Water and Environment Pty Ltd (WRM) (October 2022).

Appendix 3: GHG Emission Reductions Under Net Zero Pathways prepared by EMM Consulting Pty Ltd (September 2022).

Appendix 4: Summary of Environmental Management and Monitoring Measures.

2 Analysis of Submissions

2.1 General Review of Submissions

Appendix 1 presents a Register of Submitters including a review of the matters raised and where each has been addressed in this document.

A total of 275 submissions were received by DPE following public exhibition of the *Water Supply Amendment Report* for the Project. The public submissions may be separated into the following general categories.

- Supporting public submissions – 29 individual submissions from members of the general public supporting the Project.
- Opposing public submissions – 231 individual submissions from members of the general public opposing the Project.
- Commenting public submissions – one individual submission from a member of the general public commenting on the Project.
- Supporting organisation submissions – four submissions from organisations supporting the Project.
- Opposing organisation submissions – 10 submissions from organisations opposing the Project.

Of the public and organisation submissions received that objected to the Project, 66 submissions did not mention the *Water Supply Amendment Report* but focused on the Project more generally. One individual provided nine submissions from other individual members of the public as attachments to their own submission. There were also some duplicated submitters (i.e. a single person made more than one submission), an example of a form letter in both objecting and supporting submissions and one submission objecting to the project included three attachments with a total of 19 separate letters each raising separate matters.

The majority of supporting submissions also discussed general support for the Project and did not focus solely on the *Water Supply Amendment Report*.

Of the 231 individual public submissions received that objected to the matters raised in the *Water Supply Amendment Report*, 49 were provided by residents of Lue and surrounds (19% of individual public submissions)[5].

[5] "Lue and surrounds" has been defined as residents of Lue, Breakfast Creek, Bara, Camboon, Havilah, Hayes Gap, Monivae and Pyangle.

This is the third opportunity for community members to comment on the Project and each opportunity has resulted in vastly different outcomes. The response to the EIS was overwhelmingly supportive with support provided locally, regionally, across NSW and within Australia. The public responses to the two amendments to the Project has mostly included objections either to the Project generally or the matters raised in the reports that were the subject of public exhibition.

Over the same period, NSW Government agencies provided further feedback on the broader Project following review of the *Water Supply Amendment Report* and *Amendment Submissions Report*. A summary of each agency's response is as follows.

- Biodiversity Conservation and Sciences – Noted that their previous comments have been addressed to the satisfaction of the Department and recommended matters for conditions of consent.
- Environment Protection Authority – Noted that it had no further comments and referred to previous recommendations for conditions of consent.
- DPE Water – Recommended matters for conditions of consent.
- Resources Regulator – Noted that it had no further comments.
- Mining, Exploration and Geoscience – raised no issues with the Water Supply Amendment.
- Transport for NSW – Noted that it had no further comments and referred to previous recommendations for conditions of consent.
- Mid-Western Regional Council – Noted there was a water supply security concern for the whole region, especially at times of drought. MWRC also noted its general support for the strategy included within the *Water Supply Amendment Report* to address water supply and management.

2.2 Summary of Matters Raised

Public submissions received in support of the Project reiterated the economic benefits to the township of Lue and the surrounding community including Mudgee, Rylstone and Kandos. Submissions also noted the employment opportunities generated by all stages of the Project as the principal reason for their support. Several supportive submissions also noted the comprehensive assessments of environmental impacts undertaken by Bowdens Silver, along with the positive influence of Bowdens Silver upon the local community through their existing Community Investment Program.

The key matters raised in submissions that relate to water supply for the Project and associated environmental impacts include the risk to water supply availability for local water users and the risk of water supply constraints for the Project which may lead to production uncertainty. Other water-related matters included water management risks including dust suppression for the Mine Site and TSF, risks to local agricultural production and groundwater quality and availability risks.

Visual amenity impacts associated with the proposed realignment of the 500kV power transmission line, which was the subject of the *Amendment Report* and *Amendment Submissions Report*, were also raised in some submissions.

A range of matters were raised in submissions that did not relate to water supply for the Project or the 500kV power transmission line. The majority of these were issues reiterated from previous submissions (sometimes made by the same submitter) or concerning matters that have been comprehensively addressed elsewhere. Section 4 presents a summary of these issues and where these have been addressed in other documents. A brief response on the matters is also provided. Where issues were raised that had not been addressed elsewhere or where further commentary was considered relevant, the matter is discussed in Section 7.

3 Actions Taken Since Exhibition

3.1 Consultation

The principal activities undertaken since the exhibition of the *Water Supply Amendment Report* has involved ongoing consultation with the local community and NSW government authorities. The following specific examples are consistent with Bowdens Silver's ongoing commitment to meaningful engagement with the community and the Company's Open Door Policy.

- A detailed newsletter was distributed in the local area describing the *Water Supply Amendment Report* outcomes and updating the community on the proposed approach to water supply sources and security. This newsletter was also posted on the Company website so that it might be accessed by all interested parties[6].
- An advertisement was placed in the Mudgee Guardian notifying the community on the proposed approach to water supply sources and security, providing avenues to source more information including directions on access to reports and making submissions on the *Water Supply Amendment Report*.
- Bowdens Silver has continued its direct engagement with neighbours and the local community through phone or email correspondence. Neighbours to the Mine Site have recently been contacted with an offer to discuss any outstanding concerns directly with Bowdens Silver staff or its consultants.
- Bowdens Silver has continued to engage with those residents identified as possibly experiencing noise-related impacts that would trigger the NSW Voluntary Land Acquisition and Mitigation Policy. Bowdens Silver reiterates that it is open to discussion and negotiation with these residents in order to reach an agreement satisfactory to all parties, noting that the policy refers to voluntary acquisition or mitigation with Bowdens Silver the only party beholden to the requirements of the policy.
- Bowdens Silver regularly consults with and updates the local community on various aspects of the Project through the Project Community Consultative Committee (CCC). The most recent CCC meeting was held on 4 May 2022. At that meeting, the outcomes of the *Water Supply Amendment Report* were presented and input was provided by CCC members from their review of the available information and discussions with other community members.

[6] See https://bowdenssilver.com.au/ or https://bowdenssilver.com.au/wp-content/uploads/2022/04/Bowdens-Silver-Newsletter-April-2022.pdf for more information.

3.2 Additional Assessment

While no additional assessment has been undertaken in response to the matters raised in the recent public submissions, a detailed review of the inputs, assumptions and results of the *Updated Surface Water Assessment* prepared by WRM Water and Environment Pty Ltd (WRM, 2022) was undertaken in response to the peer review of that assessment undertaken by Ms S. Baguley on behalf of the Lue Action Group. The outcomes of this review are presented in detail in Section 5. It is noted that no outcomes of assessment were changed as a result of the review.

3.2.1 Harvestable Rights Dam Use

The following request was received from the Department of Planning and Environment (DPE) regarding changes to harvestable rights water storage rules as a result of the commencement of new Harvestable Rights Orders for NSW in May 2022.

> *In May 2022 the Harvestable Rights Orders were amended with a provision that disallows water to be moved from harvestable rights dams to excluded works or other dams in the landholding. Please provide consideration of the implications of this amendment to the project, noting that Bowdens Silver was proposing to transfer water between water storages.*

It is acknowledged that Bowdens Silver had intended to rely upon the transfer of water between harvestable rights water storages. The new Harvestable Rights Orders have necessitated a change to management strategies described in the integrated water management and supply strategy and WRM Water and Environment (WRM) was commissioned to undertake further water balance modelling of the integrated water management and supply strategy to test the updated strategy. The strategy has been updated as follows.

- Removal of the 130ML water storage dam from modelling which was planned as a collection point for water captured in the Harvestable Rights Dams within the Mine Site. This dam was to be located within the western section of the main open cut pit until that area was to be mined in Year 9 of operations.
- Water captured in harvestable rights dams would be drawn directly for dust suppression use (which may be achieved by constructing a standpipe at the relevant dams) or the water would be used directly in the processing plant, bypassing the need for transfer and storage. This would require additional pumps at these dams and change the configuration of pumps and inlets at the processing plant, however, would not change the nature of surface disturbance required for the dams.
- Water captured in harvestable rights dams may be pumped to a holding tank located within the processing plant area for short term storage as tanks are not classed as 'excluded works'.

Given the need to undertake additional water balance modelling, Bowdens Silver requested this modelling use a contemporary rainfall dataset that included the 2019 drought. This was in response to feedback received by the community on the rainfall data used in the surface water assessment that had not previously included 2019 data due to the completion date of the original assessment. The data used for the updated modelling therefore includes rainfall records provided

by the SILO database for the period from 1 January 1889 to 31 December 2021. Therefore, whilst the data includes the low rainfall of 2019, it also includes the above average rainfall that occurred in 2020 and 2021. Further information on this contemporary data, including comparisons with the data used for the surface water assessment is provided in **Section 5**.

The outcomes of the updated modelling are presented in a brief memo prepared by WRM titled *Impact of May 2022 amendment to Harvestable Rights Order on water supply reliability* is included as **Appendix 2**. In summary, the harvestable rights storage dams provide an important but not critical part in the integrated water management and supply strategy. The new rules applied through the Harvestable Rights Orders limit the transfer of water but do not prohibit the use of the harvestable rights dams. Therefore, the water captured in these dams is reduced but not removed.

The WRM memo provided in **Appendix 2** also includes updates to:

- site water balance outcomes;
- site water balance outcomes under a low runoff scenario;
- the assumed main water sources for the Project; and
- the site water balance outputs for the volume of water in the open cut pit and the tailings storage facility (TSF) as well as the water level in the TSF.

The average annual water balance shows that the change reduces the volume of clean water runoff that can be harvested. However, as this represents only a small component of total water supply, the change does not substantially increase water supply risks.

The site water balance model update has demonstrated that under average modelled climate conditions and during periods of low rainfall, the Project would continue to have a reliable supply of water for both processing operations and dust suppression activities. **Table 1** presents an update to the modelled volumetric supply reliability for the Project.

Table 1
Project Volumetric Water Supply Reliability

Demand	Volumetric water supply reliability	
	Average	Lowest
Processing plant	99.6%	96.3%
Dust suppression	99.8%	99.5%
Source: WRM (2022) – Table 5.8b		

The latest update to the climate data has also increased the modelled volume of runoff generated within Mine Site catchments. WRM notes that whilst this increased runoff also increases volumes accumulating in the TSF and open cut pit, it can be stored without overflow. As updated modelling identifies slight increases in runoff from Mine Site catchments, it is anticipated that the previously assessed outcomes for Lawsons Creek streamflow and water availability would not materially change. Therefore, the outcomes presented in WRM (2022) for these matters remain valid for the purposes of assessing the Project's impacts on surface water resources. The increased runoff however, may cause overflow from the sediment dams, particularly under the high runoff scenario. However, pump station and dam capacities would be appropriately sized

during detailed design to prevent this situation arising and without the need for physical changes to the Mine Site layout. The updated water balance modelling has assumed that this would be the case.

It is noted that the updated modelling does not change the previous conclusions to the Surface Water Assessment of the Project. That is, the Project would negligibly reduce downstream flows in both Hawkins and Lawsons Creeks through the interception and retention of runoff within the Mine Site and a reduction in baseflow in both creeks. As identified in **Section 5**, the updated data increases rainfall at the Mine Site, meaning that a more conservative assessment of water supply reliability and impacts to downstream users was presented in the WRM (2022). Notwithstanding this, the potential for impacts to surface water quality would be managed over the life of the Project and monitored in accordance with an approved Water Management Plan.

3.2.2 Greenhouse Gas Emissions

Bowdens Silver, and its parent company Silver Mines Limited, are committed to responsible environmental management, including where this relates to the greenhouse gas (GHG) emissions from its activities. Recent public debate on emissions generation, especially as it concerns resource projects in Australia, has prompted internal review of the Company's commitments relating to the Bowdens Silver Project.

For the purpose of assessing GHG emissions, the type of emissions are separated into three categories.

- Scope 1 emissions occur within the boundary of an organisation and as a result of that organisation's activities.
- Scope 2 emissions occur from the generation of the electricity purchased and consumed by an organisation.
- Scope 3 emissions occur from all other upstream and downstream activities, for example the downstream use of products and services or the upstream extraction and production of raw materials.

The updated air quality assessment for the Project, prepared by Ramboll Australia Pty Ltd included an assessment of greenhouse gas generation. The total estimated GHG emissions for the Project over the lift of the Project were as follows.

- Scope 1: 444 442t CO_2-e (~31% total)
- Scope 2: 812 319t CO_2-e (~57% total)
- Scope 3: 166 055 CO_2-e (~12% total)
- Total: 1 422 816 CO_2-e

Ramboll concluded that the Project would result in annual average Scope 1 emissions that represent approximately 0.02% of total GHG emissions for NSW and 0.004% of total GHG emissions for Australia. In comparison to other metal ore mining projects, the Project's Scope 1 emissions are less than half of the average and significantly lower than emissions from coal mining operations.

Given that Scope 2 emissions were predicted to be the largest source of emissions for the Project (57% of the total), Bowdens Silver has considered opportunities to reduce these emissions. EMM Consulting Pty Ltd (EMM) were commissioned to review the Scope 2 emission generation for the Project and to provide updated GHG emission estimates for three future scenarios.

- Decarbonising of the NSW electricity grid in line with NSW plan to reach net zero emission by 2050.
- Establishment of a 12.4MW solar farm to supply a proportion of the power demand of the Project.
- Purchase of green energy for the Project to supplement the net zero decarbonisation.

The current expectations for decarbonisation of grid electricity would see sources of electricity for the Project becoming more reliant on renewable sources and therefore reduce the Scope 2 GHG emissions related to the Project. This change is projected to occur without any input by Bowdens Silver. The Company has completed an initial feasibility study relating to development of a solar farm on property owned by the Company. Power generation capability in the order of 12.4MW is currently being considered as this size is the most efficient when considering reasonable space requirements and the power demand of the Project. The purchase of green energy is an option to the Project to reduce GHG emissions generally, with the key change being that electricity prices for green energy are generally higher than standard grid supply. The predicted GHG emission generation for the Project under each of the above scenarios is presented in a letter report prepared by EMM and included as **Appendix 4**. A summary of the total Scope 2 GHG emission generation for the Project is presented in **Table 2.**

Table 2
Scope 2 Greenhouse Gas Generation by Mitigation Scenario

Scenario	Scope 2 GHG Emission Generation (CO_2-e)	Emission Reduction (%)
As presented in the EIS	812,319	0
Net zero 2050 pathway	372,926	54
12.4MW Solar farm option	227,673	72
Purchase of 35% green power	242,402	70

Bowdens Silver is not seeking approval for a solar farm as part of its State Significant Development application, with any application for a solar farm likely to be submitted to the relevant consent authority in a separate application. That said, the review of GHG emission generation under this scenario indicates it would provide a substantial reduction in GHG emission generation. For comparison, purchase of an additional 35% of power requirements from certified green power source would provide the same emissions reduction as construction and use of a 12.4MW solar farm. That is, the solar farm provides the same benefit as the Company sourcing 35% green power on top of the current decarbonisation pathway.

4 Matters Addressed in Previous Project Documentation

4.1 Introduction

It is noted that several of the individuals and organisations providing objections to the Project took the opportunity to reiterate their previous concerns. Accordingly, a large proportion of the matters raised in opposing public and organisation submissions in response to the *Water Supply Amendment Report* have been comprehensively addressed in the various documents described in Section 1.2. A summary of these matters and a reference to the section of the previous Project documentation they are addressed in outlined in the following subsections.

4.2 Aboriginal Heritage

Submissions from some local Aboriginal community members and the general public commented on the loss of cultural heritage that would occur through the removal of artefacts from the landscape within the Mine Area and relocated Maloneys Road. Submissions have also raised the value of landscape to Aboriginal people and referred to the importance of 'songlines'. Some submissions have also raised concerns regarding consultation undertaken for the application.

Matters regarding Aboriginal cultural heritage have been assessed in detail with the outcomes presented in:

- Section 4.14 of the EIS;
- the *Aboriginal Cultural Heritage Assessment* prepared by Landskape Natural and Cultural Heritage Management (Landskape) included as Volume 4 Part 13 of the *Specialist Consultant Studies Compendium* (SCSC);
- Section 6.3 of the *Amendment Report;* and
- Section 6.6 of the *Water Supply Amendment Report*.

Submissions concerning Aboriginal heritage have also been responded to in Section 5.2 of the *Submissions Report* and Section 4.4.1 of the *Amendment Submissions Report*.

The Mine Site and relocated Maloneys Road are located predominantly within private land and an area that has already been heavily modified by past clearing, primarily for pastoral and agricultural activities. The assessed impacts of the Project are consistent with, and of a smaller scale to those that have already occurred. On this basis, it is considered that the Project would not appreciably increase cumulative impacts to Aboriginal cultural heritage in the region. In summary, the Project would require the removal and salvage of 25 Aboriginal cultural heritage

sites, which are indicative of open occupation and are relatively common in the vicinity of the Mine Site. 31 other sites identified within the Mine Site would be protected from inadvertent harm over the Mine life. All sites have been identified by the registered Aboriginal parties to be of high cultural significance. The majority of sites are considered by Landskape (2020) to be of low scientific, educational and aesthetic significance.

In its feedback on the application, Heritage NSW noted that it is satisfied with the adequacy of the assessment undertaken and with the outcomes of consultation as well as the proposed management measures that would be developed through a Heritage Management Plan. Through further consultation with Heritage NSW, an Indigenous Technical Heritage Mentorship Program has now been developed and advice on the program and opportunity to give feedback provided to all Aboriginal stakeholders for the Project. The program would commence upon development of the Mine Site and would partner a Project archaeologist and an elder in the community with one or two Aboriginal youths with an interest in learning the process of Aboriginal object recording, collection, analysis and curation.

4.3 Acid and Metalliferous Drainage (Leachate) Management

A number of submissions raised possible risks associated with acid and metalliferous drainage (AMD) and referred to past examples of legacy impacts of mining. Previous submissions that raised similar concerns with AMD or leachate generation generally or the proposed management of leachate were reviewed by Bowdens Silver and its consultants during preparation of the *Submissions Report*. Following this review, no changes to leachate management were considered necessary as the engineered design of the Waste Rock Emplacement (WRE) and the Tailings Storage Facility (TSF) provided best practice approaches to lining, construction, development and capping that would be applied in rehabilitation. It is noted that planning for management of the Oxide Ore Stockpile is consistent with the adjacent WRE and includes capping of this material to limit ingress of water and oxygen to prevent leachate generation. Bowdens Silver would prepare a Mine Waste Rock Management Plan to guide operational management concerning the identification, classification, separation and handling of waste rock material, progressive development of the WRE, ongoing testing and data collection and periodic review of the management strategy against collected data.

It is noted that Bowdens Silver has included additional seepage management measures for the TSF (see Section 4.15) following review of community and Government agency feedback. Further consideration of management measures to limit AMD risks would be a key component of detailed design processes, with the management approach to be refined and implemented throughout the Project life.

The design and construction of the WRE and the TSF are presented in Section 2.5 and 2.8 of the EIS, respectively. Additional technical information on waste materials, construction and closure of the WRE and TSF is presented in the following documents.

- The *Materials Characterisation Assessment* prepared by Graeme Campbell & Associates Pty Ltd and presented as Volume 1 Part 3 of the SCSC.
- The *Bowdens Silver Project Lue, N.S.W. – Tailings Storage Facility Preliminary Design* prepared by ATC Williams Pty Ltd which is provided in Volume 5 Part 16A of the SCSC.

- The *Preliminary Design of PAF Waste Rock Emplacement, Oxide Ore Stockpile and the Southern Barrier* and the *TSF and WRE Closure Cover Design* prepared by Advisian – Worley Parsons Group included as Parts 16b and 16c of the SCSC.

A technical assessment of seepage potential from the TSF has also been undertaken by Jacobs (Australia) Pty Limited (Jacobs) and presented as Annexure 10 of the *Updated Groundwater Assessment* that is provided as Appendix 4 of the *Water Supply Amendment Report*. Submissions concerning leachate management have also been responded to in Section 5.3 of the *Submissions Report* and the management of leachate discussed in Sections 3.2 and 3.3 of the *Water Supply Amendment Report*.

This documentation comprehensively described the presence, extraction and management of potentially acid forming (PAF) ore, waste rock and tailings together with the non-acid forming (NAF) waste rock. The liquid draining from the PAF ore, waste rock and tailings has consistently been referred to as leachate, a term reflective of its origin as a product of interaction between water, oxygen and reactive sulphide minerals. The term leachate is therefore synonymous with AMD.

Whilst there are many historical instances of environmental issues arising from AMD, it must be recognised that many arose due to limited (or in some cases no) understanding of AMD processes. Technological advances in the pre-mining assessment of AMD potential and refined understanding of measures to limit generation and to enable capture and treatment mean that historical examples act as a warning but in no way reflect the likelihood of the same issues occurring within the Mine Site.

In summary, the proposed management and mitigation measures have two components, namely, progressive construction and management over the life of the operating Mine involving lining and encapsulation and progressive rehabilitation including capping and cover systems. During the life of the Project, the proposed storage of tailings and PAF waste rock has been designed to limit seepage and manage leachate. As a consequence, all contaminated water that is generated by operations would be retained within the Mine Site and prevented from entering the downstream environment or cause any impacts on water quality. Progressive encapsulation and then rehabilitation of the WRE and TSF using an engineered capping and cover system designed to limit the ingress of oxygen and water would prevent leachate and seepage generation during closure. These measures would be the subject of ongoing programs during operations to assess their effectiveness at managing AMD risks and achieving rehabilitation objectives. Following closure and confirmation of successful rehabilitation outcomes, leachate management structures such as the leachate management dam would be decommissioned and the land rehabilitated. Using this approach, the poor environmental outcomes of legacy operations would be avoided.

4.4 Air Quality

Submissions relating to air quality have commented on dust generation and potential health risks associated with inhalation or ingestion of dust and the contained minerals. Matters relating to air quality impacts are addressed in

- Section 4.4.2.5 of the EIS;
- the *Updated Air Quality Assessment* for the Project undertaken by Ramboll Australia Pty Ltd included as Appendix 6 of the *Submissions Report*;

- Section 6.5.3 of the *Amendment Report;* and
- Section 6.6 of the *Water Supply Amendment Report*.

Submissions concerning air quality were responded to in Section 5.5 of the *Submissions Report* including a review of meteorological data used for modelling.

In summary, both recorded data and meteorological modelling were used to inform the assessment of air quality impacts. It is predicted that there would be no exceedance of the relevant air quality criteria for particulate matter (TSP, PM_{10}, $PM_{2.5}$) at any privately-owned residences or receivers, either from the Project alone or cumulatively. It is also predicted that there would be no exceedance of the impact assessment criteria at any receivers (Project-related or private) for metal dust concentrations, respirable crystalline silica or hydrogen cyanide (HCN). The EPA has no outstanding queries on the Project and has provided recommendations for conditions of consent and conditions for an Environment Protection Licence to regulate air quality risks.

4.5 Biodiversity

Public submissions regarding biodiversity impacts associated with the Project's water supply were principally concerned with potential impacts to aquatic ecology resulting from minor flow reductions in Hawkins and Lawson Creeks. Submissions also raised potential impacts to Koala and the clearing of native vegetation generally.

Matters relating to terrestrial and aquatic biodiversity are addressed in:

- Sections 4.10 and 4.11 of the EIS;
- the *Updated Biodiversity Assessment Report* prepared by EnviroKey Pty Ltd included as Appendix 5 of the *Water Supply Amendment Report*;
- the *Updated Biodiversity Offset Strategy* prepared by Niche Environment and Heritage Pty Ltd included as Appendix 6 of the *Water Supply Amendment Report;*
- the *Aquatic Ecology Assessment* prepared by Cardno included as Volume 4 Part 10 of the SCSC;
- Section 6.2 of the *Amendment Report*; and
- Section 6.4 of the *Water Supply Amendment Report*.

Submissions regarding terrestrial and aquatic biodiversity were responded to in Sections 5.11.4, 5.11.5 and 5.26 of the *Submissions Report and* Sections 4.4.2 and 5.2 of the *Amendment Submissions Report*.

In total, the Project would result in the removal of 381.17ha of native vegetation of variable condition. This vegetation has the potential to be habitat for a range of native fauna including some threatened species. However, the Project is not expected to result in significant impacts upon migratory or threatened species. Biodiversity impacts that cannot be avoided would be offset in accordance with the NSW Biodiversity Offsetting Scheme, with 795ha within and surrounding the Mine Site currently intended to be conserved in perpetuity. Additional 'off-site' biodiversity offset areas would also be considered as well as other options available to the Project under the NSW Biodiversity Offsets Scheme.

Assessment outcomes concluded that the greatest potential impact to aquatic ecology would occur only in the event of an accidental release of poor-quality water. This risk would be effectively managed given the design of the Project and the ongoing management and monitoring measures that would be aimed at preventing the release of such water to the surrounding watercourses. The interception of surface flow on site and groundwater drawdown as a result of the open cut pits would result in a minor reduction in surface flow in Hawkins and Lawsons Creek (a reduction to average annual Lawsons Creek streamflow of between 1.2% and 2.2%). It has been assessed that the likely impacts to aquatic habitat would be minor. The potential loss of stygofauna and their habitat due to direct displacement or groundwater drawdown has also been assessed to represent minor potential impacts.

The Project would result in a 1.2% reduction to average annual Lawsons Creek streamflow at the confluence with Hawkins Creek. At the confluence with Walkers Creek, this reduction increases to 2.2%. Whilst these streamflow losses are minor, some flows would be re-instated post-mining as catchment areas are restored.

Finally, BCS has noted that the Directorate's previous comments on the Project have been addressed to the satisfaction of the Directorate and have provided recommended conditions of consent.

4.6 Blasting / Blast Fumes

Submissions concerning blasting raised matters relating to potential risks associated with vibration impacts and health risks associated with blast fumes. These matters have been comprehensively addressed in:

- Section 4.3 of the EIS in relation to blasting and vibration;
- Section 4.4 of the EIS in relation to blast fumes;
- the *Noise and Vibration Assessment* prepared by SLR Consulting Australia Pty Ltd included as Volume 1 Part 1 of the SCSC; and
- the *Updated Air Quality Assessment* for the Project undertaken by Ramboll Australia Pty Ltd included as Appendix 6 of the *Submissions Report*.

Submissions regarding blasting and blast fumes were responded to in Sections 5.5.15 and 5.18.13 of the *Submissions Report*, respectively.

In summary, in order to ensure the impacts from blasting associated with the Project are minimised, each blast would be designed to ensure compliance with the relevant blasting criteria. Based upon the assessment of indicative blast designs and maximum instantaneous charges for the blasts in both ore and waste rock, the blasting and vibration assessment has predicted there would only be minor exceedances of the relevant amenity blast criteria at three residences, all of which are the subject of negotiated agreements with Bowdens Silver.

In order to achieve compliance with the relevant criterion, blast scheduling, vibration impacts, NO_2 emissions and blast fume risk would be managed in accordance with a *Blast Management Plan* incorporating blast management practices and blast fume prevention measures consistent with those demonstrated within the industry to be effective in controlling blast fume. The EPA has no outstanding queries on the Project and has provided recommendations for conditions of

consent and conditions for an Environment Protection Licence to regulate blasting risks. Blast safety would also be regulated by the Resources Regulator in terms of the mine safety requirements for the Project.

4.7 Consultation

A number of submissions were received regarding the perceived lack of consultation and information presented by Bowdens Silver to the residents of Lue and surrounds.

During the past two years, consultation efforts have been hampered by COVID-19 restrictions and in response to this Bowdens Silver initiated two successful virtual events in July 2020 to present the EIS outcomes and in December 2021 to present the integrated water management and supply strategy. These events involved live stream presentations on various subject matter and time for questions. These live stream events are available to view from the Bowdens Silver website[7]. In addition to the above, community newsletters have been mailed to approximately 1,600 residences in the area (and are available on the company website) as well as direct letters and emails and also ad-hoc and planned meetings with stakeholders. It is important to Bowdens Silver that the concerns that have been expressed by Lue and district residents are responded to and managed through the adoption of the practical mitigation measures recommended throughout the comprehensive range of environmental studies prepared for the Project. Bowdens Silver has always maintained an open door policy with regards to its neighbours and any member of the community with these stakeholders welcome to attend their office and discuss matters with the team. It is noted that Bowdens Silver regularly consults with and updates the local community through the Project Community Consultative Committee (CCC) on various aspects of the Project. The most recent CCC meeting was held on 4 May 2022[8] and another is planned to be held during the fourth quarter 2022.

Consultation for the Project was discussed in detail in Section 3.2.2.1 of the EIS. The *Social Impact Assessment* prepared by Umwelt (Australia) Pty Ltd and presented as Volume 6 Part 17 of the SCSC presents the outcomes of community engagement on social risks. Additional discussion on consultation was included in Section 5.8 of the *Submissions Report*, Section 4.8 of the *Amendment Submissions Report* and Section 5.2 of the *Water Supply Amendment Report*.

Bowdens Silver continues to believe that the overwhelming support shown in the community for the Project is a testament to the manner in which it has continued to engage with the local community in the planning and assessment of the Project.

4.8 Cyanide

Bowdens Silver has acknowledged the concern and uncertainty reflected in public submissions regarding the potential risks associated with cyanide transportation, storage, use and the management of residual cyanide. The matters raised regarding the potential risks associated with cyanide are comprehensively detailed in:

- Section 4.16.1.3 of the EIS; and
- the *Updated Human Health Risk Assessment* prepared by Environmental Risk Sciences Pty Ltd included as Appendix 7 of the *Submissions Report*.

[7] https://bowdenssilver.com.au/
[8] A copy of the CCC meeting minutes from 4 May 2022 (and all previous meetings) can be accessed from the Bowdens Silver website (https://bowdenssilver.com.au/community-consultative-committee-meeting-minutes/)

Submissions concerning cyanide were responded to in Sections 5.5.12, 5.9 and 5.11.18 of the *Submissions Report*.

In summary, it is reiterated that the use of cyanide in mining processes is a common and well understood practice, and that the concentrations of cyanide used for the Project would be significantly lower than most gold projects in Australia and globally. No exceedances of the HCN impact assessment criteria of 200µg/m³ are predicted at any surrounding residences or receivers. In addition, the *Updated Human Health Risk Assessment* identified no health risks of concern in relation to community exposures to cyanide derived from the Project. This assessment was also independently peer reviewed by a specialist on behalf of DPE with agreement on the outcomes of assessment. Regardless, Bowdens Silver would ensure the safe transportation and storage of cyanide on site and that its use and management would be consistent with world's best practice.

4.9 Groundwater

Matters raised in submissions relating to the groundwater assessment outcomes associated with the integrated water management and supply strategy included water availability to groundwater users, baseflow reduction, groundwater quality and monitoring. These matters are discussed in detail in Section 5. Other submissions have raised matters relating to groundwater such as the risk of impact from Project-related infrastructure such as the TSF, WRE and leachate management dam. These matters have been comprehensively assessed elsewhere and are detailed in:

- Section 4.6 of the EIS;
- Section 3.3 of the *Submissions Report*;
- Section 6.3 of the *Water Supply Amendment Report*; and
- the *Updated Groundwater Assessment* prepared by Jacobs Group (Australia) Pty Ltd. included as Appendix 4 of the *Water Supply Amendment Report*.

Submissions regarding groundwater-related risks have been responded to in Section 5.11 of the *Submissions Report*.

Detailed modelling and assessment of potential changes has taken into account the various engineered structures that are components of the Project. Peer review of the groundwater modelling by an independent specialist and by DPE Water has confirmed that the groundwater model is fit for purpose to estimate groundwater take and predict impacts (i.e. groundwater drawdown) to the regional groundwater system associated with the changes resulting from the mining activities. The Project would not alter the beneficial use category of groundwater resources. It is reiterated that the Project meets the NSW Aquifer Interference Policy's Level 1 Minimal Impact Considerations for highly productive, alluvial, porous rock and fractured rock aquifers, with the predicted impacts of the Project acceptable under this policy.

4.10 Health / Lead

Matters relating to health risks, particularly with regard to the risks of lead to the local community, have been raised in consultation during preparation of the EIS and in public submissions since the exhibition of the EIS. These matters have been comprehensively assessed and are detailed in:

- Section 4.8 of the EIS;
- *Updated Human Health Risk Assessment* prepared by Environmental Risk Sciences Pty Ltd included as Appendix 7 of the *Submissions Report*; and
- Section 6.8 of the *Amendment Report;*

Submissions regarding health risks associated with lead have been responded to in Section 5.15 of the *Submissions Report* and Sections 4.5.3 and 6.1 of the *Amendment Submissions Report*.

In summary, it has been concluded that impacts derived from the Project would make a negligible contribution to overall exposures to the assessed metals, including lead. Importantly, detailed technical assessments have concluded that there would be no health risk issues relevant to the Project for any members of the community, including children and sensitive individuals. Regardless of this conclusion, a comprehensive monitoring program has been proposed so that this can be demonstrated in practice.

Finally, it is noted that the methodology and assumptions used to reach the conclusions of the health risk assessment have been subject to independent peer review, commissioned by DPE. This review agreed that health risks due to the Project are very low. Further to this, the Project has been assessed by the Western NSW Local Health District and the EPA has completed a thorough technical review of matters relating to dust generation, with no matters outstanding from these agencies.

4.11 Lighting and Sky Glow

A number of comments were received in community submissions relating to the effects of Mine Site lighting on the existing environment. The possible effects of night lighting on the surrounding environment and particularly the Dark Sky Region have been comprehensively addressed in:

- Section 4.9 of the EIS; and
- the *Lighting and Sky Glow Assessment* prepared by Lighting, Art & Science Pty Ltd included as Volume 3 Part 8b of the SCSC.

Submissions relating to these matters received responses in Section 5.29.3 of the *Submissions Report*.

In summary, Bowdens Silver has committed to a range of design measures to limit the potential for lighting impacts on the local environment. The impacts of sky glow on the local environment were assessed to be insignificant under both clear sky and cloudy conditions. With the implementation of the mitigation measures identified in the above documents, the Project would

comply with the limits for dark rural environments as stipulated in AS/NZS 4282:2019 *Control of the Obtrusive Effects of Outdoor Lighting*. Furthermore, calculations to determine the illuminance of sky particles at varying levels above the Mine Site were also provided to the Siding Spring Observatory who concluded that the night sky impacts of the Project would be negligible. Similar negligible impacts were predicted for the local astronomical observatories in the Mudgee, Ilford and Breakfast Creek localities.

4.12 Noise

Noise was raised frequently in submissions with a range of matters identified to be of concern to the local community. The comments included general concern regarding the potential change in noise sources and therefore experience of the rural locality, as well as the impacts of noise generated by construction activities and traffic. Concerns regarding the perceived lack of assessment of low frequency noise were also raised. Matters relating to construction, operational and low frequency noise impacts associated with the Project are addressed in:

- Section 4.2 of the EIS;
- the *Noise and Vibration Assessment* prepared by SLR Consulting Australia Pty Ltd included as Volume 1 Part 1 of the SCSC;
- Section 6.4 of the *Amendment Report*; and
- Section 6.6 of the *Water Supply Amendment Report.*

Submissions relating to these matters were responded to in Section 5.18 of the *Submissions Report* and Sections 4.4.4 and 4.5.4 of the *Amendment Submissions Report*.

In summary, it is acknowledged that noise from the Project could range from being totally indiscernible to being clearly audible at times depending on proximity to the Mine Site, meteorological conditions and the presence of other noise sources at the time. Assessment outcomes have predicted a number of exceedances of adopted noise criteria during adverse climate conditions and assuming worst case operational circumstances. These outcomes would be managed in accordance with the NSW Government's Voluntary Land Acquisition and Mitigation Policy (VLAMP) with ongoing management designed to minimise the risk of impact. In addition, a comprehensive range of design and operational mitigation measures has been developed to reduce noise levels at surrounding receivers as far as practicable, including installation of a minimum of two permanent, continuous real-time noise monitors which would be representative of rural residences and residences in Lue. The *Operational Noise Management Plan* for the Project would include a system for sampling A-weighted and C-weighted noise levels to establish the extent of any low frequency noise. These measures would be supported by reactive management in response to triggers that would permit Bowdens Silver to proactively reduce noise generation where there is a risk of non-compliance. The proposed use of real-time monitoring would assist Bowdens Silver to manage its operations upon receipt of feedback from the system. It is noted that the EPA has no outstanding queries on the Project and has provided recommendations for conditions of consent and conditions for an Environment Protection Licence to regulate noise-related risks.

4.13 Rehabilitation

Comments regarding rehabilitation of the landform and final land use were included in a number of public submissions, particularly with regard to long-term risks associated with the proposed final landform and the financial security associated with the various closure commitments.

Rehabilitation and post mining land use has been comprehensively detailed in Section 2.16, Appendix 5 of the EIS and Section 2.8 of the *Amendment Report*. Submissions regarding rehabilitation were responded to in Section 5.22 of the *Submissions Report*, and Section 4.4.6 of the *Amendment Submissions Report*. In addition, the geomorphic design of the WRE has been considered in response to the Resources Regulator in Section 5.6 of the *Amendment Submissions Report*.

In summary, rehabilitation of disturbed areas within the Mine Site would be an integral component of the entire Project. Bowdens Silver intends to progressively rehabilitate disturbed areas that are no longer required or have been completed in their final form. This would allow Bowdens Silver to progressively identify the most appropriate rehabilitation methods for the respective components of the Mine Site. It is acknowledged that a final void would be a component of the rehabilitated landform and would be partially revegetated where sections are not inundated with water. Final voids are an accepted legacy of mining projects and feature in many existing or completed mining projects. The objective of rehabilitation for this site feature would be to ensure it is not visible from public vantage points, is not a safety risk and is not a source of pollution. These objectives are considered achievable. In addition, the proposed design and rehabilitation are considered appropriate with the outer slopes of the WRE designed to generally follow a similar profile to the underlying natural surface, i.e. to have a convex upper slopes and concave lower slopes, thereby avoiding straight sides with drainage lines and depressions. The detailed design for rehabilitated landforms would be confirmed during preparation of the Rehabilitation Management Plan that would be ultimately approved by the Resources Regulator.

Furthermore, it is noted that community expectations regarding defaults on rehabilitation commitments are not consistent with the expectations and conditional requirements that would be required by the NSW Government. This includes detailed planning, regular reporting and the provision of up-front financial securities that guarantee rehabilitation commitments are satisfied. Progressive and final rehabilitation are heavily regulated processes in NSW and Bowdens Silver welcomes such scrutiny, as successful rehabilitation outcomes have been an objective of the Project since inception and accordingly, a key factor in Project planning.

4.14 Social / Economic

In response to the *Water Supply Amendment Report*, several submissions commented on the anxiety associated with the expectation that water for the Project would be sourced directly from the Mine Site and not rely on an external source. This matter is considered in Section 5.4 of this report. Consistent with the feedback received through the engagement processes, the principal issues raised in submissions related to change that might affect the local sense of community and sense of place, health and wellbeing and social amenity. Submissions raising these matters also commonly identified concerns with Project economics and Mine viability, concerns relating to property devaluation and economic impacts to surrounding land uses.

There has been substantial effort applied to understand and assesses social and economic risks resulting from the Project. These matters have been comprehensively addressed in:

- Sections 4.19 and 4.20 of the EIS;
- the *Economic Impact Assessment* prepared by Gillespie Economics included as Volume 5 Part 15 of the SCSC; and
- the *Social Impact Assessment* prepared by Umwelt (Australia) Pty Ltd presented as Volume 6 Part 17 of the SCSC.

Submissions regarding these matters received responses in Sections 5.10 and 5.23 of the *Submissions Report* and Section 6.3.2 of the *Amendment Submissions Report*.

In summary, a comprehensive program of community engagement and research has identified the anticipated and likely social risks of the Project and resulted in a range of social enhancement strategies being recommended and that would be implemented by Bowdens Silver. With the implementation of these measures, the social benefits of the Project would be maximised, and negative social impacts would be minimised. Ongoing meaningful engagement throughout the Project life is proposed to ensure that mitigation programs are refined over time to minimise negative effects and ensure the benefits of the Project are distributed as equitably as possible.

Importantly, the *Economic Assessment* has demonstrated that there would be substantial economic and employment benefits to the NSW and local community resulting from the Project.

4.15 Tailings Storage Facility

A key matter raised in submissions related to perceived risks to groundwater and surface water resources arising from the construction and operation of the Tailings Storage Facility (TSF). The design, construction, operation and management of the TSF is presented in:

- Section 2.8 of the Amended Project Description for the Project that is provided as Appendix 1 of the *Water Supply Amendment Report*;
- the *Bowdens Silver Project Lue, N.S.W. – Tailings Storage Facility Preliminary Design* prepared by ATC Williams Pty Ltd which is provided in Volume 5 Part 16A of the SCSC; and
- the *Preliminary Design of PAF Waste Rock Emplacement, Oxide Ore Stockpile and the Southern Barrier and the TSF and WRE Closure Cover Design* prepared by Advisian – Worley Parsons Group included as Parts 16b and 16c of the SCSC.
- Annexure 10 of the *Updated Groundwater Assessment* that is provided as Appendix 4 of the *Water Supply Amendment Report*.

Matters raised in submissions relating to the TSF were addressed Section 5.25 of the *Submissions Report*.

While it is appreciated that the TSF is a large structure with an important function, Bowdens Silver has given this component the requisite attention in determining its placement, design, management and rehabilitation. The preliminary design for the TSF was undertaken by ATC Williams Pty Ltd, a globally recognised engineering consultancy specialising in dam design and

tailings management and in accordance with accepted design guidance. The TSF would be subject to further detailed design and engineering before construction to test the preliminary design component. This work is not expected to change the size or function of the TSF. If anything, it would improve management outcomes.

Since the exhibition of the EIS, consultation with the EPA has confirmed that the TSF liner configuration and permeability presented in the TSF preliminary design meets the EPA's criteria, provided any approval included appropriate conditions of consent. The EPA criteria are intended to set best practice design principles for the permeability of linings for tailings storage. Regardless of the above, and in response to submissions and comments received on the matter, Bowdens Silver has committed to add further design elements to the TSF that are focused on providing additional seepage mitigation. As Bowdens Silver is focused on demonstrating its commitment to the highest feasible environmental standards, it is considered that the cost associated with additional seepage mitigation is reasonable, given that these measures will provide added certainty for the community, relevant Government agencies and for the consent authority when reviewing the merits of the Project.

Comments in submissions referring to the 2018 TSF failure at the Cadia Mine have little relevance to the design and construction of the TSF for the Project. Furthermore, the expectation in some submissions that all tailings structures will fail is not consistent with the majority of outcomes from using such structures. Failures are inevitably made public, while properly functioning structures do not attract attention. Apart from Cadia, since 1960 there have been no catastrophic TSF failures in Australia, where it can only be assumed that this almost complete absence of occurrence is due to a higher level of regulation and oversight. Whilst TSF failures act as a reminder of the importance of comprehensive design, construction and management, their causes are invariably investigated and result in improvements to design considerations. Therefore, these failures only improve the TSF design outcomes for the Project.

4.16 Tourism

Consistent with the feedback received through the engagement processes identified in Section 1.3 of this document, several opposing submissions raised concerns that the Project was not compatible with tourism activities in the area and that the presence of the Project could result in a loss of tourist trade. These matters have been considered and addressed in:

- Sections 4.18.6.6 and 4.20.6.8 of the EIS;
- the *Economic Impact Assessment* prepared by Gillespie Economics included as Volume 5 Part 15 of the SCSC; and
- the *Social Impact Assessment* prepared by Umwelt (Australia) Pty Ltd presented as Volume 6 Part 17 of the SCSC.

Submissions regarding these matters were responded to in Section 5.27 of the *Submissions Report* and Section 4.6 of the *Amendment Submissions Report*.

In summary, mining operations would not be visible from Lue and only from short sections of Lue Road. Therefore, it is unlikely that tourists would be aware of the presence of the Project unless they are looking for it. Similarly, Bowdens Silver has committed to a number of environmental management and mitigation measures that would limit the community exposure

to mining and therefore it is not considered likely that tourism would diminish as a result of construction and operation of the Project. For those local landowners that lease their properties for short or long-term tourist use or provide other tourism-related services, the assessments undertaken for the Project indicate that local amenity and the attractiveness of these locations would not be diminished as a result of the Project. Indeed, it is considered that many small businesses in the locality would benefit from the Project through an increase in wages flowing through the local economy, a sentiment that is reflected in a number of the supporting submissions received regarding the Project.

4.17 Traffic and Transport

The concern from residents in Lue relating to the potential for Project-related traffic to pass through Lue and disrupt its peaceful and rural ambience have been acknowledged since the commencement of investigations and planning for the Project. Traffic-related risks and mitigation measures have been comprehensively assessed and addressed in:

- Section 4.12 of the EIS;
- the *Traffic and Transportation Assessment* prepared by The Transport Planning Partnership Pty Ltd included as Volume 4 Part 11 of the SCSC; and
- Section 6.6 of the *Amendment Report*.

Submissions regarding traffic impacts were responded to in Section 5.28 of the *Submissions Report* and Section 4.4.5 of the *Amendment Submissions Report*.

In summary, Bowdens Silver's commitment of both the time and funds to relocate Maloneys Road was intended to demonstrate to the community that Bowdens Silver is firmly committed to the sustainability of Lue. Regardless of this, when compared to existing traffic types and levels, the contribution of the Project to local traffic levels would be minor. The greatest change that would be experienced locally is likely to occur during site establishment and construction as vehicles moving construction materials as well as those transporting personnel would occur. This estimated 18-month period would include the construction of the relocated Maloneys Road, overpass of the disused rail line and bridge crossing of Lawsons Creek as well as the commencement of site preparation and then construction. However, it should be noted that whenever possible, these activities would be scheduled so that construction activities and the delivery of materials occurs following the construction of the relocated Maloneys Road. As a result, a large proportion of delivery vehicles would not need to pass through Lue. An indicative development schedule is presented in Section 2.3.2 and Table 2.2 of the Amended Project Description for the Project that is provided as Appendix 1 of the *Water Supply Amendment Report*.

Traffic generation through Lue and that required to pass through Mudgee would be subject to management through a *Traffic Management Plan* prepared in consultation with MWRC and TfNSW and ultimately approved by DPE. It would be expected that, should the Project be approved, it will be a condition of the development consent that such a plan must be approved before site establishment and construction commences. In its feedback on the Project, TfNSW has recommended a similar condition of consent and Bowdens Silver supports this recommendation.

4.18 Visual Amenity

Several comments were received in community submissions relating to possible views of the Mine Site and associated infrastructure, particularly with regard to the relocated 500kV power transmission line. Comments on visual amenity also relate to night time impacts associated with lighting. These matters have been rigorously assessed and are presented in:

- Section 4.9 of the EIS;
- the *Visual Impact Assessment* prepared by Richard Lamb and Associates included as Volume 3 Part 8a of the SCSC;
- the *Lighting and Sky Glow Assessment* prepared by Lighting, Art & Science Pty Limited included as Volume 3 Part 8b of the SCSC
- Section 6.7 of the *Amendment Report;*
- Section 6.5 of the *Water Supply Amendment Report*;
- the *Response to Submission from Lue Action Group on Visual Impacts* prepared by Richard Lamb and Associates included as Appendix 8 of the *Water Supply Amendment Report*; and
- the *Bowdens Silver Mine Existing TransGrid 500kV Transmission Line – Realignment Option Study* prepared by GHD Pty Ltd included as Appendix 7 of the *Water Supply Amendment Report.*

Submissions regarding these matters were responded to in Section 5.29 of the *Submissions Report* and Section 4.7 of the *Amendment Submissions Report*.

In summary, no mining infrastructure would be visible from Lue village. Views of some components within the Mine Site would be possible from some locations within the public road network. It is acknowledged that the Project would result in changes in the visual landscape in the vicinity of the Mine Site with views from six private residences possible at certain stages of development (three of which are Project-related, having entered into agreements with Bowdens Silver). It is considered that the distance from the viewing locations and Mine Site as well as the proposed visual controls would achieve an acceptable level of impact.

Views of the re-aligned 500kV power transmission line and towers may be possible within parts of Lue, however, these would be largely screened by existing vegetation and infrastructure. Some private properties would have views of power transmission towers and lines where they did not have views before. Assessment of these views has concluded that the character and quality of the visual landscape within Lue and for private properties would not significantly change. In order to mitigate the visual impact of the 500kV power transmission line, Bowdens Silver has elected to move the alignment further to the east by approximately 200m. While this alignment does not remove the altered views, the impact is considered mitigated by the added distance between the visible power lines and private residences.

Lighting of the Project would result in only minimal and acceptable impacts to the built or natural environment and would have negligible impacts on astronomical observatories in the region. The lighting strategy for the Project has been selected to provide reasonable and feasible mitigation for potential impacts.

5 Response to Baguley Review

5.1 Introduction

This subsection provides a response to the matters raised in the *Independent Review of the Bowdens Silver Pty Limited Surface Water Assessment – Updated*, prepared by S. Baguley on behalf of the Lue Action Group and hereafter referred to as Baguley (2022). This review was provided as Attachment 2 of the Lue Action Group's submission lodged with the DPE following the public exhibition period for the *Water Supply Amendment Report.*

Baguley (2022) provides a comprehensive peer review of the surface water assessment for the Project. The key matters raised in Baguley (2022) that relate to water supply for the Project and associated environmental impacts include:

- the suitability of data used for the assessment;
- the risk to water supply availability for local water users; and
- the risk of water supply constraints for the Project which may lead to production uncertainty.

Other water-related matters included water licensing, risks to local agricultural production and risks to groundwater springs and wetlands.

5.2 Scientific Information for Landowners (SILO)

The comments provided in Baguley (2022) make several references to the accuracy of rainfall data used in the surface water assessment. In addition, Bowdens Silver has received several queries directly from the community on the use of data sourced from the SILO data service[9]. The following presents a brief summary of the data used for assessment, why this data is considered to be the most accurate representation of rainfall conditions and a brief discussion on the period of data used. This is intended to provide further clarification and justification of the approach taken and assist in justifying responses to the matters raised in the Baguley (2022) review.

The SILO data service provides freely available, spatially and temporally complete climate datasets. The service collates raw observational data from Bureau of Meteorology (BoM) station records (or other providers) and processes it to produce interpolated datasets. These datasets are available for either BoM station locations or at the centroids of 5km x 5km (0.05° x 0.05°) grid cells which extend across Australia.

[9] https://www.longpaddock.qld.gov.au/silo/

As SILO is fitted to BoM station data, it accurately reproduces observed data (at the point of observation) with only minor differences arising from data interpolation. However, data at a SILO grid centroid will not be identically matched at all sites within the grid cell.

The *Updated Surface Water Assessment* prepared by WRM (WRM, 2022) utilised a complete and long-term SILO climate dataset as:

- a key element of the Project's water balance; and
- the means to quantify and assess the Project's impacts on local surface water resources.

Accurate and efficient modelling and assessment results from the use of complete and accurate rainfall and climate data. The SILO climate dataset is considered the best approach to achieving this. For this reason, SILO is commonly used by hydrological consultants, research agencies such as CSIRO and the Murray-Darling Basin Authority and State agencies.

Prior to the development of SILO, assessments such as that prepared by WRM would utilise data from the nearest rainfall station, with data from other nearby rainfall stations substituted for missing data points to create a composited rainfall dataset. However, as substituted data is drawn from a location with different attributes that influence rainfall (e.g. site elevation, local topography and land use), it would not necessarily provide an accurate reflection of site conditions. Whilst there are two historical BoM stations in Lue (Lue Station and Bayly Street), neither provide publicly available, long-term, contemporary or complete rainfall records. Therefore, SILO was selected as it provided a complete 130-year rainfall dataset generated using more robust mathematical methods. The SILO data is therefore more accurate than a dataset with data substitution to make up gaps in data availability.

It is noted that SILO regularly reviews and updates data processing methods and inputs. Since the generation of the Project's original dataset, there have been three material updates to SILO. These included two updates (8 July 2020 and 15 June 2022) that incorporated revised BoM data and one (25 September 2019) that addressed an interpolation error in rainfall data. For the Project, WRM obtained two datasets from SILO, one on 2 January 2019 and another on 30 September 2019. Both datasets were for the grid point located at latitude 32.60 degrees South and longitude 149.85 degrees East, (1.6 km north of the Mine Site). The data covered the 130-year period between 1 January 1889 to 31 December 2018.

The SILO dataset obtained 2 January 2019 was used to generate the local climate plots presented as Figures 3.1 and 3.2 of the Surface Water Assessment prepared by WRM. However, the SILO data obtained 30 September 2019 (i.e. following the 25 September 2019 SILO update), was used for the water balance modelling and assessment of the Project. This data reflects a change to the SILO interpolation method (from using monthly observational data to daily). It was therefore important that this data was sourced and used. However, a clerical oversight has meant that the data used in Figures 3.1, 3.2 and 3.3 of WRM (2022) was not updated. It should be noted that the data applied in the water balance modelling results in average monthly and annual rainfalls generally lower than presented on Figures 3.1 and 3.2 of WRM (2022) and therefore more conservative and not in favour of the Project. Regardless of the above, it is appreciated that Baguley (2022) considered the data presented in Figures 3.1 and 3.2 of WRM (2022) which led to identification of this clerical oversight. For clarity and completeness, updated Figures 3.1 and 3.2 of WRM (2022), prepared using the EIS SILO data utilised for the Project's water balance modelling presented in WRM (2022), are presented below.

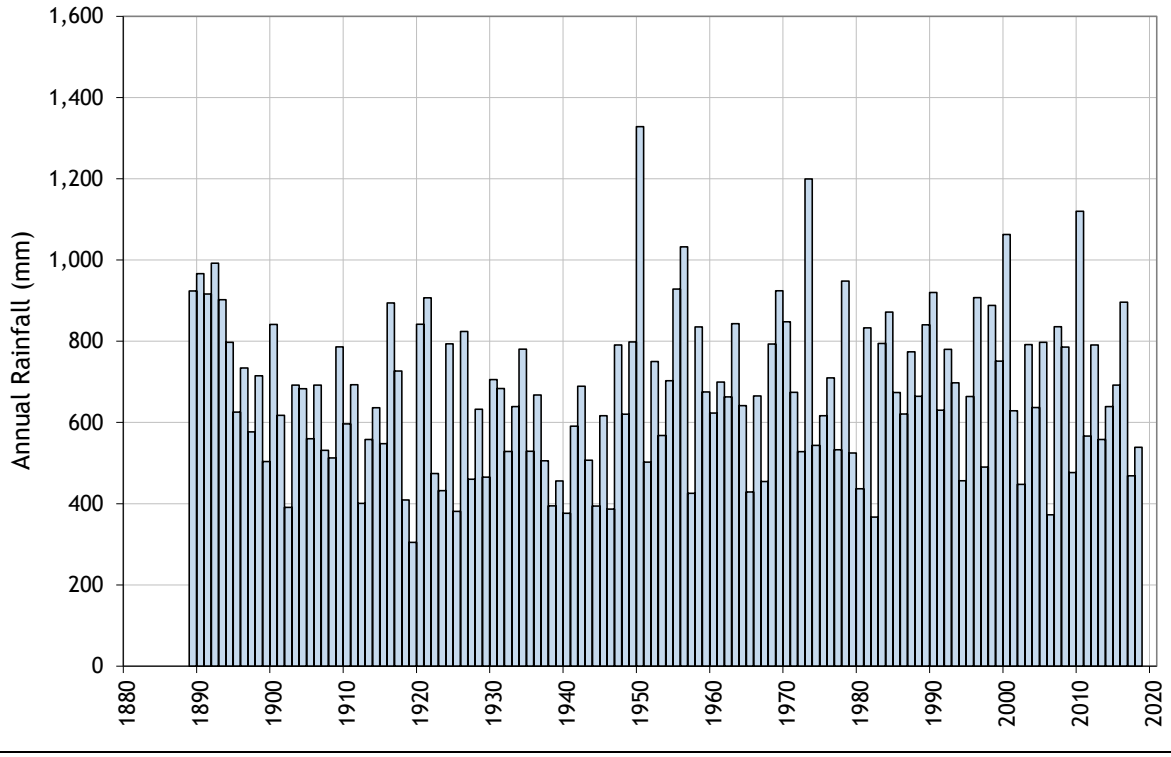


Figure 1
Annual rainfall at the Mine Site - 1889 to 2018 (source: SILO point dataset - Qld Department of Environment and Science, 30 September 2019)

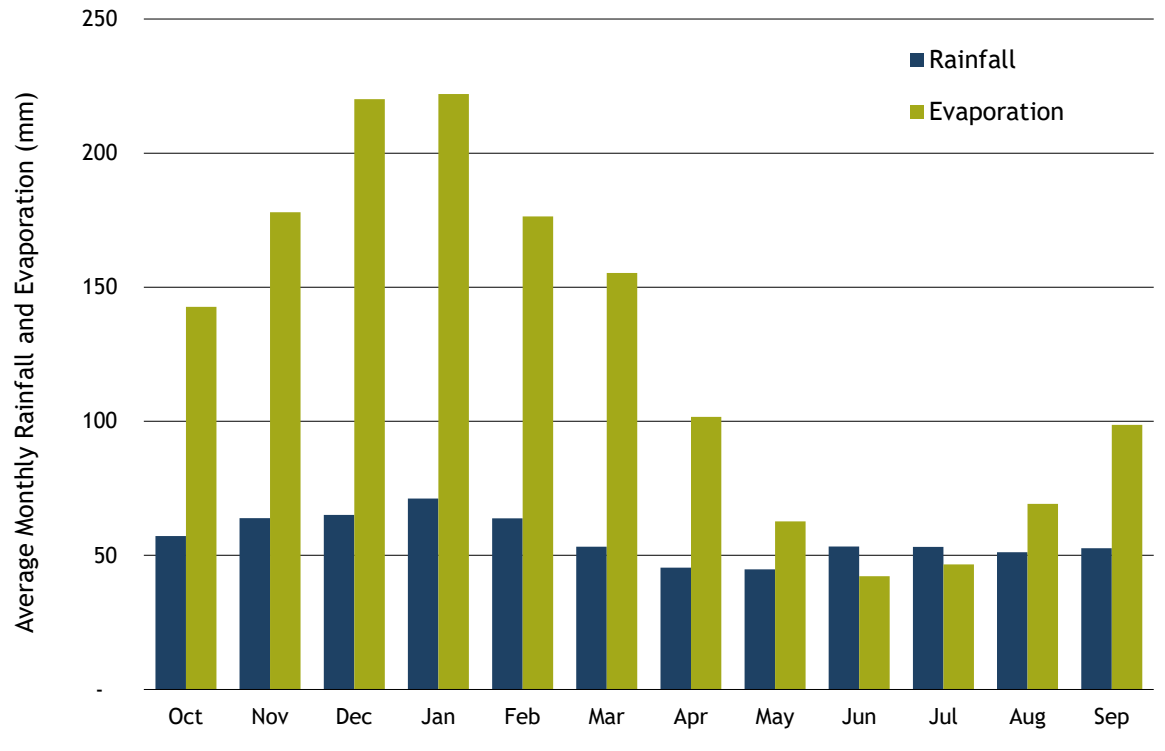


Figure 2
Average monthly rainfall and pan evaporation at the Mine Site - 1889 to 2018 (source: SILO point dataset - Qld Department of Environment and Science, 30 September 2019)

Comparison of **Figures 1** and **2** with Figures 3.1 and 3.2 of WRM (2022) respectively identify a decrease in annual total rainfall depth and average monthly rainfall whilst evaporation remains largely unchanged.

As the review of harvestable rights water management (described in Section 3.2.1) required an update to water balance modelling, the opportunity was taken to source and apply an updated dataset from SILO. This would also address concerns raised from some in the community regarding the omission of data from 2019 which was a particularly dry year. Therefore, an updated SILO dataset was accessed from SILO on 29 August 2022 that covered the period from 1 January 1889 to 31 December 2021. It should be noted that the dataset included 2020 and 2021 which were both relatively wet years for the area.

For completeness, this response includes the SILO data used in WRM's water balance modelling assessment that was accessed on 30 September 2019 and covering the period from 1 January 1889 to 31 December 2018 and compares this with the one accessed from SILO on 29 August 2022 that commences 1 January 1889 and ceases 31 December 2021. These datasets are hereafter referenced as "EIS SILO" and "2022 SILO" respectively.

For clarity and to illustrate the lack of change from the inclusion of three additional years of rainfall data (2019 to 2021) that includes a very low rainfall period, **Table 3** below presents a comparison of annual rainfall exceedance probability (AEP) calculated from EIS SILO and 2022 SILO data. As shown in **Table 3**, despite the inclusion of 2019's very low rainfall, the 2022 SILO dataset returns annual rainfall statistics with negligible differences between the EIS SILO dataset used for WRM's assessments. Whilst the 2022 SILO data includes 2019, the EIS SILO rainfall statistics are lower than those derived from the 2022 SILO data. This is further demonstrated by a comparison of monthly average rainfall, as presented in **Figure 3**. This figure shows that, where differences in statistics and monthly averages occur, an increase not a decrease in rainfall is generally observed in the 2022 SILO data. This may be a factor of the broader data updates but also the influence of two relatively wet years in 2020 and 2021. Ultimately, this data suggests an improved outcome for the Project overall and demonstrates the conservatism applied for the assessment of Project's water supply reliability and potential impacts to downstream users.

Table 3
Annual Exceedance Probability for Mine Site EIS SILO and 2022 SILO Data

	EIS SILO	2022 SILO	Difference
AEP (%)	Rainfall (mm/year)		%
99	318	319	0%
95	397	406	-2%
90	445	459	-3%
80	509	529	-4%
50	652	683	-5%
20	824	862	-4%
10	926	965	-4%
5	1,018	1,055	-4%
2	1,128	1,161	-3%
1	1,206	1,234	-2%
0.5	1,281	1,303	-2%
0.2	1,376	1,388	-1%

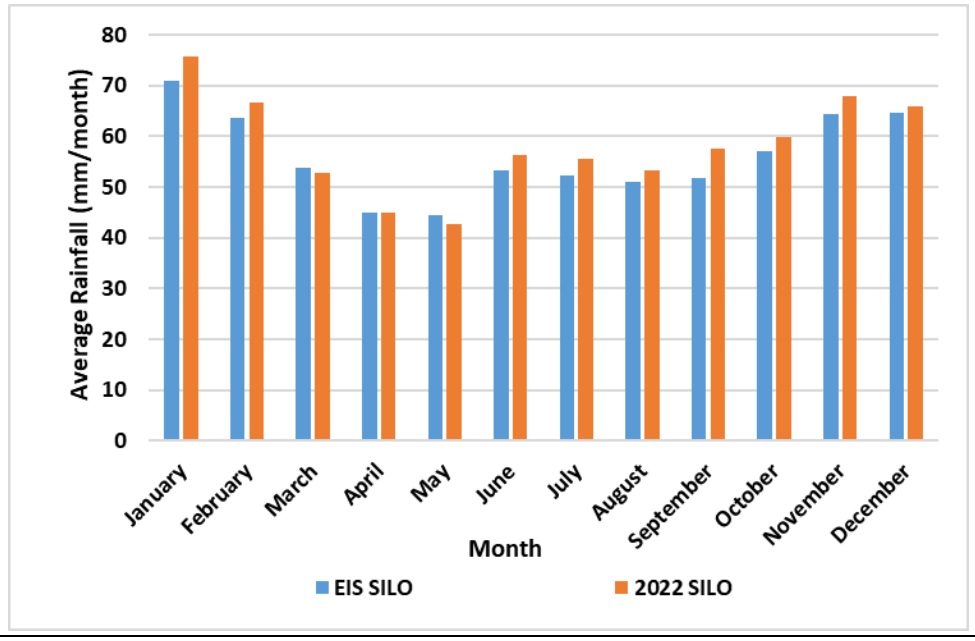


Figure 3
Average Monthly Mine Site Rainfall: EIS SILO and 2022 SILO

5.3 Response To Matters Raised

5.3.1 Average Rainfall

Comment

The Bowdens surface water assessment data appears to show a monthly average that exceeds 75mm over summer. This is incorrect, as evidenced by the rainfall data from Mudgee (26km west of the mine site), Rylstone (22km south of the mine site) and Lue Station.

Many of the other months are also too high when compared to Mudgee, Rylstone and Lue rainfall statistics. The data should be reviewed and revised down so as to not incorrectly inflate the amount of rainfall which the region actually receives. The data for the Bowdens site needs to be presented numerically, so they can be clearly understood.

Response

Table 4 presents the average monthly rainfall generated from the SILO data utilised for water balance modelling. This table also presents for comparison the monthly averages from the 2022 SILO dataset as well as those from the following BoM weather stations that are proximal to the Mine Site:

- Lue Station (BoM ID 62071) with a 89% complete period of record from 1 January 1881 to 31 December 1920;
- Mudgee (George Street) (BoM ID 62021) with a 99% complete period of record from 1 January 1870 to present; and
- Rylstone (Ilford Road) (BoM ID 62026) with a 93% complete period of record from 1 January 1870 to present.

Note: Data from Lue (Bayly Street) (BoM ID 62062) has been excluded from the analysis as it is considered less reliable due to significant data gaps (26% completeness), rendering any comparisons with this dataset questionable.

Table 4
Comparison of Monthly Average Rainfall Data from EIS SILO, 2022 SILO and BoM Stations (Lue Station, Mudgee [George Street] and Rylstone [Ilford Road])

Source	EIS SILO	2022 SILO	Lue Station	Mudgee (George Street)	Rylstone (Ilford Road)
Month	Rainfall (mm)				
January	70.9	75.8	71.7	67.9	70.9
February	63.5	66.6	56.0	62.8	64.1
March	53.8	54.9	53.5	54.8	55.6
April	45.1	45.2	49.1	44.4	43.7
May	44.3	42.4	44.9	48.7	42.4
June	53.2	55.9	67.3	54.7	47.8
July	52.3	56.0	55.1	53.2	46.8
August	51.1	53.0	57.2	51.8	46.5
September	51.9	57.3	58.6	52.2	47.6
October	57.1	59.4	54.5	59.1	54.1
November	64.3	67.7	61.5	62.5	62.9
December	64.7	65.5	69.8	65.1	66.4
Summer Month	62.4	65.0	61.2	62.0	62.3
Overall Month	56.0	58.3	58.3	56.4	54.1

Review of **Table 4** identifies the EIS SILO as returning no summer month with an average rainfall greater than 75mm. As noted above, the monthly averages presented in Figure 3.2 of WRM (2022) do not reflect the SILO data used for the water balance modelling and assessment. The EIS SILO summer monthly average of 62.4mm/month is also comparable to the averages for all BoM stations. However, whilst data collected at the Mudgee and Rylstone BoM stations are useful for setting a regional context, they are situated over twenty kilometres from the Mine Site and cannot be assumed to accurately reflect rainfall conditions in Lue.

As the data from Lue Station is not publicly available after 1920, this data is not reliable for assessment purposes. However, with overall monthly averages of 56.0 and 58.3mm/month respectively, the EIS SILO is lower than, and the 2022 SILO matches, that of Lue Station (58.3mm/month). Whilst Lue Station has a shorter period of publicly available record that does not extend to current timeframes, the relative completeness of its data over the 39-year data record supports the derivation of monthly averages for comparison.

In summary, whilst there is some variance in individual monthly averages, there is no significant difference between the SILO or BoM data that might substantially influence assessment outcomes. As expected, the SILO data accurately reflects monthly rainfall for the Mine Site and the regional intra-annual rainfall variation at all BoM stations. This is demonstrated on **Figure 4** that compares monthly averages for EIS SILO, 2022 SILO and Lue Station. This figure shows good overall correlation in average monthly rainfall and similar intra-annual variation whereby the lowest rainfall months are April and May with January recording the highest average monthly rainfall.

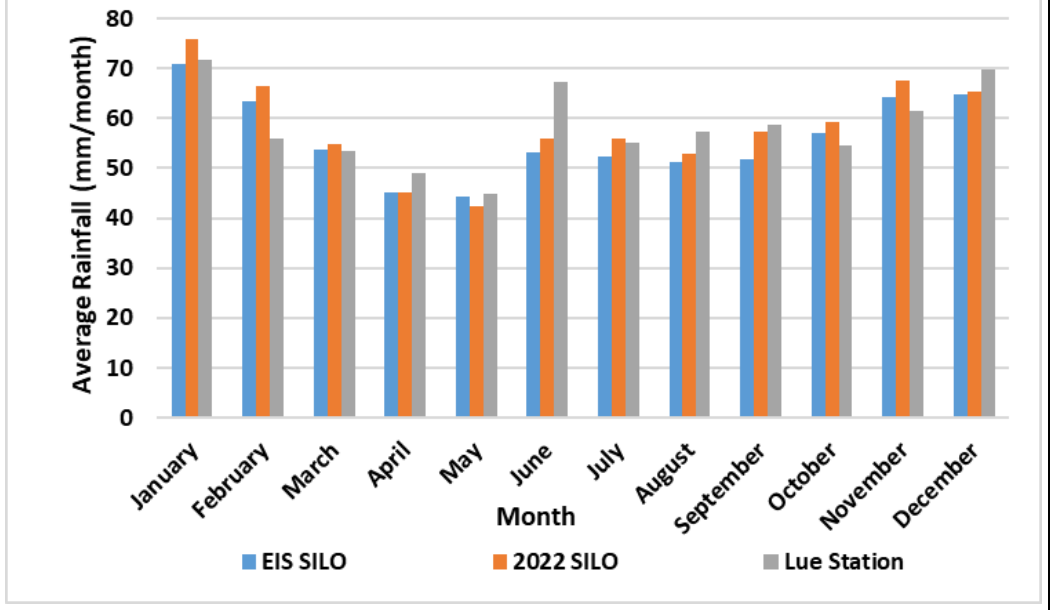


Figure 4
Average Monthly Rainfall: Mine Site EIS SILO, 2022 SILO and Lue Station

5.3.2 Exclusion of Relevant Data

Comment

The number of very low rainfall years is clearly not reflected in the Bowdens' surface water assessment annual rainfall data, which has only three years of less than 400mm. This in part seems to be a deliberate attempt to distort the data, as it has excluded 1888 and 2019, both of which are very dry years. Actual long term rainfall data recorded by landholders in the region show there has been nine (9) years where rainfall of less than 400mm has been recorded between 1887 and 2021; and 23 years where rainfall of less than 500mm has been recorded in this period.

Given that the community that will be affected by this mine have recently lived through the crippling drought which culminated in the 2019/2020 Black Summer fires, this is viewed very poorly.

Response

Assessment Dataset

There has been no "deliberate attempt to distort data" and Bowdens Silver and its consultants strongly refute this baseless assertion. The earliest commencement date for SILO data is 1 January 1889 and the EIS was lodged in May 2020. As noted in Section 5.2, SILO data was obtained in January 2019 and used to prepare initial climate graphs and figures whilst the EIS SILO dataset, used in the surface water assessment, was accessed in September 2019. This illustrates the significant lead time (i.e. >2 years) and efforts required to fully consider potential impacts according to current best practice. Therefore, they were substantially completed in 2019. For consistency with the EIS, WRM utilised the EIS SILO dataset for the *Updated Surface Water Assessment*. Whilst it is noted that 2019 was a year of very low rainfall, lower annual rainfall totals occur in the EIS SILO data. Notably, the longer period between 1938 and 1940

(total rainfall of only 1,227mm), which is included in the EIS SILO data, is lower than the 1,319mm between 2017 and 2019. As identified on **Table 3** and **Figure 1**, the EIS SILO data returns lower rainfall statistics than would be the case had 2019 data been included.

Landowner Rainfall Data

The annual landowner rainfall data presented as Figure 9 of Baguley (2022) is not publicly available and has not been provided to Bowdens Silver for consideration in this response. It is however noted that the data series presented in Figure 9 of Baguley (2022) is composited from spatially different locations and useful for comparative purposes only. Whilst Lue Station data is publicly available from BoM for the period 1881 to 1920 and has therefore been subjected to quality control protocols, it is unclear whether the remainder of the data series presented in Baguley (2022) has been subjected to similar analysis.

Low Rainfall Periods

In the absence of the landowner data, only a qualitative review is possible. It is correct that Figure 3.1 of WRM (2022) identifies only three years where annual rainfall was less than 400mm. However, this dataset was only used to prepare graphs and figures and not to assess the Project's impacts on surface water resources, availability to downstream users or water supply reliability. The EIS SILO dataset includes nine years where rainfall is less than 400mm/year and 25 where annual rainfall is less than 500mm. Therefore, the EIS SILO matches the landowner data's sub-400mm/year frequency whilst sub-500mm/year rainfall frequency increases in the EIS SILO data. As noted in Section 5.3.1 whilst use of data from BoM stations further afield (e.g. Mudgee and Rylstone) are useful for setting a regional rainfall context, they do not represent actual site conditions and should not be directly compared with the EIS SILO data. This notwithstanding, a comparison of the simple percentile analysis presented as Table 5 of Baguley (2022) with those of the EIS SILO and 2022 SILO datasets is provided in **Table 5**.

As shown on **Table 5**, the lowest percentile rainfall of the EIS SILO data is 8% lower than that presented for the Lue Region in Baguley (2022) and represents the most significant difference between the calculated percentiles of the two datasets. Comparison of the remaining percentiles presented in **Table 5** show negligible differences between the EIS SILO, the 2022 SILO dataset and those for the Lue Region presented in Baguley (2022). Furthermore, despite the inclusion of the low rainfall 2019 period, the lowest percentile for the 2022 SILO is higher than that of the EIS SILO, yet still below that for the Lue Region that was presented in Baguley (2022).

The 130-year EIS SILO rainfall dataset is therefore considered appropriate for capturing historical variation in local rainfall and suitable for assessing the Project's potential surface water impacts and water supply reliability.

Table 5
Annual Rainfall Percentile Analysis of EIS SILO, 2022 SILO, Lue Region, Mudgee [George Street] and Rylstone [Ilford Road])

Percentile	Rylstone (Ilford Road)[1]	Mudgee (George Street)[1]	Lue (Region)[1]	EIS SILO	2022 SILO
	Rainfall (mm/year)				
0	309	302	329	305	310
10th	427	431	434	432	445
20th	509	494	525	503	526
30th	559	544	567	555	576
40th	593	596	611	622	648
50th	635	651	671	665	700
60th	679	695	729	698	729
70th	745	761	772	786	814
80th	800	828	825	835	874
90th	875	929	912	908	945
100th	1,293	1,443	1,385	1,328	1,361
Note 1: Sourced from Table 5 of Baguley (2022)					

5.3.3 Impacts on Water Availability

Comment

It is also noteworthy that the 10th percentile is 427mm/a and 431mm/a respectively for Rylstone and Mudgee and 20th percentile is 509mm/a and 494 mm/a respectively. For the for [sic] *Lue region the 10th percentile is 434mm/a and the 20th percentile is 525mm/a. In this area, one in every 10 years receives little over 400mm of rainfall and is very dry and one in every 20 years receives in the order of 500mm. The point of this is that in Australia, a semi-arid climate is one where average rainfall is between 250mm and 500mm per year7. The analysis here shows that one in every five years, the climatic conditions for Rylstone, Mudgee and Lue are semi-arid. This means that any loss of available water in these years severely impacts the land, and the people, plants and animals trying to survive on it.*

The landholders who live in this area have adapted to these conditions, they store feed, destock, diversify, take off farm jobs or make other provisions to carry their properties through the dry times. In 2019, the groundwater resources were only just sufficient to supply the stock and domestic needs of the properties adjacent to the mine. This leaves two questions hanging:

How does a mine 'get through the dry times'? Mothballing for years until the rains return? Diversification?

Where is the social licence if operating this mine makes all surrounding landholdings and business unviable because its left them with no water?

Response

As shown in **Table 5**, percentile analysis of the EIS SILO indicates comparable values to those presented for the Lue Region in Baguley (2022). Whilst percentile analysis may support an inference on the average or expected period between which a given rainfall total may occur, in

reality such periods are generally random. Therefore, it cannot be stated categorically that once every ten years, annual rainfall will be a "*little over 400mm"*. For example, annual rainfall less than 500mm does not occur in the first 20 years of the EIS SILO data and seven times in the following 20-year period.

Furthermore, the assertion that the Lue region meets NSW Government's definition of a semi-arid zone is not correct. To meet such a definition, average rainfall must be between 250mm/year and 500mm/year. As evidenced in Table 3 of Baguley (2022), mean (average) annual rainfall for Lue is 671mm/year, significantly higher than the 500mm/year threshold. It is not appropriate to classify the climate as semi-arid for some of the time. Bowdens Silver recognises that extended periods of low rainfall are possible during the life of Mine. As noted above, extended periods of low rainfall are incorporated into the EIS SILO dataset used to assess the Project's water supply reliability and its impacts on water resources. In recognition of this potential for low rainfall, a key objective in developing the Project's integrated water management and supply strategy was to increase the security of the Project's water supply without impairing water availability for other users. This would be achieved by reducing the Project's water demand, limiting evaporative losses from water storages and supplementary supply from advanced dewatering (production) bores. As noted in Section 3.2.2 of the *Water Supply Amendment Report*:

- Water demand would be reduced by a higher rate of water recycling within the processing circuit.
- Water stored in the TSF and other water management infrastructure would be managed to reduce the water surface's exposure to evaporation.
- Clean water captured within the Mine Site would be separated as much as possible from water in containment zones so there is always sufficient water for dust suppression.
- Water sources would be prioritised to ensure that operational requirements and the function of containment dams is not compromised at any time.

This means the Project can operate with a high level of confidence in its water supply arrangements. It is acknowledged that there is concern in the community regarding water supply availability, however the conclusions of assessment indicate minimal impacts to the water supply for private water users under the integrated water management and supply strategy. Therefore, it is not agreed that the Mine would leave residents without water.

Comment

The surface water assessment acknowledges that there will be an impact on availability of water to downstream surface water users, and says:

> *"The Water Sharing Plan for the Macquarie Bogan Unregulated and Alluvial Water Sources states that water must not be taken under an access licence when there is no visible flow or where an access licence permits take from an in river pool, when the volume in that pool is less than its full capacity.*
>
> *The principal mechanism by which the Project would affect the quantity of water supplies available to other surface water users in the Lawsons Creek Water Source of the Macquarie Bogan Unregulated and Alluvial Water Sources is by reducing flows such that the frequency and duration of cease-to-flow periods is increased."*

The surface water assessment concludes:

> *"The impact of the Project on the frequency of flows greater than 1 ML/d (approximately 12L/s), which occur about 81.0% of the time downstream of the Walkers Creek confluence, is expected to be negligible. Therefore, the impact of the loss on the availability of water to downstream water users would be negligible."*

The conclusion drawn by WRM is incorrect. As is shown in the analysis in this paper, it is the other 19 percent of the time when extremely dry semi-arid conditions, are experienced in the affected catchment areas, when water is in desperately short supply. Therefore, the impact of any loss of water is critical. It is also expected that in these conditions, one in every five years, that the conditions of the Macquarie Bogan Unregulated and Alluvial Water Sources Water Sharing Plan would be unable to be met.

Response

It is noted that, even in the absence of the Project (that is, under current conditions), all water users would be impacted by cease to flow conditions during extended periods of low rainfall. Using the Australian Water Balance Model, WRM (2022) assessed Lawsons Creek's streamflow frequency for no-mining, maximum mining disturbance and post-mining conditions. This assessment considered the "cease to flow" condition in Lawsons Creek as being flows less than 0.1ML/day at the confluence with Walkers Creek (refer Location C, Table 8.1 and Figure 8.2 of WRM [2022]). The flow frequency curves for the no-mining, maximum mining disturbance and post-mining at this location, as derived from the Australian Water Balance Model are presented as Figure 8.3 of WRM (2022).

Review of this figure shows that without mining, cease to flow conditions (i.e. flows less than 0.1ML/day) occurred 9.8% of the 130-year period modelled. When the maximum impacts of mining are considered, the Project would increase the frequency of these conditions occurring by approximately 0.6%, even under low rainfall conditions. As this represents approximately two additional days of cease to flow conditions, the description of such impact as negligible is justified.

Comment

Further, the methodology used to calculate the loss of water downstream and the cease-to-flow predictions appears to be flawed. The assessment reports that:

> *"The estimated impact of the Project on the frequency of flows at location C in Lawsons Creek that was conducted by comparing the outputs of the AWBM model of the premining catchment areas (described in Section 3.5.3) with the corresponding results of a model with the reduced catchment area"*

This seems to indicate that the catchment area of the mine was subtracted from the AWBM model. However, what is not clear is what area was used. As noted elsewhere in the assessment, the catchment area of the containment system is expected to peak at 550 ha. This equates to an average annual loss of flow of 177 ML/a. From Table 8.1 of the assessment (Figure 12), it appears this is what is used, given the reduction in flows is 175.2 ML/a. However, in actual fact, the reduction of flow must consider all water that is being extracted from the site – including the contiguous area of 2850ha – and used in the proposed mining operations as this is what the downstream flows will be reduced by. As shown in Figure 5.3 of the surface water assessment, at peak requirement, the mean annual flow is 1,955 ML/a (p 6-86).

Even before there was a scheme to use all water from the Bowdens' lands for the proposed mine operations, there was a predicted increase in the cease-to-flow frequency during low flows, but this prediction is buried in the Environmental Impact Statement. It is also unclear where the 'Location C' is as presented in Figure 8.3 of the surface water assessment, which gives the effect of loss on Lawsons Creek streamflow frequency. This is important, as the impact appears to be greatest at Location D, as shown in Figure 12.

A review of the previous surface water assessment[8] found that the numbers in the table above are unchanged. It is extraordinary, and simply unbelievable, that this has not changed under the revised proposal when such an increase in water use from the site it proposed.

Response

Bowdens Silver's contiguous landholding is 2,580 hectares (not 2,850), with much of this area remaining outside of the Mine Site. To establish the Project's impacts on other water users, WRM (2022) assessed the Project's maximum impact on cease to flow conditions by removing the full 5.5km^2 (550 hectare) Mine Site catchment from contributing to downstream flow. This 5.5km^2 Mine Site catchment includes the 3.0km^2 Walkers Creek sub-catchment (tailing storage facility) and the 2.5km^2 Blackmans Gully (open cut pit, processing plant) and Price Creek (waste rock emplacement) sub-catchment.

Using the Australian Water Balance Model, WRM (2022) established that by removing the Mine Site catchment:

- at the confluence with Hawkins Creek (Location A on Figure 8.2 of WRM [2022]), streamflow would be reduced by approximately 80.3ML/year (or 1.1%) of the 7,136ML/year average Lawsons Creek streamflow at this location; and
- at the confluence with Walkers Creek (Location C on Figure 8.2 of WRM [2022]), streamflow reduction would increase by 96.3ML/year to 176.6ML/year that represents 2.2% of the 8,735ML/year average Lawsons Creek streamflow at this location.

As Location C is the point immediately downstream of the Mine Site catchment's maximum extent, it is the most appropriate point to assess the Project's maximum impact on streamflow. As noted in Section 8.4 of WRM (2022), the relative impact on Lawsons Creek streamflow would reduce significantly downstream of the Mine Site. This means that streamflow impacts at Location D of WRM (2022) Figure 8.2 would be less than those at Location C.

The use of on-site sources for Project-related water supply would not require an increase to the maximum Mine Site catchment assessed for the EIS. As there is no increase to this catchment, there is no further reduction in streamflow contributions from the Mine Site. Hence, the identical catchment area and streamflow values in both tables. However, groundwater abstraction from advanced dewatering (production) bores would result in a minor increase to the predicted reduction in baseflow (groundwater contribution to streamflow). This results in changes to the figures for baseflow reduction, total / percentage changes due to the Project when Tables 8.1 of WRM (2020) and WRM (2022) are compared.

5.3.4 Water Licensing

Comment

The Bowdens surface water assessment makes the following statements:

> *"This advanced dewatering would occur via production bores that would provide up to 10L/s and supply between 376 ML/a to 408 ML/a. During mining operations, (after allowance for pit face evaporation) residual groundwater inflows to the main open cut pit are expected to range between approximately 174 ML/a and 662 ML/a."*
>
> *"Due to the impact of drawdown on the local groundwater profile by the open cut pit. The groundwater assessment (Jacobs, 2022) predicts the reduction in baseflow would increase during operations such that at the conclusion of mining operations, the baseflow loss would be up to approximately 14.0 ML/a, increasing to up to 19.3 ML/a post mining. Bowdens Silver has obtained water access licencing to account for this loss"*

These statements would seem to indicate:

Much greater than 376 ML/a to 408 ML/a will be dewatered from the groundwater system, as this is exclusive of what is lost via evaporation once the water is in the pit

Bowdens appears to be seeking a licence only for a small portion (14.0 ML/a) of the water proposed to be taken from the groundwater system, not the full amount of up to 662 ML/a.

Response

This comment correctly identifies WRM (2022) statements regarding licensing arrangements for surface water losses due to baseflow reduction. However, it overlooks the information presented in the *Water Supply Amendment Report* that identifies the following with regards to the Project's water access licensing requirements during operations from the relevant water sources and water sharing plans:

- *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources Order 2020* - Lachlan Fold Belt Groundwater Source (Other) Management Zone:
  - Maximum predicted groundwater take (Jacobs, 2022) – 1,040ML/year.
  - Entitlement held by Bowdens Silver – 1,480ML/year.
- *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources Order 2020* - Sydney Basin Groundwater Source:
  - Maximum predicted groundwater take (Jacobs, 2022) - 232ML/year.
  - Entitlement held by Bowdens Silver - 394ML/year.
- *Water Sharing Plan for the Macquarie Bogan Unregulated and Alluvial Water Sources 2012* - Lawsons Creek Water Source:
  - Maximum predicted baseflow reduction (Jacobs, 2022) - 14ML/year.
  - Tailings Storage Facility (WRM, 2022) - 123ML/year
  - Entitlement held by Bowdens Silver - 139ML/year.

In addition, based on its contiguous landholding of 2,580ha, under Section 53 of the *Water Management Act 2000*, Bowdens Silver is also entitled to maximum harvestable rights dams with a combined capacity of 180.6ML.

In summary, Bowdens Silver is not seeking to license a small portion of the Project's predicted impacts on water sources, rather it holds volumetric and landholder entitlements that fully account for, and exceed, its predicted impacts on water sources.

5.3.5 Groundwater Modelling

Comment

Numerical groundwater modelling has been undertaken for the proposed Bowdens' mining operations, however, as illustrated in the above discussion, to be of any value, the outputs of modelling methods are dependent on the availability of accurate and long term input. There is a paucity of data available in this instance, being limited to one off water levels and an average of measured groundwater levels measured for just over six years at the Bowdens' site10. Given the paucity of data, exacerbated by a high level of uncertainty, there cannot be any confidence in the predictions derived from the modelling which has been presented nor the impacts to springs and waterways assessed using the modelling.

Response

Whilst uncertainty in groundwater modelling is acknowledged and recognised, Bowdens Silver has full confidence in the groundwater modelling and assessment prepared for the Project. This model was calibrated to local conditions using the long history of data collected within and surrounding the Mine Site. This model was the subject of a peer review undertaken by Dr Noel Merrick who concluded the model is "fit for purpose". This conclusion was also supported by a subsequent peer review undertaken by the then Department of Planning Industry and Environment – Water (DPIE – Water).

5.3.6 Water Balance Modelling

Comment

It is probable that the SILO data presented for historical rainfall data has been used in the water balance model. This will overestimate the water available for use across the site, in dust management and processing. It is highly questionable that 740 ML/a of rainfall and runoff would be available as an 'inflow' in a low rainfall scenario.

Given this question mark, there are concerns regarding the validity of the conclusions of the modelling and the assertions that water requirements for the site can be met.

Further, the sensitivity analysis appears to be fundamentally flawed, in that it considers only a 14% reduction in 'rainfall and runoff' to derive the low 'rainfall and runoff' value. There is also no sensitivity analysis of climate change impacts. It is considered that the reasons for this are that a true assessment of the low rainfall and runoff' would show there is insufficient water to meet the proposed mine's water demands for an unacceptable duration.

Response

Section 5.3.1 of WRM identifies the rainfall data source for the Australian Water Balance model component of the site water balance as being the EIS SILO dataset. As demonstrated in Sections 5.3.1 and 5.3.2, the 130-year EIS SILO rainfall dataset is considered appropriate for capturing historical variation in local rainfall. Therefore, Bowdens Silver has full confidence in the conclusions of the site water balance model that identify the Project has a reliable water source that can meet dust suppression and processing requirements.

The 740ML/year annual rainfall and runoff total is incorrectly identified as being a "low rainfall scenario". As not all rainfall becomes runoff (generally), WRM tested the site water balance model's sensitivity to **low runoff** rather than a **low rainfall** period. This analysis was undertaken by altering the Mine Site catchment's runoff response parameters (refer Table 5.8 of WRM [2022]).

For the modelling assessment, daily rainfall varies throughout the model period and within the ranges of the EIS SILO data. As such, the low runoff scenario applies historical rainfall patterns obtained from the entire EIS SILO dataset but assumes less water is collected for Project-related use. This is why the low runoff scenario results in a 14% reduction in water availability.

Whilst it recognised that climate change is a consideration for the final void pit lake as it would remain in perpetuity, the rainfall variation in the EIS SILO data is considered sufficient to account for any near-term impacts of climate change.

5.3.7 Harvestable Rights and Water Access Exemptions

Comment

The surface water assessment makes the following statements in regards to sediment dams:

> *"Water captured in sediment dams would be released in accordance with best practice, and would therefore be exempt from licensing….In the event that (even after the addition of a flocculant) the quality of water captured in the Containment Zone was such that it could not be released it would be contained on site. No sediment dams would be constructed on a major stream. Therefore, these dams would be used "solely for the capture, containment and recirculation of drainage and/or effluent, consistent with best management practice or required by a public authority to prevent the contamination of a water source", and the captured runoff would be exempt from licensing."*
>
> *However, Bowdens Silver may choose to also utilise the water stored in one or more of the sediment dams. This water, and that collected for dust suppression, would be stored under the maximum harvestable rights provisions of the NSW Water Management Act, 2000.*

The second statement appears to contradict the first one, indicating that the basins will form part of the water sources for the proposed mine site. Given this, it appears unlikely that it is correct to assert that the water access licence exemptions will not apply.

Response

Bowdens Silver anticipates that after the settlement of suspended sediment in these dams, the water may be suitable for release in accordance with discharge limits applied by the NSW Environment Protection Authority (EPA) through an environment protection license (EPL). However, discharges from the Mine Site would not be permitted to occur until it is confirmed

that runoff water derived from the placed/stockpiled NAF waste rock is suitable for release. Where discharge cannot occur due to water quality constraints, consistent with best practice, water would be recirculated to prevent contamination of the downstream water source and thus exempt from licensing requirements.

Should water quality be acceptable for discharge, Bowden Silver may choose to use the water collected in a sediment dam (or dams) under its harvestable rights entitlement. This may only occur if the volume of all harvestable rights dams, including the nominated sediment dam(s), remains within the bounds specified in the harvestable rights order.

Potential water quality constraints notwithstanding, Bowdens Silver's long-term objective is to discharge water collected within the sediment dams to the downstream environment to assist in maintaining environmental flows. However, WRM considered the retention of all sediment-laden runoff within the Mine Site for the assessment of impacts to downstream flows and users. Therefore, Bowdens Silver has presented and assessed the Project's maximum impact on water resources and users.

5.3.8 Water Access Licences and Transfers

Comment

Corkery (2022) reports that Bowdens Silver holds the following volumetric entitlements to account for the predicted groundwater take from the relevant water sources.

> *"Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources Order 2020 - Lachlan Fold Belt Groundwater Source (Other) Management Zone – 1 480ML.*
>
> *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources Order 2020 - Sydney Basin Groundwater Source – 194ML.*
>
> *Water Sharing Plan for the Macquarie Bogan Unregulated and Alluvial Water Sources 2012 - Lawsons Creek Water Source – 139ML.*
>
> *Bowdens Silver has also been notified of the successful purchase of an additional 200ML groundwater use entitlements within the Sydney Basin Groundwater Source of the Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources Order 2020.*
>
> *The entitlement within the Lawsons Creek Water Source of the Water Sharing Plan for the Macquarie Bogan Unregulated and Alluvial Water Sources 2012 accounts for runoff interception by the TSF which is required as its embankment is situated on a third order watercourse."*

What is notable in this list of Water Access Licences is the for each of the water sources, Bowdens' is seeking to transfer the licence from either the Sydney Basin catchment or further downstream within in Murray Darling catchment.

In relation to the transfer within an unregulated water source, there are clear environmental constraints, as the instream impacts can be significant in the upstream locations when this occurs. This is because, to state the obvious, the purchase of Water Access Licences from elsewhere is not the purchase of water from those areas.

Response

This comment is not accurate, the Project does not require the transfer of water from any water source or management zone outside of those in which the Mine Site is located and has not moved licences upstream to the detriment of any users in other areas.

Review of publicly available mapping identifies the Mine Site is situated within the boundaries of all relevant water sources and water sharing plans applicable to the Project. Although the reference to "*Sydney*" within the naming of the Sydney Basin Groundwater Source of the *NSW Murray Darling Basin Porous Rock Groundwater Sources Order 2020* is possibly misleading, it should be recognised that it does not lie within WaterNSW's drinking water catchment for Sydney. The same applies for any reference to the Murray-Darling Basin in groundwater sharing plans. The naming of groundwater sources and water sharing plans relates to the host geology of the aquifer system and not the geographical location of a surface water catchment.

As stated in Section 5.3.4, Bowdens Silver holds volumetric and landholder entitlements that fully account and exceed its predicted impacts on water sources, including the loss of base flow. These entitlements are fully authorised, lawful and within the bounds of the NSW Government's bulk access regime for the relevant water sources.

5.3.9 Presence of Springs and Peatland Swamps

Comment

Cardno13 presented mapping of springs within the Bowden's study area stated there were 29 springs present within an approximately 320ha area – just under one per every 10ha. These springs are the lifeblood for many (humans, plants, animals) in the area.

The presence of springs, swamps, bogs and mires was also an issue highlighted in the RRCFC's aquatic ecology report submitted to the recent Preliminary Regional Issues Assessment for Hawkins Rumker14 This analysis established that there are upland swamps presenting throughout the Upper Cudgegong and Upper Lawson Creek catchments. These are all an important part of the complex of endangered montane mire communities distributed across the tablelands and adjacent ranges of NSW and are referrable to the Montane Peatlands and Swamps Endangered Ecological Community (EEC) listing under the NSW Biodiversity Conservation Act 2016 and the Temperate Highland Peat Swamps on Sandstone EEC Commonwealth Environment Protection and Biodiversity Conservation Act 1999 listing. Information provided by landholders adjacent to the Bowdens site indicates that these areas are present within and adjacent to the Bowdens site (Figure 14) as well in adjacent valleys.

The environmental impact assessment for the Bowdens' project does not acknowledge the presence of these upland swamps within their own site nor in the adjacent areas.

The impacts to the springs, creeks and rivers in this area and meadows, sphagnum bogs, wetlands and associated ecosystems as well as the wide range of threatened species, populations and communities that are dependent on these features is an unacceptable impact for a short-term mine project.

Response

As identified in Section 4.5.15 of Jacobs (2022) water quality data from springs included in the water quality sampling program does not closely correlate with that of regional groundwater. Rather, much of these areas were inferred by Jacobs (2022) to be reliant on rainfall recharge and sub-flow, rather than regional groundwater and not anticipated to be impacted by the Project. Jacobs (2022) also considered that springs associated with discharge from bedding planes within the Sydney Basin sediments are also unlikely to be impacted by drawdown.

Bowdens Silver does not dispute that the Montane Peatlands and Swamps Endangered Ecological Community may occur in the local setting. However, the terrestrial ecology surveys commissioned for the Project and undertaken by EnviroKey did not identify it within the Mine Site or the relocated Maloneys Road. EnviroKey is an experienced, highly competent and accredited assessor who considered an extensive Study Area via a substantial survey effort. The biodiversity assessment for the Project has been completed to the satisfaction of the NSW Biodiversity Conservation Division of DPE.

Had any Montane Peatlands and Swamps Endangered Ecological Community been found within the disturbance footprint, it would have formed part of the Project's offsetting obligations. Bowdens Silver fully accepts these obligations as part of its responsibilities, as evidenced by the quantum of the Project's offsetting requirements.

5.3.10 Loss of Water from the Landscape

Comment

The surface water assessment makes the following statements in regard to sediment dams:

> *"The catchment area of this containment system would vary over the Project life, and is expected to peak at 550 ha (comprising 300 ha in the TSF catchment and 250 ha in the remainder of the water management system) or 2.0% of the Lawsons Creek catchment (of 272 km2 downstream of the Walkers Creek confluence) would be removed over the Project life. Based on the estimated average undisturbed area runoff in the local catchment, this equates to an average annual loss of flow of 177 ML/a."*

This assertion overlooks the fact that the water requirements for the whole project is being drawn from within Bowdens' land, both that within the 'containment system' as well as the Bowdens' contiguous land holdings. As shown in Figure 5.3 of the surface water assessment, at peak requirement, the mean annual flow is 1,955 ML/a (p 6-86), comprised of:

- *Clean water harvesting: 48 ML/a*
- *Runoff and rainfall: 917 ML/a*
- *Additional groundwater extraction from the pit: 612 ML/a*
- *Advanced dewatering (bore water extraction): 378 ML/a*

Putting aside the fact that a portion of the groundwater becomes baseflow for the creek downstream, and taking just the surface water flows, the surface water extraction by the proposed mine will be 965 ML/a. This would equate to a loss of flow from 10.9% of the Lawsons Creek catchment. It is an enormous and unsustainable impact on the water resources within this catchment and a significant impact on all land downstream of the proposed mine site. The loss of baseflows must be considered in addition to this.

Further, it is not clear where the 917ML/a is going to come from, given the catchment area of this containment system is only going to yield 177 ML/a. This is well short of the required water and its source has not been explained.

Response

Jacobs (2022) predicted a maximum 14.0ML/year loss of base flow to streamflow in Lawsons and Hawkins Creeks as the result of mining and groundwater abstraction from advanced dewatering. This loss is accounted for by licensed volumetric entitlement held by Bowdens Silver for the Lawsons Creek water source.

The Project would only capture runoff from within the 5.5km^2 Mine Site catchment that was used to assess impacts to streamflow and downstream water users. This Mine Site catchment includes the containment zone, clean water zone and the erosion and sediment control zone. Whilst this latter zone is also situated within the Mine Site catchment, Bowdens Silver's long-term objective is to discharge water collected within the sediment dams to the downstream environment to assist in maintaining environmental flows.

The Australian Water Balance Model prepared by WRM (2022), was used to predict the runoff component from the Mine Site catchment for the site water balance. As vegetation is removed and less permeable surfaces are introduced within this catchment (such as roads and active mine infrastructure), the proportion of rainfall becoming runoff would increase. That is, less runoff would infiltrate or be lost to evapotranspiration. As shown on Table 5.4 of WRM (2022), this proportion increases by up to 10 times in some sections of the Mine Site catchment. This results in catchment discharge increasing from the average 177ML/year in its current, undisturbed condition to the average 856ML/year during the Project-life (refer Table 5.5 of WRM [2022]). Whilst the origin of the 917ML/year stated in the submission is unclear, Tables 5.4 and 5.5 of WRM (2022) identify the cause and outcomes of increased Mine Site catchment yield as the result of changes to runoff characteristics.

The use of an average 177ML/year streamflow loss to the downstream system is valid as it quantifies current conditions for assessing impacts, not disturbed catchments with altered runoff characteristics. These impacts are acceptable and accounted for by Bowdens Silver's volumetric entitlements. Where runoff characteristics are changed, the Project maximises the opportunity to collect this runoff in accordance with its legal entitlements, thereby reducing the need for external water requirements.

5.3.11 Impact on Biophysical Strategic Agricultural Land

Comment

Downstream of the proposed mine site, there is BSAL present (Figure 15). The surface water assessment has not considered the impacts of using water from within Bowdens' holdings on this land.

DPIE's provided the following information on BSAL (DPIE 2014):

This land has the best quality soil and water resources and plays a sustaining role in the State's $12billion agricultural industry.

Agricultural land across the state was assessed against specific scientific criteria-levels of soil fertility, land and soil capability classes and access to reliable water and rainfall levels.

It is the inherent values of the land itself, rather than the agricultural activity it supports, which determine the BSAL classification.

Given the climate variability experienced in this country, the water resources are a critical part of this equation. As DPIE itself says (above), BSAL is that land which has the best quality soil and water resources and plays a sustaining role in the State's $12billion agricultural industry.

As has been demonstrated in the analysis in this paper, the catchment in which the mine site is proposed has a high variability in rainfall and frequently experiences dry years. The water that supports the BSAL land moves through the upstream catchment and then is available to support agriculture in the mapped areas. Any mining within the supporting catchments threatens the water resource in the BSAL areas. The proposed mine will interrupt both groundwater and surface water flows, and as such, the BSAL area is at risk of losing the critical water which underpins its inherent value.

Response

Figure 15 of Baguley (2022) identifies biophysical strategic agricultural land (BSAL) as being present downstream of the Mine Site. However, WRM notes that the relative impact on Lawsons Creek streamflow would be negligible and reduce significantly with increasing distance downstream due to the contribution of other tributaries to streamflow. Furthermore, the average annual impacts on Lawsons Creek streamflow are fully accounted for by Bowdens Silver's volumetric water entitlements under both water licensing and basic landholder rights. These entitlements are available to any water user or landholder and permissible under the *Water Management Act 2000* and the bulk access regime of the Lawsons Creek Water Source of the *Water Sharing Plan for the Macquarie Bogan Unregulated and Alluvial Water Sources 2012*. Therefore, Bowdens Silver reiterates that it has satisfied all obligations relating to the assessment and licensing of impacts to water resources and other water users.

6 Response to Submissions – Water Supply

6.1 Introduction

The amendment to the Project that was the subject of the *Water Supply Amendment Report* had three components.

i) Remove the previously proposed water supply pipeline as a Project component.

ii) Amend the Mine Site layout to support the proposed integrated water management and supply strategy.

iii) Amend the alignment of the 500kV power transmission line to reduce the visual impact of the infrastructure.

The following subsections present responses to the matters raised in relation to the decision to remove the water supply pipeline from the Project and replace the external water supply with reliance on on-site sources and implementation of an integrated water management and supply strategy.

6.2 Lawsons Creek and Availability for Other Users

Representative Comment(s)

Water is an essential and sometimes rare resource for us and not only waters our livestock but the groundwater allows us to grow crops without irrigation. Without water from the Lawsons Creek our property would not sustain any livestock or any type of farming enterprise.

Margaret Cameron of Lue, NSW (Submission No. SE-40683553)

I believe that the figures and assumptions presented are flawed and the report has been skewed heavily in the mining companies favour to attempt to show that:…

b) The volume of water to be extracted, captured and recycled on site will have NO effect on our property located downstream on the Lawsons creek at Lue.

John Lydiard of Lue, NSW (Submission No. SE-40671528)

The increased harvesting of water will be detrimental to Lawson Creek, as the decreased runoff into the creek will cause ecological problems in the future.

Ronald Spithill of Camboon, NSW (Submission No. SE-40604793)

Having been in the area for over 20 years, in close proximity to Lawsons Creek, i do possess some understanding in the behavior of the creek. It has a highly varied flow, rising quickly in heavy rain and subsiding quickly to its normal flow rates. Outside of exceptional seasons like the one just past, the creek regularly ceases flowing above the junction of Bara Ck (some 8km West of Lue). I would estimate a normal average flow of under 20lt/sec when the creek is flowing. Usually in summer it ceases flow and is reduced to several waterholes topped up by groundwater flows through the gravels and along rock shelves. The creek is used for stock and domestic supply by several landholders but has no further capacity for larger withdrawals like irrigation. Couple this with the creeks value as a wildlife habitat in a predominantly agricultural area and its value becomes apparent. i feel the water use/drawdown at the proposed mine would have drastic effect on the creek.

Paul Evans of Lue, NSW (Submission No. SE-40333502)

Lawson creek is listed in the NSW Stressed Rivers Assessment in the most category (S1) - with both high environmental stress and a high extraction rate resulting in series of water holes with no visible flow during summer.

(Name Withheld) of Lue, NSW (Submission No. SE-40167114)

With the recent changes, water supply is now reliant totally on water harvested on site or capturing surface water from the Lawson Creek system. Having lived in the area for decades I have seen the Lawson Creeks flow reduce to nothing at regular intervals with downstream landholders reliant on shallow well water, or a system of waterholes.

Bruce Christie of Monivae, NSW (Submission No. SE-40642004)

Figure 1. Below. Taken 11th September 2019. Flow evidence in Lawsons Creek. Although some small pools of water could be found along Lawsons Creek, Local landowners became almost totally reliant on Groundwater. This photo is clear evidence of zero runoff in 2019. Since 1980, Lawson Creek has looked like this in 1980, 1982, 1994, 2002, 2003, 2017, 2018, 2019. Bowdens can expect to have these occurrences 2 twice during the 16 year mine life. Depending on Climate change. If they reduce valley runoff, we will see more of this. They provide no evidence that they can accommodate for these occurrences.

Tom Combes of Lue, NSW (Submission No. SE-40602001)

Response

The *Water Supply Amendment Report* presented an *Updated Surface Water Assessment* prepared by WRM Water and Environment Pty Ltd (WRM, 2022) and an *Updated Groundwater Assessment* prepared by Jacobs Group (Australia) Pty Limited (Jacobs, 2022). WRM (2022) and Jacobs (2022) also assessed the Project's impacts to Lawsons Creek via the loss of groundwater (baseflow) and change in Mine Site catchment contributions to Lawsons Creek streamflow during operations and post-mining. The following predictions presented in these reports are relevant to water access for local water users.

- The Project would reduce the baseflow contribution by up to 14.0ML/year during operations and up to 19.3ML/year post-mining.
- At maximum disturbance during operations, the Mine Site's water management system would reduce the approximately 507km^2 Lawsons Creek catchment by 5.5km^2 or 1.1%.

- The Project would result in a 1.2% reduction to average annual Lawsons Creek streamflow at the confluence with Hawkins Creek. At the confluence with Walkers Creek, this reduction increases to 2.2%. This already minor reduction would be reduced post-mining as catchment areas are restored.

The principal means by which the Project would impact upon downstream users is by increasing the frequency and duration of periods when "cease to take" water access license conditions would occur. The *Water Sharing Plan for the Macquarie Bogan Unregulated Rivers Water Sources 2012* identifies that water must not be taken under a water access licence when:

- there is no visible flow (Clause 53[1]); or
- from an in-river pool, when the volume in that pool is less than its full capacity (Clause 53[3]).

It is noted that, irrespective of Project approval, all water users would be impacted by these conditions during extended periods of low rainfall. Like other water users, the Project could be affected by extended periods of low rainfall and Bowdens Silver has carefully considered water supply security for the Project. Whilst this is discussed further in Section 5.5, Bowdens Silver has demonstrated that the Project would have sufficient supply during low rainfall periods to continue operating. This would be achieved by methods that do not relate to increasing the impacts on surface water sources. Rather, water supply security would be achieved via reducing water demand through processing efficiencies and maximising the recovery, recycling and reuse of water within the Mine Site's water management system. Coupled with advanced dewatering, these strategies form the core of the integrated water management and supply strategy that results in a Project that does not significantly impact on other water users.

The following presents a detailed overview of the change in catchment contributions and subsequent impact to streamflow and cease to flow periods. Baseflow reduction is discussed in detail in Section 6.7 of this report.

In order to establish the Project's impacts on other water users, WRM (2022) assessed the Project's maximum impact on cease to flow conditions by removing the full 5.5km^2 Mine Site catchment from contributing to downstream flow. This 5.5km^2 Mine Site catchment includes the 3.0km^2 Walkers Creek sub-catchment (tailing storage facility) and the 2.5km^2 Blackmans Gully (open cut pit, processing plant) and Price Creek (waste rock emplacement) sub-catchment. Using the Australian Water Balance Model[10], WRM (2022) established that by removing the 5.5km^2 Mine Site catchment, approximately 80.3ML/year (or 1.1%) of the 7,136ML/year average Lawsons Creek streamflow would be removed (measured at the confluence with Hawkins Creek). This reduction to catchment contribution increases to 176.6ML/year at the confluence with Walkers Creek, an incremental increase of 96.3ML/year that, in total represents 2.2% of the 8,735ML/year average Lawsons Creek streamflow at this point. During low rainfall periods, catchment contributions to streamflow would naturally decrease. It is noted that the incremental 96.3ML/year increase between the two points assessed, is substantially less than the 123ML/year water access licence held by Bowdens Silver to account for runoff intercepted by the tailing storage facility

[10] The Australian Water Balance Model collates all available data on the catchment being assessed including rainfall and evaporation patterns, physical conditions including terrain, watercourses, topography and other available data to predict the volume of runoff available from rainfall.

Post-mining, with the rehabilitation and re-establishment of pre-mining catchment areas, Project-related impacts to Lawsons Creek streamflow diminish, whereby there is:

- a 0.3% reduction in streamflow at the confluence with Hawkins Creek; and
- a 0.4% reduction in streamflow at the confluence with Lawsons Creek.

Using the Australian Water Balance Model, WRM (2022) then assessed Lawsons Creek's streamflow frequency for no-mining, maximum mining disturbance and post-mining conditions. This modelling utilised a 130-year rainfall dataset (1889 – 2018) that included years when rainfall was lower than, or similar to, 2019 (see Section 6.3.2). This assessment considered the "cease to flow" condition in Lawsons Creek as being flows less than 0.1ML/day at the confluence with Walkers Creek (refer Location C, Table 8.1 and Figure 8.2 of WRM [2022]). The flow frequency curves for the no-mining, maximum mining disturbance and post-mining at this location, as derived from the Australian Water Balance Model are presented as Figure 8.3 of WRM (2022).

Review of this figure shows that without mining, cease to flow conditions (i.e. flows less than 0.1ML/day) occurred 9.8% of the 130-year period modelled. When the maximum impacts of mining are considered, the Project would slightly increase the frequency of these conditions by 0.6%, even under low rainfall conditions. This represents approximately 2 additional days per year.

Therefore, even during low rainfall periods, the Project would result in a negligible cumulative change in water availability. It is also noted that, as other downstream catchments contribute to streamflow in Lawsons Creek, the relative impact of the Project would reduce significantly with increasing distance downstream.

Representative Comment(s)

We lived on the Lawson Creek for 30+ years 1980's – late 2014. The water springs in the Lawson Creek would regularly dry up during drought. The silver mine exhausting local ground water will only exacerbate this. Stock + domestic water security must take priority of a silver mine.

Julie Loneragan of Mudgee, NSW (Submission No. SE-40975986)

Response

The observations noted in this submission agree with Jacobs' (2022) inference that most local springs are maintained by rainfall fed sub-surface flows (or inter-flow) within the soil profile. This was supported by water quality and level data collected at springs and regional groundwater monitoring bores which did not closely correlate, as would be expected if there was a high degree of connectivity between the two systems.

Therefore, spring discharges are not anticipated to be impacted by mine dewatering as they are not inferred to be dependent upon the regional groundwater system. Springs associated with discharge from bedding planes within the Sydney Basin sediments are also unlikely to be impacted by drawdown.

Representative Comment(s)

The EIS indicates most of the water for operations will be obtained on site by breaking through aquifers as the pit is developed and drawing down the ground water that is so critical to maintaining the waterholes along Lawson Creek – these water holes were vital to keeping stock alive on farms all along Lawson creek during the drought.

Saskia Van Schie of Freshwater, NSW Submission No. SE-40547625

The Lawson creek is not a permanent flowing water source. It is generally a collection of water holes above the surface where water flows underground downstream.

Should the groundwater level be lowered even 1m under the creek there can't be any water in the water holes as most are not even that deep.

John Lydiard of Lue, NSW (Submission No. SE-40671528)

Response

The NSW Aquifer Interference Policy requires that Bowdens Silver hold water access licences to account for the maximum predicted Project-related "take" from all groundwater sources, which it does. This includes the predicted indirect "take" from the Lawsons Creek water source due to baseflow reduction. Baseflow is that part of streamflow derived from groundwater discharge and bank storage.

Whilst the predicted drawdown extends beneath a section of Lawsons Creek, it is typically in the order of 1m or less and would not directly correspond with creek water levels. Rather, within the area of predicted drawdown and where water levels in remnant pools are a direct reflection of regional groundwater levels, there is potential for pool levels to decline during extended periods of no-flow. Remnant pools that are isolated from the regional groundwater system or those sustained by smaller perched groundwater systems, are unlikely to be impacted by mining-related groundwater drawdown.

Representative Comment(s)

*The EIS was presented to the public and the government with a **major component** being an external water source. Without an external water source the water available in Lue and within 5kms of Lue and most likely much further afield with be diminished in quality and quantity.*

Lue Action Group of Lue, NSW (Submission No. SE-40692948)

Response

The previously proposed water supply pipeline has been removed from the Project via the adoption of a suite of on-site measures including:

- A 390ML/year reduction in water demand via a higher rate of water recycling within the processing circuit;
- transfer prioritisation strategies to reduce evaporative loss of water stored in the TSF and other water management infrastructure that ensure operational requirements and the water management system is not compromised at any time; and
- separation of clean water captured from water in containment zones to ensure availability of water for dust suppression.

These measures provide the Project with a secure water supply that is sourced solely within the Mine Site. The assessments prepared by WRM (2022) and Jacobs (2022) have comprehensively demonstrated the Project's impacts on surface water and groundwater resources, including quality and availability to other users, would be negligible.

6.3 Agriculture

Representative Comment(s)

My areas of concern are:-

1. Insufficient groundwater available for the mine to proceed without creating shortages to primary production in the local area.

Guy Sim of Running Stream, (NSW Submission No. SE-40682916)

The farming community and Lue have struggled for many years. This Bowdens Mine simply can't come in and take water. It is wrong. The world is changing – water quality and quantity is imperative for all those living in this area.

(Name Withheld) of Burradoo, (NSW Submission No. SE-40979502)

Our farm is in close vicinity. Our animals rely on the creek water + we know what the drought can do. It's only a matter of time.

(Name Withheld) of Monivae, (NSW Submission No. SE-42064762)

Response

Bowdens Silver recognises the agricultural history and productivity of the locality and the ongoing use of land within and surrounding the Mine Site. The *Agricultural Impact Statement* prepared for the EIS and presented as Volume 5 Part 14 of the SCSC concluded the Project would have negligible to minor impacts upon the agricultural resources and enterprises throughout the region.

Both WRM (2022) and Jacobs (2022) assessed the impacts of the Project on the availability of water resources to other users and determined these impacts were consistent with those predicted and assessed for the EIS and therefore the conclusions of RWC (2020) remain valid.

6.4 Supply Security

Representative Comment(s)

The water pipeline, which was to bring water from the Ulan area, has now been removed from the application and greater water recycling onsite together with other modifications means the project will be self-sufficient. All of our water requirements are fully licenced. Our objective of limited affects to environmental flows and not competing with agriculture for water resources continues.

Anthony McClure of Lue, NSW (Submission No. SE-40602273)

Response

Water supply sources and reliability are a crucial component of the Project. Throughout the development application process, Bowdens Silver has continued to investigate measures to reduce Project-related water demand, increase the Project's capacity to recover, recycle, store and re-use process water and stormwater whilst also assessing the groundwater resources in the vicinity of the Mine Site as a water source for the Project.

The integrated water management and supply strategy is permissible under NSW water management legislation and regulations. Where required, Bowdens Silver holds water access licences to account for water taken for the Project. These licences did not require transfer into the relevant water sources or management zone and have been acquired from current allocations and therefore do not place additional demand on water resources.

Furthermore, with regard to other water users, the Project would only slightly increase the frequency of cease to flow conditions by 0.6% even under drought conditions. The relative impact of the Project on Lawsons Creek would reduce significantly with increasing distance downstream as other tributaries contribute to streamflow in Lawsons Creek.

By changing the way water is sourced and managed, the water supply pipeline and its associated surface disturbance is removed from the Project, strengthening its credentials as an ecologically sustainable mining operation.

Representative Comment(s)

A mine must have a secure water supply to operate. A cobbled together collection of rainfall and runoff, harvestable rights, creek water and bore water is not a secure water supply. This mine must be assessed as unviable and the application refused.

(Name Withheld) of Lue, NSW (Submission No. SE-40655223)

The available surface water and groundwater at Lue and north of Lue will not be reliable. This project must have a reliable water source in order to process ore and for dust suppression. Without an external water source this project will not be financially viable.

(Name Withheld) of Lue, NSW (Submission No. SE-40606977)

There is not enough water for this mine. This was recognised at the beginning hence the original proposal to pipe water from the Ulan & Moolarben mines. The onsite water availability has not magically increased just because the pipeline cannot be built.

(Name Withheld) of Clandulla, NSW (Submission No. SE-40641160)

The mine will not have an external water source. Without an external water source there is no secure reliable water supply so the mine will be reliant on rainfall and runoff and groundwater. A mine cannot operate without a reliable and secure water source.

Lue Action Group of Lue, NSW (Submission No. SE-40692948)

Further, I believe, Sections 8 of SEARS are not complete. Bowdens have failed to identify an adequate and secure water supply for the life of the project.

Tom Combes of Lue, NSW (Submission No. SE-40602001)

Response

As described in the *Water Supply Amendment Report* and demonstrated by WRM (2022) and Jacobs (2022), the Project has a secure and reliable water supply that no longer requires external input. This has been achieved via a range of measures that optimise the way the Project recovers and re-uses water and supplemented by groundwater resources. The Project's water supply reliability has been tested using robust modelling techniques that demonstrate the Project's viability to all stakeholders.

Representative Comment(s)

At the moment La Nina exists but when there are droughts (and they occur frequently), there will be no additional water .
This issue of water supply is insurmountable as far as this project is concerned.

Suzana Chandler of Lue, NSW (Submission No. SE-40062459)

Australia's climate variability is well recognised: in their modelling Bowdens allow for highs of 30% above average but only allow for lows of 14% below average. This is ludicrous. Any landholder who keeps rainfall records knows that dry years can go as low as 50% below average.

Running Stream Water Users Association
of Running Stream, NSW (Submission No. SE-40655700)

How will they make the mine operational in dry years? What will happen downstream in drought? Climate modelling shows times of drought will get more frequent and more severe. This is a semi arid area. There is simply not enough water for a mine.

(Name Withheld) of Olinda, NSW (Submission No. SE-40602296)

We do not believe that the amended EIS adequately caters for contingencies during periods of prolonged drought and the huge demands for water that the mine will require. We are hugely concerned that the mine will be consuming large quantities of local water especially in the 1 ½ year establishment and construction phase.

ACN 059 643 533 Pty Ltd of Lue, NSW (Submission No. SE-SE-40666803)

Response

As noted in Section 5.2, WRM (2022) assessed the Project's water supply reliability and potential impacts using a long-term rainfall dataset obtained from the SILO data service. This dataset captured 130 years of variability in rainfall conditions, including high and low rainfall periods.

The sensitivity analysis presented in Section 5.7 of WRM (2022) identifies the Project's water balance response when parameters relating to runoff are increased or reduced. As the data utilised covers the historical range of rainfall conditions, the sensitivity analysis does not assess individual, discrete periods of high or low rainfall. Rather, Tables 5.11 and 5.12 of WRM (2022) present the average annual site water balance, calculated from the full range of results of the modelled low and high runoff scenarios respectively. The results of the low runoff site water balance modelling identified that water supply reliability would only be slightly reduced. As noted in Section 6.2, even under drought conditions, at a maximum the Project would only slightly increase the frequency of cease to flow conditions in Lawsons Creek.

Figure 3.2 of the *Water Supply Amendment Report* identifies that at a maximum, the Project would require approximately 1 320ML/year. This would occur during operations and significantly exceeds the water requirements of the site establishment and construction stage that would be met by advanced dewatering and water captured in harvestable rights dams.

6.5 Groundwater

Representative Comment(s)

We have a registered bore with a current 50 megalitre irrigation licence which is an important part of my family's plans for the future. The company has claimed there will be no impacts on this asset. This confidence seems misplaced as there has been no monitoring of this bore since KCN inexplicably ceased the practice in 2012 and SVL holds no other information about it that they will disclose to me.

Maureen Boller of Lue, NSW (Submission No. SE-40060469)

(1)The proposal must be rejected, due to the huge impacts its proposed water useage will have on agriculture in the surrounding area, residents in the village, those dependent on reliable bore water and downstream users. My major personal concern as a landholder engaged in an agricultural business is the potential impacts on critical underground water sources on our property, most particularly our farm 50 megalitre irrigation licence. Our ability to use our land to raise cattle and sheep is entirely dependent on underground water in times of drought and I have no confidence that any make good provisions will overcome that potential loss.

Mick Boller of Lue, NSW (Submission No. SE-40510578)

Response

The behaviour of the groundwater system and potential impacts to the groundwater setting from the Project are well understood and have been estimated under a worst-case scenario. Jacobs (2022) predicted no impact at any registered groundwater bore that is also a water supply work associated with the licensed extraction of groundwater.

Jacobs (2022) made this prediction using the numerical groundwater model developed for the EIS. This model was calibrated to local conditions using the long history of data collected within and surrounding the Mine Site. This model was the subject of a peer review undertaken by Dr Noel Merrick who concluded the model is “fit for purpose”. This conclusion was supported by a subsequent peer review undertaken by the then Department of Planning Industry and Environment – Water (DPIE – Water).

Whilst the nominated bore is well beyond the zone of predicted groundwater impact, Bowdens Silver would welcome the opportunity to incorporate it into its groundwater monitoring network.

Representative Comment(s)

Whilst groundwater drawdown greater than 2m is predicted at only one privately-owned registered groundwater bore Jacobs (2022) considers this prediction is the result of model conservatism. Words to strike fear into the hearts of groundwater users.

Predicted- and if the modelling is erroneous and the prediction is in error, the groundwater users of Lue and surrounds will be bearing the burden

Mick Boller of Lue, NSW (Submission No. SE-40510578)

Response

Bowdens Silver understands the privately-owned registered groundwater bore, where drawdown greater than 2m is predicted (GW061475), is inoperable and not being used by the landholder. Records indicate this bore was only 15m deep and drew supply from the Illawarra Coal Measures, part of the Sydney Basin sediments that overlie the Rylstone Volcanics.

The adoption of a conservative (or worst-case) approach to modelling is precautionary and highly appropriate as it results in predictions that likely over-estimate potential impacts. Jacobs (2022) notes the Sydney Basin sediments are highly stratified and include low permeability siltstone and shale horizons that would inhibit the vertical (downward) migration of groundwater. These low permeability horizons are observed within the Shoalhaven Group which overlies the Rylstone Volcanics to a minor extent in the proposed open cut pit area and more extensively to the north. The Shoalhaven Group is overlain by the Illawarra Coal Measures. Whilst the Sydney Basin sediments are represented in the model, these low permeability horizons were not specifically represented. However, these horizons would act to isolate the Sydney Basin sediments from any mining-induced drawdown in the underlying formations. This limited hydraulic connectivity means that the predicted drawdown within the Sydney Basin sediments is conservative and unlikely to be realised.

While scepticism of the modelling outcomes is acknowledged, it should be recognised that this modelling is the best predictive tool available to identify and assess Project-related changes to the groundwater setting. The modelling used a substantial monitoring dataset to inform its calibration to local conditions. Based on this calibration, the model accounts for the progressive mining over the life of the Project to inform its predictions and the subsequent assessment of groundwater impacts. The modelling has been subject to multiple expert peer reviews and assessment by DPE Water which have all confirmed that the model and approach taken is fit for the purpose of predicting groundwater impacts to the regional groundwater system associated with the changes resulting from the mining activities.

Representative Comment(s)

All 106 bores should be part of a monitoring program so there can be no dispute about the degree of loss of access to water once the proponent commences the dewatering and collection process.

Mick Boller of Lue, NSW (Submission No. SE-40510578)

Response

Jacobs (2022) notes that of the 106 registered groundwater bores within a 10km radius of the proposed open cut pit, 24 (23%) are utilised for Bowden Silver's groundwater monitoring program. The closest bores to the Mine Site are the most appropriate to include in the monitoring network as drawdown impacts would propagate from the open cut pit and therefore it is important to monitor impacts at locations before they may reach private bore owners.

Review of Figures 44 and 45 of Jacobs (2022) identifies almost all privately-owned registered groundwater bores are outside the zone of predicted groundwater impact. However, Bowdens Silver welcomes discussion with any concerned bore-holder regarding incorporation, where appropriate, of their bore into its groundwater monitoring network once operations commence.

Representative Comment(s)

WATER IS A MAJOR FACTOR IN THE LUE AREA, THE LAST DROUGHT LASTED NINE YEARS, LOCAL FARMS DEPEND ON THE ACQUIFERS. THIS PROJECT WILL DECREASE THE WATER AVAILABLE TO LOCAL FARMS ON TOP OF THE HIGH RISK OF TOXIN CONTAMINATION.

David Chandler of Lue, NSW (Submission No. SE-40268536)

Response

As previously noted, the behaviour of the groundwater system and potential impacts to the groundwater setting from the Project are well understood. The groundwater modelling undertaken by Jacobs (2022) predicted no impact at any registered groundwater bore associated with the licensed extraction of groundwater. Jacobs (2022) predicted that just two registered bores would be impacted by Project-related drawdown. Of these bores, one is understood to be inoperable with supply from the other not expected to be affected by drawdown due to its depth.

Modelling undertaken by WRM (2022) identifies the Project's water management infrastructure can retain all runoff within the Mine Site without the need to discharge mine-affected water to the downstream environment. Furthermore, as described in Section 3.3 of the *Submissions Report*, whilst seepage rates for the preliminary design of the TSF were within the bounds stipulated by the NSW Environment Protection Authority, Bowdens Silver elected to include additional design elements for seepage mitigation. These additional elements were then assessed via refined groundwater, solute transport and mixing/dilution modelling of the TSF's influence on Lawsons Creek water quality. These additional assessments identified that TSF seepage would not adversely impact the beneficial uses of Lawsons Creek.

Representative Comment(s)

If the on site water is going to be used, it will drain the water table. So the Lue valley will be come dry – bores will dry up.

Alan Dale of Lue, NSW (Submission No. SE-40604070)

The proponent will not be able to find the necessary water to conduct its operations without catastrophically depleting groundwater in the area of Hawkins Creek and Lawson Creek.

Mick Boller of Lue, NSW (Submission No. SE-40510578)

Response

The above submissions indicate the anxiety in the local community concerning water availability. Using a peer reviewed, fit for purpose and calibrated groundwater model, Jacobs (2022) predicted potential groundwater drawdown impacts at two privately-owned registered groundwater bores as a result of Project development[11]. The extent and magnitude of Project-related groundwater impacts remains consistent with those presented and assessed for the EIS. There is no indication in the modelling and assessment that bores within the Lue valley would dry up. These conclusions have been considered by DPE Water with that agency having no further matters of concern with the Project.

Whilst the Project's water supply arrangements have been amended, Jacobs (2022) reaffirms that, for all other registered users, the predicted impacts to groundwater availability would meet the NSW Aquifer Interference Policy's Level 1 Minimal Impact Considerations for highly productive, alluvial, porous rock and fractured rock aquifers.

Representative Comment(s)

Too much groundwater flowing into the pit is usually the case in mining but is rarely predicted or assessed by DPE-Water and certainly not included in any report by RW Corkery.

Lue Action Group of Lue, NSW (Submission No. SE-40692948)

Response

Groundwater inflows to the open cut pit have been predicted using a peer reviewed, fit for purpose and calibrated groundwater model developed by Jacobs (2022). The approach to modelling is detailed in the *Groundwater Assessment: Model Report* that is provided as Annexure 9 of Jacobs (2022). This annexure was prepared at the request of the then DPIE – Water and compiled using the technical modelling information presented in the *Groundwater Assessment* prepared for the EIS (Jacobs, 2020).

As described in Section 6 of the *Groundwater Assessment: Model Report*, the model was subjected to an uncertainty analysis to assess the effect on the model predictions when model input parameter values, such as hydraulic conductivity, are changed. This analysis identified that predicted inflows to the open cut pit are most sensitive to changes in the hydraulic conductivity of the aquifer (that is the rate at which water may pass through the medium). However, the range of hydraulic conductivity values in the vicinity of the open cut pit is well understood through comprehensive aquifer testing. Full discussion of the uncertainty analysis was provided in Section 6 of the *Groundwater Assessment: Model Report*.

Representative Comment(s)

There is insufficient detail regarding water use in the Bowden's proposal. They state they will "establish acceptable contingency measures with potentially impacted landowners, should they be required in the event that the predicted lowering of the groundwater table eventuates"17.

[11] It is noted that bore GW802888 is now Project-related, the owner having signed an agreement with Bowdens Silver. Bore GW061475 remains privately-owned but is understood this bore is damaged and not relied upon by the owner.

What are these contingency measures, when will they be put into place, and who will pay for them?

Jack White of Lue, NSW (Submission No. SE-40685561)

Response

Sections 3.2 and 3.3 of the *Water Supply Amendment Report* describes the management and use of water for the Project, including total demand, sources of water and the site water balance.

The groundwater modelling undertaken by Jacobs (2022) predicted that drawdown during operations and post-mining would affect two off-site registered groundwater bores (GW061475 and GW802888 – noting that GW80288 is Project-related and GW061475 is unused). Jacobs (2022) also predicted the Project would not affect any other off-site registered groundwater users.

The NSW Aquifer Interference Policy requires that, where the minimal impact considerations for aquifer interference activities are exceeded at any water supply work (e.g. drawdown greater than 2m), "make good provisions" will apply. As stated in Section 6.3.6.1 of the *Water Supply Amendment Report*, if water supplies at GW061475 and GW802888 become compromised due to mining induced drawdown, "make good" provisions would be honoured by Bowdens Silver.

However, the Aquifer Interference Policy does not provide detail on what comprises "make good" provisions. Therefore, Bowdens Silver proposes to adopt the following approach.

- Seek agreement with the potentially affected landowner to access the groundwater bore to:
  - conduct a detailed bore assessment (depth, diameter, construction, water level); and
  - incorporate the bore into the Project's groundwater monitoring program and routinely access for water level measurements and sampling (if required).
- Consult with the potentially affected landowner to identify technically feasible mitigation options in the event of mining-induced drawdown affecting bore performance. These may include the construction of a new bore, surface works (tanks/dams), pipe distribution systems for changed bore location or other options, depending on the individual circumstances and requirements of the individual landowner.
- Negotiate and sign a "make good" agreement with the landowner that details the timing, triggers, steps and mitigation measures.
- Agree on the period and frequency for ongoing monitoring of water levels within the groundwater bore.
- Execute the provisions of the "make good" agreement when required.

Bowdens Silver would bear the costs of all steps in this process, including the construction and installation of agreed mitigation measures. Should no access agreement be reached, no further action would be required from Bowdens Silver, however the landowner would retain the right to resume the process at any time.

6.6 Aboriginal Heritage

Representative Comment(s)

…turkeys nest dam (increased from 65ML)".

- *With this increase holding capacity by 50%, what impacts is this going to have on any existing cultural heritage site/s.*
- *Does this change anything in the Submitted EIS Cultural Heritage Management Plan?*

Wellington Valley Wiradjuri Aboriginal
Corporation of Orange, NSW (Submission No. SE-40066074)

Response

Section 4.14 of the EIS describes the outcomes of the *Aboriginal and Historical Cultural Heritage Assessment* prepared by Landskape Natural and Cultural Heritage Management and presented in the EIS as Volume 4 Part 13 of the SCSC (Landskape, 2020). Landskape (2020) identified 25 sites within the Mine Site requiring removal of items of Aboriginal cultural heritage significance.

As noted in Section 6.6 of the *Water Supply Amendment Report*, two of the sites identified for removal by Landskape (2020) are situated in areas that would be disturbed by the construction of two harvestable rights dams (WC South and BG Centre). Therefore, the amended Mine Site layout (including the turkeys nest dam) would not require the removal of additional items of Aboriginal cultural heritage significance and no changes to the management of Aboriginal Cultural Heritage would be required.

6.7 Baseflow Reduction

Representative Comment(s)

The reliance on advance groundwater dewatering when storage dams are likely to fail during extended dry periods provides a false sense of security. During these critical times of regional water shortage any further lowering of groundwater levels and associated loss of baseflow to local streams imposes an unacceptable risk to the environment and other water users.

Julia Imrie of Ulan, NSW (Submission No. SE-40684300)

…this means any open cut would then mean a permanent reduction in groundwater flow to the creek, a situation causing a permanent change in the nature of the creek, effectively killing it in any sustained period of dry weather.

Paul Evans of Lue, NSW Submission No. SE-40333502

All Agricultural business in the Lawson Creek Valley rely on the water fed from Lawson Creek and the groundwater aquifers that feed into it. Interconnectivity of the groundwater and Lawson Creek is well proven. Any impact to Lawson Creek will have catastrophic impacts on both business and residents.

Tom Combes of Lue, NSW (Submission No. SE-40602001)

Response

A key objective of the modelling undertaken by WRM (2022) and Jacobs (2022) was to identify and assess Project-related impacts on flows within Lawsons Creek. Jacobs (2022), using a groundwater model calibrated to local conditions, predicted that advanced dewatering, development of the open cut pit and the subsequent final void would reduce the volumes of groundwater (baseflow) discharging to Hawkins and Lawsons Creeks. During operations, the maximum predicted baseflow reduction would be 14.0ML/year. At approximately 15 years post-mining, this baseflow reduction would peak at 19.3ML/year. However, following cessation of mining operations, the groundwater system would undergo recovery with Project-related baseflow loss predicted to reach equilibrium and stabilise at approximately 10.7ML/year, 34 years post mining.

WRM (2022) used an Australian Water Balance Model that was also calibrated to local conditions to simulate Lawsons Creek streamflow over the 130-year period (1889 – 2018). This modelling established that, downstream of the Mine Site at the confluence with Walkers Creek (refer Location C, Table 8.1 and Figure 8.2 of WRM [2022]), the average annual Lawsons Creek streamflow was 8 735ML/year. During operations, the maximum predicted baseflow reduction represents 0.16% of the average annual streamflow in Lawsons Creek at the confluence with Walkers Creek. The peak post-mining baseflow loss would result in a 0.22%[12] reduction with an ongoing 0.11% reduction following the post-mining recovery of the groundwater system.

Using the peak operational baseflow loss and the removal of 5.5km^2 of pre-mining catchment area, WRM (2022) assessed the Project's maximum impact on Lawsons Creek streamflow when measured at Location C. This assessment identified the Project would reduce average annual streamflow by 2.2% during operations. The Project's impacts on streamflow would significantly reduce with increasing distance downstream as other tributaries contribute to Lawsons Creek streamflow.

Any post-mining loss of baseflow would be offset by the rehabilitation and restoration of approximately 5.0km^2 of the pre-mining catchment that would return runoff to the local surface water system. As shown in Table 8.1 of WRM (2022), post-mining the Project would result in a 0.4% reduction in average annual Lawsons Creek streamflow. As this 0.4% reduction includes the peak post-mining baseflow loss, the Project's impact to streamflow would further diminish over time.

Whilst the predicted baseflow loss would occur irrespective of prevailing climatic conditions, the full volume is accounted for by water access licences in the Lawsons Creek water source that are held by Bowdens Silver. Equally, the assessment outcomes described above demonstrate that even under worse case conditions, the Project is not predicted to substantially decrease water availability for other users.

[12] Section 6.3.6.3 of the *Water Supply Amendment Report* incorrectly stated the maximum predicted 19.3ML/year baseflow represented a 0.3% reduction in mean annual streamflow.

6.8 Licensing

Representative Comment(s)

Harvestable rights total only 180.6ML however Figure 3.3 shows Runoff and rainfall use of up to 953 ML per year. Table 3.5 indicates Average water balance of 856 ML per year. There is no explanation of water rights and licenses that correlate with these tables.

…….I object, in the strongest possible terms, to allowing Bowdens Silver to capture additional water over what is allowed to be harvested from their land under the Harvestable Rights Capacity.

It is unjust that Bowdens be permitted to Harvest Water from Water collected from Containment Zone, Erosion and Sediment Control Zone and the Clean Water Zone, but only call the Clean water harvested water.

Tom Combes of Lue, NSW (Submission No. SE-40602001)

Response

The use of the word 'harvest' when referring to the sourcing of water via runoff capture is appropriate. However, it should not be confused with 'harvestable rights' which are the rights of a landowner under the *Water Management Act 2000* to construct and use a dam under certain circumstances without the need to obtain formal approval[13].

The integrated water management and supply strategy incorporates the collection of runoff within the Mine Site for use in Project-related activities and is permissible under NSW water management legislation and regulations. This strategy was described in the *Water Supply Amendment Report* which has been reviewed by DPE Water. This Department, responsible for surface and groundwater management in NSW, has not queried the permissibility of the proposed strategy, nor has it raised any issues in relation to water licensing.

Harvestable rights permit a landholder to construct dams (with some location restrictions) up to a maximum collective capacity (volume) and without a water access licence, water supply work approval or water use approval. Harvestable rights therefore apply to dam volume and does not equate to the volume of runoff captured in the dams. 180.6ML is Bowdens Silver's maximum entitlement under the harvestable rights provisions of the *Water Management Act 2000* (WM Act).

The Australian Water Balance Model prepared by WRM (2022), was used to predict the runoff component of the site water balance. As vegetation is removed and less permeable surfaces are introduced within the Mine Site (such as roads and active mine infrastructure), the proportion of rainfall becoming runoff within the Mine Site would increase. That is, less runoff would infiltrate or be lost to evapotranspiration. As shown on Table 5.4 of WRM (2022), this proportion increases by up to 10 times in some sections of the Mine Site. This results in Mine Site catchment discharge increasing from 177ML/year (average, in its current condition) to an average 856ML/year during the Project-life.

[13] More information on these basic landholder rights is available here https://water.dpie.nsw.gov.au/licensing-and-trade/basic-landholder-rights/harvestable-rights

Much of this increased runoff would be collected from sections of the Mine Site that are classed as the "containment zone" as any runoff could contain elevated dissolved metals. This section's runoff would be collected in the water management infrastructure identified in Figure 3.1 of the *Water Supply Amendment Report*. As this infrastructure is designed to prevent pollution of the downstream water source, it is classed as "excluded works" under Clause 3 of Schedule 1 of the *Water Management (General) Regulation 2018*. Infrastructure classed as "excluded works" is exempt from licensing under Clause 12, Part 1 of Schedule 4 of the *Water Management (General) Regulation 2018* and this water may be reused within the Mine Site. The site water balance also includes runoff collected within the open cut pit and the TSF. The open cut pit effectively operates as a turkeys nest dam, with surface water runoff diverted around this component of the Mine Site with only incident rainfall and licensed groundwater inflows entering the pit available for reuse. Water access licences, with an entitlement of 123ML, are held by Bowdens Silver for the construction of the TSF.

Representative Comment(s)

Bowdens water amendment makes clear that their groundwater licenses have been purchased in the Sydney Water Basin catchment as well as further downstream in the Murray Darling catchment. The Sydney Water catchment is clearly not relevant to western waters and the NSW government has historically indicated a preference not to move licenses upstream within the same catchment, as the water is less likely to be available high up in the catchment and will consequently disadvantage local people and farmers reliant on that water.

John Smidmore of Avalon Beach, NSW (Submission No. SE-40439493)

Response

Section 6.3.5.3 of the *Water Supply Amendment Report* clearly states that Project-related water access licensing requirements have been secured from the relevant water sources, namely:

- *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources Order 2020* - Lachlan Fold Belt Groundwater Source (Other) Management Zone;
- *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources Order 2020* - Sydney Basin Groundwater Source; and
- *Water Sharing Plan for the Macquarie Bogan Unregulated and Alluvial Water Sources 2012* - Lawsons Creek Water Source.

Review of publicly available mapping identifies the Mine Site is situated within the boundaries of each water source and water sharing plan identified above. Although the reference to "*Sydney*" within the naming of the Sydney Basin Groundwater Source of the *NSW Murray Darling Basin Porous Rock Groundwater Sources Order 2020* is possibly misleading, it should be recognised that it does not lie within WaterNSW's drinking water catchment for Sydney. The naming of this water source relates to the host geology of the aquifer system and not the metropolitan area. Therefore, the Project did not require the transfer into any water source or management zone and has not moved licences upstream to the detriment of any users in other areas.

Representative Comment(s)

A mining operation with no reliable water source is not sustainable. One of the requirements of the SEARs is that there will be a reliable water source. There is no evidence that Bowdens hold the required water licenses and they do not hold works approvals to extract this water.

Lue Action Group of Lue, NSW (Submission No. SE-40692948)

Response

As described in the *Water Supply Amendment Report* and demonstrated by WRM (2022) and Jacobs (2022), the Project has a secure and reliable water supply. Section 6.3.5.3 of the *Water Supply Amendment Report* and Table 30 of Jacobs (2022) clearly identifies the water access licences held for the Project by Bowdens Silver. Details of these water access licences is publicly available and readily verified via the NSW Water Register.

As the Project is classed as State Significant Development, in accordance with Section 4.41 of the *Environmental Planning and Assessment Act 1979*, works approvals issued under Section 90 of the WM Act are not required. This does not remove the need to nominate the location of groundwater impacts nor assess its implications as would occur for a works approval. However, as there is a much higher level of scrutiny applied to Government assessment of State Significant Development projects, the additional assessment of such approvals is not warranted.

Representative Comment(s)

Should approval be granted based on this amendment, the department will have granted an implied privatisation of the aquifer creating a negative externality for stock and domestic users of the aquifer.

(Name Withheld) of Pymble, NSW (Submission No. SE-40687034)

Response

The DPE – Water administers the WM Act which provides clear arrangements for controlling land-based activities affecting the quality and quantity of the State's water resources. The WM Act requires that all Project-related extraction of groundwater is accounted for, and in accordance with, the requirements of the applicable Water Sharing Plan. These plans specify the rules placed on water use in the subject water sources to equitably distribute the resource in a manner that recognises the limitations placed upon it. This distribution occurs via a bulk access regime that also accounts for basic landholder rights (i.e. domestic and stock use) within the water source.

All water access licences held by Bowdens Silver to satisfy its obligations have been obtained in accordance with the rules and bulk access regimes of the applicable Water Sharing Plans. Furthermore, Jacobs (2022) predicted minor impacts from Project-related groundwater drawdown at two off-site registered groundwater bores.

Therefore, the Project is not expected to result in negative outcomes for stock and domestic users of local and regional groundwater resources.

6.9 Water Management Strategy

Representative Comment(s)

In regard to the above project I would like to object about the water retention on site, the building of the huge dam which will contain hazardous chemicals that will be stored on site, this is contrary to the original submission. This storage also can be a danger to the local creek and river systems as well local pasture if any water escapes from the storage dam.

(Name Withheld) of Lue, NSW (Submission No. SE-40657545)

Response

Water storage within mine sites is a common practice and does not on its own create risks to the local environment. WRM (2022) used the site water balance model to test the effectiveness of the Mine Site's water management system. WRM (2022) identified that all water captured in the containment (mine affected) zone water system could be contained throughout the Project life without uncontrolled or controlled discharge to downstream watercourses. That water management strategy has been reviewed by DPE – Water and the EPA with not further issues raised by either agency in response.

Representative Comment(s)

"Bowdens Silver's long-term objective is to discharge water collected within the sediment dams to the natural environment."[iii] ***This is shocking as the health of our local environment relies so much on the good management of the mine site, not only during the time when ore is being produced, but forever.***

Sarah Inglis of Havilah, NSW (Submission No. SE-40670742)

Response

This submission neglected to fully reproduce the text of the relevant section of the *Water Supply Amendment Report* (Section 3.2.1) that is reproduced below.

> *"Whilst Bowdens Silver's long-term objective is to discharge water collected within the sediment dams to the downstream environment, the predicted and assessed impacts in the Updated Surface Water Assessment (WRM, 2022) considers this water as retained within the Mine Site. Water collected within ESC zone dams, that is deemed unsuitable for release, would be pumped to the turkeys nest dam for use in processing operations."*

The EPA feedback on the Project (DOC21/585121-15 dated 11 August 2021) notes that should discharge of water be proposed for the Project, the water balance would need to be recalculated and resubmitted with an accompanying assessment. WRM (2022) conservatively assesses impacts to the receiving environment and downstream users as the result of all water captured within the Mine Site being retained. To ensure containment, the water management infrastructure of the erosion and sediment control zone has been deliberately oversized, with design volumes exceeding NSW requirements for erosion and sediment control.

Following cessation of mining operations, as disturbed catchments are progressively rehabilitated and revegetated, the need for erosion and sediment control dams would be removed and the final landform allowed to freely discharge to the receiving environment.

Representative Comment(s)

During wet times, immense amounts of water come down from the hills and, flows all over our property. This same will happen at Bowdens Silver Mine. If we don't maintain ground cover, our farm is subject to erosion. I query whether the Integrated Water Management and Water Optimisation Programme as outlined in the Amendment will be able to handle extreme weather events such as in February 2002 when our neighbours at Havilah received 225mls in one night in a storm.

Sarah Inglis of Havilah, NSW (Submission No. SE-40670742)

Response

WRM (2022) assessed the ability of the Mine Site's water management infrastructure to retain runoff using the daily timestep site water balance model. This assessment utilised the runoff parameters adopted for the site water balance (refer Table 5.4 of WRM [2022]) and those of the high runoff scenario (refer Table 5.8 of WRM [2022]). The results of these assessments identified that, even under high runoff conditions, all site water storages (including sediment dams) could contain runoff without any overflows occurring.

6.10 Dust Suppression

Representative Comment(s)

A water challenged mine will be less able to spray for dust mitigation especially during dry spells and drought.

(Name Withheld) of Lue, NSW (Submission No. SE-40167114)

When there is no water available one certain outcome will happen. Dust suppression will stop. No more water carts. It is certain that processing will continue.

At what point will DPIE require a shutdown trigger order for on-site works including processing on the basis of water shortage?

Rex Plummer of Rylstone, NSW (Submission No. SE-42117034)

A water-challenged mine will be less able to spray the roads and undertake dust-mitigation activities, causing more dust movement - this will especially be the case during dry times and droughts when dust is at its worst

(Name Withheld) of Nullo Mountain, NSW (Submission No. SE-40673254)

Response

A priority in planning the integrated water management and supply strategy for the Project was ensuring that sufficient water would be available for dust suppression. As noted above, the Project has a secure and reliable water source that includes requirements for on-site management. Table 1 identifies that dust suppression activities can be maintained, even during periods of low rainfall, with 99.5% supply reliability.

Representative Comment(s)

Further, Bowdens attempt to "get by" by recovering and recycling more water from the tailings dam and leachate dam are very likely to increase the health impacts on the local community and environment. Recovery of this water will clearly reduce the water levels in each dam, exposing more toxic elements in the soil (lead/cadmium/cyanide) to wind events, which will spread these compounds further afield.

John Smidmore of Avalon Beach, NSW (Submission No. SE-40439493)

The recovery of more water from the tailings dam for mining operations is unsound as it will cause the water level in the tailings dam to lowered (sic) *and exposing toxic soil containing lead, cadmium and cyanide that could lead to exposure to residents, livestock and valuable grazing land on windy days.*

Ronald Spithill of Camboon, NSW (Submission No. SE-40604793)

If the Tailings moisture level is decreased, the potential for dust off the tailings dam will increase. There are no plans for management of tailings dust. What will prevent contaminate TSF dust from blowing directly over Lue during normal NW winds. How will the tailings dam remain moist to prevent dust?

Tom Combes of Lue, NSW (Submission No. SE-40602001)

Response

The recovery and recycling of mine-affected water optimises water re-use and reduces the Project's reliance on external water resources. Whilst this approach increases the efficiency of water recovery from the TSF and the leachate management dam, it would not result in the complete removal of water from either structure. The paste thickener would increase water recovery from tailings prior to deposition in the TSF and therefore deposited tailings would still contain moisture. Similar to the previously proposed tailings deposition, any exposed tailings beach would remain partially wetted via interstitial pore water within the deposited tailings.

Dust generation from the TSF was previously assessed for the EIS via an updated Air Quality Assessment (Ramboll, 2021) and the Updated Human Health Risk Assessment (enRiskS, 2021). These assessments concluded the Project would not result in impacts deleterious to human health nor would there be exceedances of impact assessment criteria at any receivers (Project-related or private) for metal dust concentrations, respirable crystalline silica or hydrogen cyanide. Both of these assessments were subject to peer review by independent consultants commissioned by Bowdens Silver and the Updated Health Risk Assessment has been subject to an addition peer review commissioned by DPE.

Representative Comment(s)

Application of a chemical to haul roads and other dust generating surfaces such as the TSF surface simply means another poisonous contaminant joins the silicates and sulphides which join the breathable airstream as PM 10 and PM 2.5. There is no way that this won't happen because the loads of high pressure tyre and steel machinery track will pulverise the entire surfaces.

Rex Plummer of Rylstone, NSW (Submission No. SE-42117034)

Response

The application of chemical-based suppressants / sealants is a standard practice used in the mining, road construction and other construction industries either for application at the point of material crushing or applied in water carts to haul roads. The suppressants are biodegradable and would not result in a 'poisonous contaminant" entering the air.

6.11 Assessment and Reporting

Representative Comment(s)

The surface water assessment has failed to properly consider the dry periods, such as experienced in 2018-2019. These years saw insufficient water for the existing industries, little only the vast volume required by a Lead & Silver mine.

(Name Withheld) of Olinda, NSW (Submission No. SE-40682931)

Response

The assessment prepared by WRM (2022) utilised a daily rainfall and evaporation dataset for the Mine Site covering the period from January 1889 to December 2018 (130 years). As noted in section 5.2, this data was obtained from SILO for the point located at latitude 32.60 degrees S and longitude 149.85 degrees E, which is located 1.6 km north of the Mine Site. This long-term, reliable dataset includes historical periods where rainfall was lower than, or similar to 2019 conditions. An update to the water balance modelling has been presented in Section 3.2.1 that utilises data that covers the period from January 1889 to December 2021.

Whilst it is recognised that 2019 rainfall data was not included originally, the SILO dataset included periods of very low rainfall which informed the assessment of the Project's water supply reliability and potential impacts on the downstream environment (e.g. Lawsons Creek streamflow). The rainfall comparisons presented in Sections 5.3.1 and 5.3.2 clearly demonstrate that, even without 2019 data, the SILO data applied at the time the EIS was submitted accurately represents local conditions. Nonetheless, the marginal change to water balance outcomes with the inclusion of more recent data indicates that the conclusions of WRM (2022) were representative of the range of conditions expected at the Mine Site and is not materially affected by the exclusion of 2019 data.

Representative Comment(s)

Bowdens have submitted one view. They have not submitted much of a sensitivity analysis or differing views on consequences if this single report is wrong or actual circumstances are worse than forecast.

Robert Bleach of Breakfast Creek, NSW (Submission No. SE-40661030)

Response

The *Water Supply Amendment Report* describes and summarises the outcomes of WRM (2022) and Jacobs (2022) that were provided in full and placed on public exhibition.

The modelling undertaken to support the assessments of both WRM (2022) and Jacobs (2022) was the subject of a range of sensitivity testing, as described in:

- Section 5.7 of WRM (2022) presenting the sensitivity analysis undertaken on the site water balance model;
- Section 7.11 of WRM (2022) presenting the sensitivity analysis undertaken on the final void water balance model;
- Section 5.2 of Annexure 9 of Jacobs (2022) presenting the sensitivity analysis undertaken on the steady-state calibration groundwater model; and
- Section 7 of Annexure 9 of Jacobs (2022) presenting the uncertainty analysis undertaken on the calibrated, transient predictive groundwater model.

Representative Comment(s)

Furthermore, the Department of Planning should rigorously audit the accuracy of the underlying assumptions and conclusions of the Bowdens report, assess how realistic they are in the actual circumstances of the area and in particular fully take into account worst case scenarios of drought that are becoming more the norm.

Robert Bleach of Breakfast Creek, NSW (Submission No. SE-40661030)

Response

Each of the assessments undertaken for the Project is presented with sufficient detail available for readers including officers within the NSW Government to understand and assess the assumptions made and the conclusions draw in the assessment. Where further technical review is required a peer review is commissioned. Bowdens Silver has commissioned its own peer reviews of the assessments to ensure the assessment processes have been robust and outcomes are defensible. These reviews were also intended to provide the community with certainty regarding the process and outcomes. Peer reviews have been commissioned to review the procedures and outcomes relating to air quality, noise, human health risks, groundwater, surface water and the economic assessment. Each of the reviews supported the outcomes of assessment and in some cases made recommendations to strengthen the assessment and outcomes.

Further to this, where DPE or other agencies consider it is necessary, independent peer reviews may be commissioned to consider the assessments in further detail.

Representative Comment(s)

Bowdens original EIS, when water was going to be piped from elsewhere, had a table showing impact of the mine on downstream catchments. Despite this significant amendment of now sourcing all water on site, there has been no change to this table. One does not have to be an expert to realise this is plain incorrect and very misleading.

(Name Withheld) of Clandulla, NSW (Submission No. SE-40641160)

Response

This submission is assumed to be in reference to Table 8.1 of WRM (2022) and the corresponding table in the *Surface Water Assessment* prepared by WRM and presented with the EIS as Volume 2 Part 6 of the SCSC (WRM, 2020). This table presents the predicted maximum and post-closure impact of the Project on mean annual streamflow downstream of the Mine Site. Table 8.1 of WRM (2022) presents different values for baseflow reduction and total flow change from those provided by WRM (2020).

The use of on-site sources for Project-related water supply would not require an increase to the Mine Site water management system catchment area. As there is no increase to the mining catchment, there is no further reduction in streamflow downstream of the Mine Site. Hence, the identical catchment area and streamflow values in both tables.

However, groundwater abstraction from advanced dewatering (production) bores would result in a minor increase to the predicted reduction in baseflow (groundwater contribution to streamflow). This baseflow reduction, coupled with the loss of flow contribution from the mining catchment, would result in the total change due the Project life. During operations, the maximum loss to mean annual streamflow downstream would be:

- 88.9 megalitres per year (ML/year) in Hawkins Creek, representing 4.5% of total pre-mining streamflow (1,958ML/year). A 2.7ML/year change from the value presented in Table 8.1 of WRM (2020); and
- 189.3 ML/year in Lawsons Creek, representing 2.2% of total pre-mining streamflow (7,136ML/year). Representing a 1.0ML/year change from Table 8.1 of WRM (2020).

Hence, it is not correct that Table 8.1 was not updated.

Whilst, the Project would rely on Mine Site water sources to meet operational and dust suppression demand, the negligible change to streamflow reduction is the result of the additional measures introduced to Mine Site water management. These measures reduce processing water demand by 390ML/year and optimise the recovery, recycling and management of water within the Mine Site such that impacts to other water users (surface and groundwater) remain negligible.

Representative Comment(s)

The solids content of the tailings has increased from 56% to 63%. This 12.5% relative increase in solids content is significant. The impacts of this proposed change do not appear to have been assessed by the proponent. There is no updated information provided regarding the materials handling characteristics, the tailings beach slope predictions, beach slope design or tailings emplacement methodology for the paste thickened tailings.

Michael White of Manobalai, NSW (Submission No. SE-40580643)

Response

As noted in Section 3.2.2 of the *Water Supply Amendment Report*, the tailings slurry would be transferred via pipeline from the processing plant to the paste thickener plant with the high solids content tailings “paste” then transferred to the tailing storage facility via pumps and a pipeline.

ATC Williams, who were engaged to inform preliminary design of the TSF, were involved in planning the integrated water management and supply strategy and were comfortable that the strategy would be satisfied. Therefore, the preliminary design of the TSF remains consistent with that described and presented in the EIS with the additional mitigation retained as described in the *Submissions Report* for the EIS. This notwithstanding, following an approval of the Project, the detailed design of the TSF would commence. This would consider in greater detail the various design components to ensure that the TSF meets all design guidance as required by Dams Safety NSW and the Australian National Committee on Large Dams. Whilst this process is not expected to substantially change the preliminary design it will result in more refined management outcomes.

6.12 Social Impacts

Representative Comment(s)

Although Bowdens may have water licences to do so, they have no physical proof that water is there and no social licence to take it either.

Social Licence is important in this issue because it represents the community's opinion and acceptance. Is this plan worthy? Is this plan possible? Modelling may well provide possible outcomes however experience is significantly more reliable. It is crucial that local knowledge is represented in this decision.

Social License to operate Bowdens Mine is made up of three components: legitimacy, Credibility and Trust.

- *Legitimacy: this is the extent to which an individual or organisation plays by the 'rules of the game'. That is, the norms of the community, be they legal, social, cultural, formal or informal in nature.*
- *Credibility: this is the individual or company's capacity to provide true and clear information to the community and fulfil any commitments made.*
- *Trust: this is the willingness to be vulnerable to the actions of another. It is a very high quality of relationship and takes time and effort to create.*

Tom Combes of Lue, NSW (Submission No. SE-40602001)

Response

Water balance modelling and regional groundwater modelling are the best available tools to provide certainty of water supply and assess the possible implications of the development of the Project on the environmental and social setting in which it is located. The technical assessments undertaken by WRM (2022) and Jacobs (2022) were informed by modelling calibrated to local conditions using data collected in the local environment. In this way, locally available and contemporary data was used to predict future outcomes.

Bowdens Silver understands that ongoing and transparent consultation with all stakeholders is vital in gaining and maintaining a social licence to operate the Project. Since it became involved in the Project in June 2016, Bowdens Silver feels it has demonstrated that it is an engaged and supportive part of the Lue and district community, together with the surrounding communities

centred on Mudgee, Rylstone and Kandos. Acknowledgement of Bowdens Silver's engagement and support is evidenced by the substantial number of positive submissions received for the Project from community members in these areas. This strong community support is also clearly demonstrated in the research outcomes of the *Social Impact Assessment* (Umwelt, 2020). Bowdens Silver's backing of the local community has included financial and other support for local groups and their initiatives. Community support has enabled a wide range of community events, sporting clubs, community groups and importantly education projects and initiatives to occur and indeed, continue to exist in sometimes difficult circumstances. Bowdens Silver has committed to maintain and expand its Community Investment Program with the involvement of the local community. Bowdens Silver has also encouraged and enabled the involvement of Bowdens Silver personnel in activities that support the surrounding community. These personnel live locally and contribute to the regional economy.

These elements are key components of the Company's ongoing commitment to obtain and maintain its social licence to operate the Project. Feedback provided to Bowdens Silver has demonstrated that without this support, many local events, organisations and events would not occur. This approach to involvement in the community demonstrates the credibility of the Company and their legitimate place in the community, prior to receiving approval for the Project.

Regardless of this, there are those in the community that remain concerned about the implications of the Project's development and mistrust the assessment and approvals process. The Water Supply Amendment to the Project that places reliance on on-site water supply seems illogical to some local community members with a lived experience of the recent prolonged drought. In these circumstances, it is hard to trust modelling when the actual experience was extremely difficult.

Bowdens Silver has focused considerable effort in planning and justifying its water supply strategy. Translating predictions of modelling to the certainty of practice is something that will take time and consistent demonstration that outcomes align with predictions. By continuing to meet the expectations and commitments made to the community Bowdens Silver will continue to build trust with its neighbours and those that currently oppose the Project. With this approach, Bowdens Silver is confident that it will earn and maintain its social licence as operator of the Project.

At this stage, Bowdens Silver is confident that the assessments presented justify approval of the Project and it accepts that in the current circumstances acceptance of the Project may not be a pre-condition to approval but would be developed over time.

Representative Comment(s)

.....it might be legal but is it moral to take this water from a sustainable community with impending water demands that climate change will no doubt throw up?

Sonia Christie of Monivae, NSW (Submission No. SE-40604856)

Water is a precious commodity for the local community and should not be used in this way for mining purposes.

Roxene Quinn of Mudgee, NSW (Submission No. SE-40611055)

Response

The aim of ecologically sustainable development is to recognise the environmental and social outcomes of development that must be considered if the economic benefits are to be realised in the short and long term. The focus is therefore on the sustainability of society between and across generations and the preservation of ecosystem services.

In relation to the availability of water resources for other users, both WRM (2022) and Jacobs (2022) concluded the Project would result in negligible change to the current surface and groundwater settings. This was an important requirement in planning for the integrated water management and supply strategy, that the use of on-site water sources would not be at the expense of local water users. These impacts would not expand over the long term or result in a direct cost to future generations.

Representative Comment(s)

LAG requests that the Social Impact Assessment be updated with interviews with those individuals and landowners who have unregistered groundwater bores and or take water for domestic and stock use from Lawsons Creek, as is their riparian right, and who have properties that will be impacted by reduced and or contaminated water supply.

Lue Action Group of Lue, NSW (Submission No. SE-40692948)

Response

It is acknowledged that the *Water Supply Amendment Report* did not explicitly discuss the social impacts that may result from the removal of an external water supply that was to support on-site water sources and its replacement with reliance solely on on-site water supply sources. The submissions that express concerns regarding the possible outcomes of reduced water supply for local water users, be they relying on water for agricultural production, the natural environment or for the supply of water for household use, identify these concerns exist in the community.

An objective in planning the integrated water management and supply strategy was that the use of on-site water sources would not be at the expense of local water users. This has been clearly demonstrated in the updated groundwater and surface water assessments prepared by Jacobs (2022) and WRM (2022), respectively. Therefore, from a technical perspective, the impacts to other water users are predicted to be consistent with those predicted in the EIS. This has been done by carefully planning water sources, the management of water resources within the Mine Site and taking measures to reduce total water demand.

It should also be noted that the removal of the water supply pipeline from the corridor has beneficial social and environmental outcomes through reduced land disturbance, which benefits the biodiversity outcomes of the Project, reduced amenity impacts during construction and maintenance, the removal of the requirements for a water treatment plant and removing to need to reach agreements with landowners to place an easement over their property.

When considering the beneficial outcomes of the amendment and the assessed environmental outcomes, it is considered that the overall social outcomes of the amendment are positive. This does not negate the concerns and anxiety felt in the community, especially those that rely on water locally and have experienced prolonged periods of reduced water availability. It is hoped that Bowdens Silver's commitment to continue to engage and participate locally would permit positive relationships with neighbours to be developed over time and reach a level of mutual respect and trust.

7 Response to Submissions – Other Matters

7.1 Introduction

The following subsections present responses to matters raised in submissions that were not related to the water supply for the Project and have not previously been identified in submissions on the Project and responded to elsewhere.

7.2 500kV Power Transmission Line

Comment

Section 2.4 of the first amendment report indicates there would be 15 additional light vehicles associated with the relocation of the powerline. Section 2.6 of the report states that 30 additional personnel would be employed by the contractor undertaking the works.

Please clarify whether the 15 vehicles include the transport of the 30 personnel employed by the contractor.

Department of Planning and Environment (Request for Information)

Response

Bowdens Silver can confirm that the 15 vehicles include the transport of the 30 personnel employed by the contractor.

It is noted that the information presented in Section 2.4 and Section 2.6 of the Amendment Report for the re-alignment of the 500kV power transmission line was included in the EIS as follows.

- Section 2.12.1 refers to the employment of 30 personnel for the 6 to 8 month powerline construction period.
- Section A5.2 of Appendix 5 of the EIS presents the projected equipment that would be utilised for site establishment and construction with Table A5.2 presenting the list of equipment required for various tasks including the construction and dismantling of the 500kV power transmission line. This includes an allowance for 15 daily trips (30 movements) for 4WD or Light Vehicles for personnel or delivery of tools.

In addition, Section 5.18.9 of the *Submissions Report* presents a clarification on the outcomes for the Year 3 operational scenario with the inclusion of six laden heavy vehicles (12 movements) and 15 light vehicles (30 movements) to account for road traffic noise generated during the construction and dismantling of the power transmission line.

The employment of 30 persons and use of 15 4WD/Light Vehicles has been included in Mine planning. Given that contractors are likely to be specialists and contracted by a single company it is likely that they will be accommodated together in the region. Therefore, it has been assumed that personnel would either travel together or in some cases make use of bus transport made available by Bowdens Silver.

Representative Comment(s)

Yet another concern is the relocation of the powerline. Moving the line a mere 100 metres from the original proposed route does not address any of the objections made previously. The power line will still have an enormous impact on the visual amenity of the region which is a major tourist destination. Bowdens' statement that only four landholders are affected is simply wrong.

Running Stream Water Users Association
of Running Stream, NSW (Submission No. SE-40655700)

Richard Lamb and Associates (Mr Lamb) was engaged by Bowdens to carry out an updated visual impact assessment and as he has only indicated that 3 homes will have a reduced impact this is not a significant reduction in the visual impacts experienced by Lue. LAG invites Mr Lamb to conduct a Visual Impact Assessment from every house in Lue rather than a select few that he has predetermined will have little or no view of the mine site. LAG believes that it is not unreasonable to request that Bowdens instruct Mr Lamb to specifically assess the impacts from all properties from the Havilah Gap to Monivae Hill including Property 94 and Property 83, both of which will have their views substantially diminished.

Lue Action Group of Lue, NSW (Submission No. SE-40692948)

Response

As noted in Section 4.7 of the *Amendment Submissions Report*, it has never been disputed that the re-aligned 500kV power transmission line would be visible from private properties or that the existing views of the infrastructure from local roads and private residences would change and some towers would become more visually apparent. The alignment of the 500kV power transmission line proposed in the *Amendment Submissions Report* provides for improved visual amenity outcomes compared to that presented in the EIS and *Amendment Report*. The *Response to Submission from Lue Action Group on Visual Impacts prepared by Richard Lamb and Associates* (RLA, 2022) that accompanied the *Water Supply Amendment Report* assessed this change and provided a detailed assessment at the four closest privately-owned properties. There was no statement that these properties would be the only ones impacted. Views of the re-aligned 500kV power transmission line and towers may be possible within Lue, however, these would be largely screened by existing vegetation and infrastructure. It is also acknowledged that there may be views of the 500kV power transmission line from public vantage points and from some places on private properties, however these views are considered in keeping with the local setting that features power supply infrastructure. RLA (2022) assessed views in terms of the character and quality of the visual landscape and not simply whether it might be seen. It was concluded that the 500kV power transmission line is part of the current setting and that power lines are a common feature in rural landscapes. The assessment concluded that the character and quality of the visual landscape would not change significantly.

It is not necessary to assess views of the Mine Site or associated infrastructure from every viewpoint or private residence. However, Bowdens Silver produced a 3D interactive model of the Mine Site that included the 500kV power transmission line alignment proposed in the EIS

and *Amendment Report*. RLA (2022) considered views of the 500kV power transmission line and from this assessment developed an understanding of the most likely impacted views, which were used as the basis for assessing the visual impacts associated with the re-aligned 500kV power transmission line.

7.3 Project Planning / Planning Matters

Representative Comment(s)

This latest proposal, and the fact that significant changes have been proposed at this late stage, raise further questions around the company's integrity and competence.

Maureen Boller of Lue, NSW (Submission No. SE-40060469)

Response

Water supply sources and reliability are a crucial component of the Project. Since public exhibition of the EIS, Bowdens Silver has investigated measures to reduce water demand and optimise the recovery, recycling, storage and re-use of water. Concurrent with these investigations has been the ongoing assessment of groundwater as an alternate water source.

Bowdens Silver's objective has always been to design a viable Project incorporating all practical, feasible and cost-effective measures to maintain, to the greatest extent, the existing environmental and social amenity of the area. Consequently, the Project design has evolved over time with an emphasis placed on simplifying and improving the Project's design along with reducing its environmental impacts.

As a result, Bowdens Silver has developed a Project that relies solely on water sources within the Mine Site and, apart from the relocated Maloneys Road, does not result in additional surface disturbance beyond its boundaries.

Representative Comment(s)

Accordingly, given the propensity of NSW Planning to support and approve such projects I urge that a change be made to the approval making Bowdens pay upfront sufficient dollars of Escrow to cover the full cost of eventual mine rehabilitation. There are too many examples of such mines flipping ownership near the end of productive life to companies that then default leaving the State to fix it and/or the community to suffer the blight of the stranded assets, piles, holes, roads and tailings dams. There are too many such examples to list here.

(Name Withheld) of Soldiers Point, NSW (Submission No. SE-40140531)

Response

As noted in Section 5.22.20 of the *Submissions Report*, Bowdens Silver would be providing a substantial security to the Resources Regulator to cover rehabilitation costs in the unanticipated event that Bowdens Silver defaults on its rehabilitation commitments. Whilst the EIS nominated a proposed security of approximately $39.4 million, the actual quantum of the security would be established prior to the commencement of on-site disturbance consistent with the approved project components. The initial security paid would relate to a nominated period of the Project life, such as 3 years. The quantum would be reviewed and approved by DPE with the security progressively increased throughout the Project life as the area of disturbance and rehabilitation works required increases.

Finally, Bowdens Silver has committed to document planning and rehabilitation achievements throughout the Project life in annual reporting to inform all Government agencies and the local community about on-site rehabilitation progress.

Representative Comment(s)

I object to the whole process of an amendment being added even before the Department has released an assessment report. This should have formed part of the original submission and been properly considered in the EIS. The original EIS was highly flawed and we see a continuation of poor environmental assessment with this amendment.

Fiona Sim of Running Stream, NSW (Submission No. SE-40572740)

This is far from an amendment, but rather a completely different application and as such requires much greater attention. Using the amendment process lacks transparency and rigor.

(Name Withheld) of Olinda, NSW (Submission No. SE-40682295)

Response

As identified in Section 4.3 of the *Amendment Submissions Report*, Clause 55AA of the *Environmental Planning and Regulation 2000* (now Clause 37 of the *Environmental Planning and Regulation 2021*) explicitly permits the amendment of State significant development applications prior to determination. This provides applicants with the opportunity to amend development applications to improve environmental and planning outcomes without the need to repeat the EIS process. Bowdens Silver has clearly identified which aspects of the Project are being amended and have updated the 'Project Description' to provide a detailed description of the Project, as currently proposed.

It is appreciated that some community members have found the planning and approvals process difficult to follow in places. However, Bowdens Silver rejects the notion that the amendment process lacks transparency and rigor. A number of comprehensive technical assessments were undertaken during preparation of the *Water Supply Amendment Report*, including the following.

- An *Updated Surface Water Assessment*, prepared by WRM Water and Environment Pty Ltd.
- An *Updated Groundwater Assessment*, prepared by Jacobs Group (Australia) Pty Ltd.
- An *Updated Biodiversity Assessment Report* by EnviroKey Pty Ltd.
- An updated *Biodiversity Offset Strategy* prepared by Niche Environment and Heritage.
- The *Bowdens Silver Mine Existing TransGrid 500kV Transmission Line – Realignment Option Study* prepared by GHD Pty Ltd.
- The *Response to Submission from Lue Action Group on Visual Impacts* prepared by Richard Lamb and Associates (RLA).

It is reiterated that Bowdens Silver has continued to consult with community members on changes to the Project and provided recorded presentations summarising the changes on its website. In addition, Bowdens Silver has an open-door policy to community engagement and encourages any community members with queries to contact the Company's Community Liaison Officer.

7.4 Sewage Management

Representative Comment(s)

Lastly I also have an issue with the plan to 'implement and maintain pump-out sewage management system by a licensed contractor'. Mudgee Sewage Treatment Plant can accommodate a maximum load of 20kl of septic/pan waste per day. With regular deliveries already taking place from Moolarben and Ulan exceeding 10kl per day on many occasions during the week and domestic rural waste accounting for a substantially large portion of the remaining 10kl, I am concerned as to the viability of this option. Are Dubbo Council going to allow for that additional load on their network on the days Mudgee is already at capacity?

Development in Mudgee is already escalating at an alarming rate and the pressure on the current Sewage Treatment Plant that it is not yet 10 years old and has already experienced failure due to excessive loads is a huge concern. As rate payers with septic systems residents of rural villages within the MWRC LGA should have priority when it comes to accessing these resources.

The approval of large scale developments such as this project puts additional pressure on a system that is already under significant pressure. And the contributions offered to council by Bowden's would not come close to compensating for the costs associated with the impact on roads and sewer alone.

Meredith Mitchell of Lue, NSW (email submission)

Response

As a MWRC ratepayer, Bowdens Silver recognises the financial implications for regional communities in providing appropriate infrastructure to meet current and future demand without adding to existing ratepayer costs. As noted in EIS Section 2.14.5, the Project would only rely on a pump-out system during the Site Establishment and Construction stage of the Project. MWRC maintains sewage treatment plants at Mudgee, Gulgong, Kandos and Rylstone, each of which could accept pumped out sewage from the Project. Bowdens Silver has consulted with Council on this matter and notes that MWRC is constantly reviewing and considering its requirements to manage the growing permanent and visitor population in the region. This includes capacity for sewage management. The current arrangements for sewage removal from the property is undertaken by a contractor. Waste is currently removed to the sewage treatment plant at Mudgee, however may be taken to other sites within the LGA (Gulgong, Kandos or Rylstone). However, in its general operations, the contractor also removes waste to Lithgow, Orange or Cowra where this type of waste is accepted without application or to Dubbo, where prior application is required. The contractor also has their own treatment facilities to process waste with a capacity of 20,000 tonnes per annum, if this is needed.

During the 18-month Site Establishment and Construction stage, Bowdens Silver would construct an on-site sewage management system for managing sewage from up to 150 persons daily during operations. This system would thus remove the Project's direct demand on MWRC wastewater treatment infrastructure capacity or that of any other council. During the operational period it is proposed to construct and operate an appropriately sized sewage management system within the footprint of the processing plant, capable of managing sewage from up to 150 persons per day. Waste from this facility would be managed on site with water irrigated within a management area or used on site for the processing of mineral ore material.

It is therefore considered that sewage generated by the Project would be appropriately managed over the life of the Project.

7.5 Miscellaneous

Representative Comment(s)

If, as the proponent asserts, there is NO risk to health from lead at the project, then to show good faith to the community the proponent must be compelled to carry out comprehensive baseline testing before approval is granted or any work commences.

Mick Boller of Lue, NSW (Submission No. SE-40510578)

Response

Prior to commencement of operations, Bowdens Silver would offer free testing to any member of the local community to ascertain existing blood lead levels. This has been a long-term commitment of Bowdens Silver that has been conveyed to the community and this submitter previously.

Representative Comment(s)

The mine will provide minimal benefit to the community or the State of NSW but the detrimental impact and cost on future generations will continue for centuries.

Tom Combes of Lue, NSW (Submission No. SE-40602001)

Response

Section 6.1.3.4 of the EIS provides discussion regarding social equity including inter-generational equity (between generations) and intra-generational equity (within a generation). In summary, the Project would be consistent with the principles of intra-generational equity as the economic benefits would be experienced throughout Australia, NSW, and within the local community including Lue, Rylstone, Kandos and Mudgee, as well as for individuals employed within the Mine Site. The significant economic benefits to the Mid-Western Regional LGA, NSW and nationally through the payment of taxes, royalties and wages would also provide funding for the development of local infrastructure and services that would be a direct benefit to future generations and thereby be consistent with inter-generation equity. The residual environmental impacts of the Project are predicted not to be prolonged such that they may represent an unacceptable cost to future generations and certainly not for centuries to come.

As outlined in Sections 1.3 and 2.2, measures such as the Community Investment Program would maximise the local distribution of benefits. Individual landowners have also been consulted on predicted outcomes and where appropriate, offered compensation or contingency measures in the event of unacceptable changes to their environment. The residual environmental impacts of the Project are predicted not to be prolonged such that they may represent an unacceptable cost to future generations.

It is to be noted that the Mid-Western Regional LGA has strong reliance on the mining of coal. The coal mining provides significant employment and considerable other local benefits. Coal mining is by far the largest contributor to the economic wellbeing in the region. However, with substantial changes primarily in relation to GHG emissions, coal mining locally and in the State is forecast to decline over time. The opportunity for the region and State to diversify into other business areas and in particular in metalliferous mining is a NSW Government priority. Although the Project would not be considered a full replacement of the local coal mining industry, it would provide considerable local benefits. Further exploration success is likely to lead to longevity of the Project and local metalliferous mining.

The NSW Government has developed a Critical Minerals and High-Tech Strategy[14]. The Project will fall under this Strategy given silver is a metal that is used in many technologies and primarily in electronics including those related to the reduction of GHG emissions. These technologies include photovoltaic cell (solar power), electric vehicles (EV's) and other technologies that contribute to a de-carbonising society. Zinc has also recently been added to the Critical Mineral and High-Tech Strategy list of priority minerals. This Strategy and the development of the Project will be benefits to future generations and are consistent inter-generation equity.

Representative Comment(s)

In the Hawkins – Rumker case the "The Department concludes that there is considerable uncertainty as to whether a future mine in the Hawkins and Rumker areas would be viable, noting the marginal economics of potential mine plans for the area, key transport constraints to mining, significant community opposition to any new coal mine development and the rapidly changing coal market. While any future mining would result in significant economic benefits to NSW, there appears to be little certainty that these benefits could be realised. This uncertainty is likely to prolong and exacerbate negative social impacts on the community, particularly to the 170 landowners in the two areas. On this basis, the Department considers there to be sufficient constraints that the Hawkins and Rumker areas should not be released for coal exploration."

Lue Action Group of Lue, NSW (Submission No. SE-40692948)

Response

Bowdens Silver rejects the comparisons with coal exploration in the Hawkins and Rumker areas for various reasons.

Firstly, the economics of the Bowdens Silver Project are not considered marginal. During the past decade, silver prices have averaged over US$21 per ounce. From May 2020, the silver price began rising steeply, peaking at over US$29 per ounce in February 2021. Pricing at the time of publication of the *Submissions Report* in June 2021 was approximately US$26 per ounce, placing it substantially above the level used in the Bowdens Feasibility Study. At the time of writing, the silver price was approximately US$21 per ounce consistent with a recent decline is precious metals pricing across the board. However, the price remains consistent with the long-term average pricing and the expectations of Bowdens Silver.

It is also important to note that mine development financing typically allows for the hedging of commodity pricing and the hedging of foreign currency exchange rates providing year-on-year stability in cashflows. Accordingly, the average cash cost of production (C1 costs) for the Project has been calculated to be approximately US$11 per ounce of silver over the Project life, demonstrating strong profit margins and project sustainability at current and forecasted silver prices.

Secondly, traffic and transportation are not considered significant constraints for the Project. Unlike bulk commodity operations such as coal mines and quarries, the ore concentrate that would be produced represents a low volume of material. During operations, it is expected that the Project would generate approximately 10 heavy vehicle (truck) movements and 16 bus movements per day on Lue Road west of Lue.

[14] See https://www.nsw.gov.au/criticalminerals

Finally, it is not reasonable to compare the community support and likely realisation of benefits from an unknown coal mine with the Project. It is well established that community opposition towards coal projects is entrenched across NSW. Formal targets have also now been established by each Australian state and territory to reach net zero greenhouse gas emissions by 2050, which impacts the marginal benefits of coal mining operations. It is emphasised that the Project is not related to coal exploration or coal mining in any capacity. Furthermore, approximately 79% of all submissions received regarding the EIS expressed support for the Project, further demonstrating that the community opposition towards the Project is not comparable to that experienced towards coal projects.

Representative Comment(s)

A concerning theory that is shared by many in the community, is that the water supply pipeline was never an economically viable option for the Bowdens Project. They never had intentions to be ecologically sustainable.

Tom Combes of Lue, NSW (Submission No. SE-40602001)

Such a large volume of water to run the mine is now supposedly coming from on-site storage and re-use as well as groundwater. if this is feasible why did Bowdens say so in the beginning.

(Name Withheld) of Soldiers Point, NSW (Submission No. SE-40140531)

Response

A comprehensive review of alternatives to using a water supply pipeline that were considered during planning for the Project is presented in Section 1.5.7 of the EIS. With regards to the amendments, several alternative options were considered in investigating water use optimisation and alternative water sources. These include the following.

- Water production bores in targeted locations on Bowdens Silver-owned land and neighbouring properties.
- Alternative locations and sizing for dams within the Mine Site including harvestable rights dams.
- Alternative design features within the TSF that would allow water to be removed and returned to the processing circuit.
- Alternative external sources of water that might connect to the Project via an alternative water supply pipeline.
- Substantial increase to the water storage dam capacity.
- Delay the Project while securing the necessary commercial negotiations regarding water supply via the water supply pipeline.

Each of these options were considered and eliminated with preference for the proposed integrated water management and supply strategy on the basis of water use efficiency, environmental impacts (water and other impacts such as native vegetation disturbance), rehabilitation implications and costs, cost efficiency and timing.

The implication that Bowdens Silver has no intention to operate an ecologically sustainable Project is not correct. It is to be emphasised that while both principles are paramount to the success of the Project and have been considered at every stage or Project development, ecological sustainability and economic viability are two very different issues. A comprehensive evaluation of the Project against the principles of ecologically sustainable development in accordance with Clause 7(1f) of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* is presented in Section 6.1.3 of the EIS. Importantly, the outcomes of this evaluation have not changed in response to amendments to the Project, namely, that the Project is considered to be consistent with the principles of ecologically sustainable development, would satisfy all relevant planning considerations and would achieve the objectives of the Project.

8 Evaluation of Merits

This section provides an update to the evaluation of the merits of the Project in light of the submissions received relating to the *Water Supply Amendment Report* and matters identified in any additional assessment or change to the statutory context for the Project. The Project has previously been comprehensively evaluated in Section 6 of the EIS, Section 7 of the *Submissions Report*, Section 7 of the *Amendment Report* and Section 7 of the *Water Supply Amendment Report*. It is not intended to repeat all of the matters raised in those documents and it is noted that this section does not necessarily replicate or supersede the evaluation of merits presented previously.

8.1 Amendments and Refinements to the Project

The amendment to the Project that was presented in the *Water Supply Amendment Report* demonstrated that the Project may rely upon on-site water supply sources to support water use requirements principally for processing and dust suppression. Consequently, the water supply pipeline has been removed from the Project. This has resulted in a simplified Project with reduced scale in terms of physical disturbance but also in terms of the landowners engaged in the process including in relation to the experience of construction-related impacts for the water supply pipeline. The complexity of arrangement for easements, water treatment, construction and management would now be avoided.

New Harvestable Rights Orders for NSW have necessitated a minor change to the integrated water management and supply strategy, however this has not materially changed the Project or altered environmental assessment outcomes. In fact, an update to the site water balance modelling has further supported the water supply reliability of the integrated water management and supply strategy.

A new alignment for the 500kV power transmission line has been proposed with a lower overall visual impact. While individual changes to the views towards the Mine Site would change, it is concluded that the proposed re-alignment to the 500kV power transmission line would not significantly change the character and quality of the visual landscape in the village of Lue.

8.2 Updated Justification of The Project

8.2.1 Health Considerations

The outcomes of the updated HHRA remain consistent with those originally presented previously, that is, the Project presents no health risk issues for the local community.

8.2.2 Biophysical Considerations

The biophysical outcomes of the removal of the water supply pipeline relate principally to the following changes as a result of the Water Supply Amendment.

- The water supply pipeline would not be constructed and therefore an area of 54.66ha that would have been disturbed for the water pipeline construction and use would not be required.
- The water supply pipeline included a requirement to clear habitat located within the Mudgee-Wollar key breeding area for the Regent Honeyeater and direct impacts to Ausfeld's Wattle (Acacia ausfeldii), which is listed as a vulnerable threatened species in NSW. Both of these impacts would be avoided.
- The integrated water management and supply strategy would reliably supply Project-related water demand throughout the Project life, including under low rainfall conditions.
- Throughout the Project life there would be no need to discharge water from the containment zone. That is, all water captured in the containment zone (i.e. tailings storage facility and leachate management dam) can be retained within the Mine Site.
- Overall, the Project would result in negligible reductions in flow and availability of water to downstream users.

The water supply reliability of the Project has been secured under these conditions through a strategy that focuses on the following.

- Reducing water demand by applying a higher rate of water recycling within the processing circuit.
- Managing water stored in the TSF and other water management infrastructure to reduce the water surface's exposure to evaporation.
- Separating clean water captured within the Mine Site as much as possible from water in containment zones so there is always sufficient water for dust suppression.
- Prioritising water sources to ensure that operational requirements and the function of containment dams is not compromised at any time.

All other biophysical impacts of the Project, as amended, would remain in the same as those previously presented.

8.2.3 Social and Economic Considerations

Feedback received regarding the water supply amendment has highlighted the concern in the community regarding water supply for the Mine Site and the possibility that this impinges on local water supply reliability. This is understandable given the recently experienced drought in the region and relative complexity of the integrated water management and supply strategy when compared to a water supply pipeline. Bowdens Silver has aimed to ensure that the reliance on

water sources within the Mine Site (surface water and groundwater) should not significantly impact local water users. Hence the focus on water management for the operation and development of a strategy to achieve water supply reliability with only minimal changes to predicted water-related impacts.

The concerns regarding water supply reliability are closely aligned to the general concern regarding the proximity of the Mine Site to Lue and the possible impacts to individuals and the current social setting of the village. This matter was addressed in detail in Section 5.21 of the *Submission Report* for the Project. The concern of some residents within the Lue community regarding proximity to mining has been acknowledged from the commencement of investigations and planning for the Project. Many of the environmental assessments were undertaken principally to address these concerns including, but not limited to, the assessment of possible:

- noise levels and blasting impacts;
- air quality impacts including from particulates and metals in dust;
- changes to the groundwater setting and to water entering Lawsons Creek;
- human health risks;
- transportation and road safety risks; and
- visual amenity impacts.

Importantly for the Water Supply Amendment, the modelling of the integrated water management and supply strategy demonstrates that the Mine would operate with limited impacts on local water quality and availability in the short and long term.

Engagement for the social impact assessment for the Project focused on understanding the matters important to the community in Lue with mitigations such as the Community Investment Program and Planning Agreement providing for the local distribution of benefits. Ensuring there are local benefits from the Project has been an important objective for Bowdens Silver and is already evident in its involvement in the communities of Lue, Rylstone, Kandos and Mudgee. The majority of the Company's existing 23 personnel reside in the region or within a short distance of the Mine.

8.3 The Public Interest

The assessment of the potential environmental impacts of the Project concludes that although there would be impacts experienced in the local setting, these would satisfy all relevant NSW guidelines and policies. Environmental risks would be subject to active management and mitigation over the life of the Project and when considered from both a stand-alone and cumulative impact perspective are concluded to be acceptable. With regards the Water Supply Amendment, detailed assessment of the Mine's proposed integrated water management and supply strategy has demonstrated that water use for the Mine would not have a significant impact on local water supply quality or reliability, even during times of drought.

While the social setting of Lue would change with an approval of the Project, and these changes may not be welcomed by some in the community, it is believed that the changes would bring benefits to the community that would contribute to the long-term sustainability of Lue. These include the benefits of employment opportunities, population growth, economic growth and

opportunities for training and education. Detailed assessment of risks to the community from the implementation of the integrated water management and supply strategy has concluded that the Project would not impact the ongoing local use of water that currently supports lives and livelihoods.

When considered on balance, the predicted outcomes of the Project are considered to be justified and would be in the public interest.

9 References

Baguley S. (2022). *Independent Review of the Surface Water Assessment* prepared on behalf of the Lue Action Group.

Environment Risk Sciences Pty Ltd (EnRisks) (2021). *Updated Human Health Risk Assessment*. Prepared on behalf of Bowdens Silver Pty Limited.

Landskape Natural and Cultural Heritage Management (2020). *Aboriginal and Historic Heritage Assessment*. Presented as Part 13 of the *Specialist Consultant Studies Compendium*. Prepared on behalf of Bowdens Silver Pty Limited

Jacobs Group (Australia) Pty Limited (2022). *Updated Groundwater Assessment*, presented as Appendix 4 of the *Water Supply Amendment Report*. Prepared on behalf of Bowdens Silver Pty Limited.

Ramboll Australia Pty Ltd (2021). *Updated Air Quality Assessment*. Presented as Appendix 6 of the *Submissions Report*. Prepared on behalf of Bowdens Silver Pty Limited

Richard Lamb and Associates (RLA) (2022). *Response to Submission from Lue Action Group on Visual Impacts.* Presented as Appendix 8 of the *Water Supply Amendment Report*. Prepared on behalf of Bowdens Silver Pty Limited.

R.W. Corkery & Co. Pty Limited (RWC) (2020). *Environmental Impact Statement*. May 2020 Prepared on behalf of Bowdens Silver Pty Limited.

WRM Water and Environment Pty Ltd (WRM) (2020). *Surface Water Assessment*. Presented as Part 6 of the *Specialist Consultant Studies Compendium*. Prepared on behalf of Bowdens Silver Pty Limited

WRM Water and Environment Pty Ltd (WRM) (2022). *Updated Surface Water Assessment.* Presented as Appendix 3 of the *Water Supply Amendment Report*. Prepared on behalf of Bowdens Silver Pty Limited

Umwelt (Australia) Pty Ltd (2020). *Social Impact Assessment*. Presented as Part 16 of the *Specialist Consultant Studies Compendium*. Prepared on behalf of Bowdens Silver Pty Limited

Appendices

Appendix 1

Register of Submitters

(Total No. of pages including blank pages = 10)

Table A1-1
Organisations Opposing the Project

Submission ID	Organisation Name	Suburb	State	Postcode	Matters not relating to the Water Supply Amendment	Miscellaneous	Project Planning / Planning Matters	Social Impacts	Water - Aboriginal Heritage	Water - Availability to Users	Water - Groundwater	Water - Lawsons Creek	Water - Licensing	Water – Management Strategy	Water - Rainfall	Water – Supply Security
Section Reference(s)					**4, 7**	**7.5**	**7.3**	**6.12**	**6.6**	**6.2**	**6.5**	**6.2**	**6.8**	**6.9**	**5.3**	**6.4**
Total - Organisations Opposing the Project					**1**	**1**	**1**	**1**	**1**	**5**	**1**	**3**	**2**	**2**	**2**	**3**
SE-40066074	Wellington Valley Wiradjuri Aboriginal Corporation	Orange	NSW	2800					X	X		X				
SE-40256526	Mossy Rock Alpacas	Monivae	NSW	2850						X						
SE-40386153	Denise Corderoy	Kandos	NSW	2848												
SE-40655700	Running Stream Water Users Association	Running Stream	NSW	2850	X					X					X	X
SE-40666803	ACN 059 643 533 Pty Ltd	Lue	NSW	2850												X
SE-40668478	Ferntree Gully Reserve	Olinda	NSW	2849								X		X		
SE-40668487	Inland Rivers Network	Wollar	NSW	2850			X			X						
SE-40669457	Ferntree Gully Reserve	Olinda	NSW	2850												
SE-40672767	Murong Gialinga Aboriginal & Torres Strait Islander Corporation	Mudgee	NSW	2850						X						
SE-40692948	Lue Action Group	Lue	NSW	2850		X		X			X	X	X	X	X	X

Table A1-2
Individuals Opposing the Project

Submission ID	First Name	Last Name	Suburb	State	Postcode	Matters not relating to the Water Supply Amendment	Miscellaneous	Project Planning / Planning Matters	Social Impact	Water – Agriculture	Water – Availability to Users	Water – Groundwater	Water – Harvestable Rights	Water – Lawsons Creek	Water – Licensing	Water – Management Strategy	Water - Miscellaneous	Water – Rainfall	Water – Supply Security
Section Reference(s)						**4, 7**	**7.5**	**7.3**	**6.12**	**6.3**	**6.2**	**6.5**	**5.3.7, 6.8**	**6.2**	**6.8**	**6.9**	**6**	**5.3.1**	**6.4**
Total - Individuals Opposing the Project						**10**	**1**	**7**	**-**	**1**	**16**	**3**	**-**	**12**	**6**	**7**	**1**	**5**	**9**
SE-39783822	Withheld	Withheld	Camboon	NSW	2849	X													
SE-39812727	Withheld	Withheld	Monivae	NSW	2850	X													
SE-39971272	Caroline	Mills	Glenmorgan	QLD	4423	X													
SE-40055254	Christine	Cooney	Sydney	NSW	2000	X				X									
SE-40060469	Maureen	Boller	Lue	NSW	2850	X					X								
SE-40062459	Suzana	Chandler	Lue	NSW	2850														X
SE-40076621	Withheld	Withheld	Mount Knowles	NSW	2850						X								
SE-40080860	Withheld	Withheld	Monivae	NSW	2850						X								
SE-40082089	Mark	Coe	Monivae	NSW	2850	X													
SE-40140531	Withheld	Withheld	Soldiers Point	NSW	2317			X											X
SE-40167114	Withheld	Withheld	Lue	NSW	2850						X			X		X			
SE-40176010	Hamish	Christie	Rylstone	NSW	2849	X													
SE-40268536	David	Chandler	Lue	NSW	2850						X								X
SE-40333502	Paul	Evans	Lue	NSW	2850							X		X					
SE-40392989	Luke	Poissant	Huntleys Cove	NSW	2111			X			X			X	X	X		X	
SE-40430712	Paul	Poissant	Huntleys Cove	NSW	2111			X			X			X	X	X		X	
SE-40430726	Tina	White	Huntleys Cove	NSW	2111			X			X			X	X	X		X	
SE-40431717	Withheld	Withheld	Beaconsfield Upper	VIC	3808									X					
SE-40438886	Withheld	Withheld	Condobolin	NSW	2877						X								X
SE-40439493	John	Smidmore	Avalon Beach	NSW	2107			X			X			X	X	X		X	
SE-40440222	Withheld	Withheld	Mount Knowles	NSW	2850	X													
SE-40441311	Harry	White	Mudgee	NSW	2850						X			X					
SE-40442767	Withheld	Withheld	Monivae	NSW	2850	X													
SE-40443225	Kerry	Ferroni	Mount Evelyn	VIC	3796									X					
SE-40447776	Withheld	Withheld	Paddington	NSW	2021						X			X	X				X
SE-40483341	Withheld	Withheld	Dulwich Hill	NSW	2203											X			
SE-40487493	Withheld	Withheld	Queanbeyan West	NSW	2620									X					X
SE-40510578	Mick	Boller	Pyangle	NSW	2849		X	X			X	X					X		X
SE-40525538	Katrina	Benoitin	Emerald	QLD	4720						X								
SE-40547625	Saskia	Van Schie	Freshwater	NSW	2096						X	X							X
SE-40570384	Haydn	Washington	Rylstone	NSW	2849	X													
SE-40570404	Withheld	Withheld	Beacon Hill	NSW	2100			X			X			X	X	X		X	
SE-40572388	Lisa	Matthews	Ilford	NSW	2850														X

Table A1-2 (Cont'd)
Individuals Opposing the Project

Submission ID	First Name	Last Name	Suburb	State	Postcode	Matters not relating to the Water Supply Amendment	Miscellaneous	Project Planning / Planning Matters	Social Impact	Water – Agriculture	Water – Availability to Users	Water – Groundwater	Water – Harvestable Rights	Water – Lawsons Creek	Water – Licensing	Water – Management Strategy	Water - Miscellaneous	Water – Rainfall	Water – Supply Security
Section Reference(s)						**4, 7**	**7.5**	**7.3**	**6.12**	**6.3**	**6.2**	**6.5**	**5.3.7, 6.8**	**6.2**	**6.8**	**6.9**	**6**	**5.3.1**	**6.4**
Total - Individuals Opposing the Project						**11**	**1**	**4**	**1**	**2**	**15**	**2**	**1**	**10**	**2**	**4**	**-**	**2**	**8**
SE-40572740	Fiona	Sim	Running Stream	QLD	42857			X										X	X
SE-40572744	Derek	Finter	Mudgee	NSW	2850						X								
SE-40576535	Melissa	Tym	Bombira	NSW	2850									X	X				X
SE-40580643	Michael	White	Manobalai	NSW	2333											X			X
SE-40580676	Withheld	Withheld	Havilah	NSW	2850	X						X							
SE-40587811	Withheld	Withheld	Mudgee	NSW	2850						X								
SE-40588578	Barbara	Beard	Springwood	NSW	2777	X													
SE-40590284	David	White	Edgecliff	NSW	2027	X													
SE-40590968	Withheld	Withheld	Lue	NSW	2850						X			X					
SE-40592215	Sabina	White	Paddington	NSW	2021	X													
SE-40594403	William	Brown	Breakfast Creek	NSW	2849						X			X					X
SE-40600654	Withheld	Withheld	Lue	NSW	2850						X								
SE-40602001	Tom	Combes	Lue	NSW	2850		X		X	X	X		X			X			X
SE-40602043	Withheld	Withheld	Lue	NSW	2850	X													
SE-40602204	Elizabeth	Van Reece	Nabiac	NSW	2312	X													
SE-40602296	Withheld	Withheld	Olinda	NSW	2849			X			X								X
SE-40603454	Carolyn	Barlow	Rylstone	NSW	2849						X					X		X	
SE-40603879	Hilary	Crawford	Rylstone	NSW	2849	X													
SE-40603889	Marcus	Cremonese	Rylstone	NSW	2849	X													
SE-40604045	Gerald	Norton-Knight	Eurunderee	NSW	2850									X					
SE-40604070	Alan	Dale	Lue	NSW	2850						X								
SE-40604119	Rosalyn	Bray	Lue	NSW	2850	X													
SE-40604793	Ronald	Spithill	Camboon	NSW	2849									X		X			
SE-40604839	Withheld	Withheld	Camboon	NSW	2849	X													
SE-40604856	Sonia	Christie	Monivae	NSW	2850			X			X	X							
SE-40606977	Withheld	Withheld	Lue	NSW	2850			X			X			X					X
SE-40606983	Katie	Christie	Queanbeyan West	NSW	2620									X					
SE-40607035	Judy	Dale	Lue	NSW	2850						X			X					
SE-40611055	Roxene	Quinn	Mudgee	NSW	2850						X								
SE-40630521	Susan	Hellyer	Dudley	NSW	2290					X									
SE-40632460	Withheld	Withheld	Stony Creek	NSW	2850						X			X					
SE-40637760	Anne	Mort	Collingwood	VIC	3066						X			X	X				X
SE-40641143	Carolyn	Barlow	Rylstone	NSW	2849	X													

Table A1-2 (Cont'd)
Individuals Opposing the Project

Submission ID	First Name	Last Name	Suburb	State	Postcode	Matters not relating to the Water Supply Amendment	Miscellaneous	Project Planning / Planning Matters	Social Impact	Water – Agriculture	Water – Availability to Users	Water – Groundwater	Water – Harvestable Rights	Water – Lawsons Creek	Water – Licensing	Water – Management Strategy	Water - Miscellaneous	Water – Rainfall	Water – Supply Security
Section Reference(s)						**4, 7**	**7.5**	**7.3**	**6.12**	**6.3**	**6.2**	**6.5**	**5.3.7, 6.8**	**6.2**	**6.8**	**6.9**	**6**	**5.3.1**	**6.4**
Total - Individuals Opposing the Project						**10**	**-**	**3**	**1**	**1**	**14**	**2**	**-**	**6**	**4**	**5**	**-**	**4**	**8**
SE-40641160	Withheld	Withheld	Clandulla	NSW	2848						X							X	X
SE-40642004	Bruce	Christie	Monivae	NSW	2850						X					X		X	
SE-40643911	Withheld	Withheld	Clandulla	NSW	2848	X													
SE-40643952	Carolyn	Barlow	Rylstone	NSW	2849	X													
SE-40645199	Lyn	Coombe	Lue	NSW	2850						X			X	X				
SE-40645262	Carolyn	Barlow	Rylstone	NSW	2849	X													
SE-40646068	Elodie	Delwaide	Lue	NSW	2850						X								
SE-40647085	Luciana	Smink	Breakfast Creek	NSW	2849			X										X	X
SE-40647464	Charles	Combes	Lue	NSW	2850						X			X					
SE-40654958	Withheld	Withheld	Clandulla	NSW	2848	X													
SE-40654997	Roberta	White	Mudgee	NSW	2850									X	X				
SE-40655223	Withheld	Withheld	Lue	NSW	2850						X			X	X	X			X
SE-40657545	Withheld	Withheld	Lue	NSW	2850							X				X			
SE-40660549	Margot	White	Wybong	NSW	2333														X
SE-40660660	Withheld	Withheld	Gracetown	WA	6284														X
SE-40661030	Robert	Bleach	Breakfast Creek	NSW	2849											X			
SE-40664997	Withheld	Withheld	Havilah	NSW	2850						X								
SE-40665426	Jane	Roberts	Bombira	NSW	2850					X	X			X					
SE-40666020	Withheld	Withheld	Huntleys Cove	NSW	2111			X											
SE-40666105	Withheld	Withheld	Olinda	NSW	2849						X								
SE-40666584	Catriona	Fraser	Hay South	NSW	2711	X													
SE-40666721	Withheld	Withheld	Rylstone	NSW	2849	X													
SE-40669063	Withheld	Withheld	Olinda	NSW	2849	X													
SE-40670065	Withheld	Withheld	Lue	NSW	2850						X			X					
SE-40670303	Karen	Macdonald	Cottesloe	WA	6011														X
SE-40670742	Sarah	Inglis	Havilah	NSW	2850						X				X	X		X	X
SE-40671307	Chris	Pavich	Mudgee	NSW	2850	X													
SE-40671423	Chris	Pavich	Mudgee	NSW	2850	X													
SE-40671528	John	Lydiard	Lue	NSW	2850						X	X							X
SE-40671551	Susannah	White	Mudgee	NSW	2850				X		X								
SE-40671876	Withheld	Withheld	St Ives	NSW	2075	X													
SE-40671942	Withheld	Withheld	Breakfast Creek	NSW	2849						X								
SE-40671999	Withheld	Withheld	Olinda	NSW	2849			X											

Table A1-2 (Cont'd)
Individuals Opposing the Project

Submission ID	First Name	Last Name	Suburb	State	Postcode	Matters not relating to the Water Supply Amendment	Miscellaneous	Project Planning / Planning Matters	Social Impact	Water – Agriculture	Water – Availability to Users	Water – Groundwater	Water – Harvestable Rights	Water – Lawsons Creek	Water – Licensing	Water – Management Strategy	Water - Miscellaneous	Water – Rainfall	Water – Supply Security
Section Reference(s)						**4, 7**	**7.5**	**7.3**	**6.12**	**6.3**	**6.2**	**6.5**	**5.3.7, 6.8**	**6.2**	**6.8**	**6.9**	**6**	**5.3.1**	**6.4**
Total - Individuals Opposing the Project						**6**	**1**	**3**	**-**	**4**	**19**	**4**	**-**	**9**	**3**	**4**	**-**	**4**	**13**
SE-40673028	Withheld	Withheld	Olinda	NSW	2849	X													
SE-40673254	Withheld	Withheld	Nullo Mountain	NSW	2849						X	X		X	X	X		X	X
SE-40673491	Jamie	Inglis	Havilah	NSW	2850									X					X
SE-40675486	English	Phillip	Monivae	NSW	2850					X	X	X		X		X			X
SE-40675637	Withheld	Withheld	Narrabri	NSW	2390						X								
SE-40675763	Chloe	Middleton	Ilford	NSW	2850	X												X	X
SE-40675773	Chris	Pavich	Mudgee	NSW	2850						X								
SE-40676731	Jamie	Inglis	Havilah	NSW	2850						X			X	X				X
SE-40678823	Withheld	Withheld	Rylstone	NSW	2849						X								
SE-40681138	Rick	Kilpatrick	Glen Davis	NSW	2846	X													
SE-40682295	Withheld	Withheld	Olinda	NSW	2849			X			X								
SE-40682318	Withheld	Withheld	Olinda	NSW	2849	X													
SE-40682906	Darren	Baguley	Nullo Mountain	NSW	2849									X				X	X
SE-40682916	Guy	Sim	Running Stream	NSW	2850					X	X			X					
SE-40682931	Withheld	Withheld	Olinda	NSW	2849						X							X	X
SE-40682943	Edwina	Templeton	Bondi Junction	NSW	2022	X													
SE-40683553	Margaret	Cameron	Lue	NSW	2850		X			X	X	X							
SE-40683718	Wendy	Griffits	Coal Point	NSW	2283	X													
SE-40684300	Julia	Imrie	Ulan	NSW	2850							X							X
SE-40684406	Janet	Walk	Camboon	NSW	2849						X								
SE-40685180	Withheld	Withheld	Olinda	NSW	2849											X			
SE-40685495	Withheld	Withheld	Lue	NSW	2850						X			X					
SE-40685561	Jack	White	Havilah	NSW	2850					X	X					X			
SE-40687034	Withheld	Withheld	Pymble	NSW	2073						X								X
SE-40691467	Withheld	Withheld	Mudgee	NSW	2850						X			X					X
SE-40692911	Heike	Schutze	Coxs Creek	NSW	2849														X
SE-40693389	Withheld	Withheld	Riverlea	NSW	2850						X								
SE-40694717	Withheld	Withheld	Olinda	NSW	2849			X			X								
SE-40967419	Kirk	Nicholson	Douglas Park	NSW	2569														X
SE-40974214	Robert	Onus	Moree	NSW	2400						X								
SE-40974221	John	Loneragan	Mudgee	NSW	2850			X											X
SE-40974774	Amanda	Kemp	Mudgee	NSW	2850										X				
SE-40974783	Glen & Alison	Barker	Bombira	NSW	2850						X			X					

Table A1-2 (Cont'd)
Individuals Opposing the Project

Submission ID	First Name	Last Name	Suburb	State	Postcode	Matters not relating to the Water Supply Amendment	Miscellaneous	Project Planning / Planning Matters	Social Impact	Water – Agriculture	Water – Availability to Users	Water – Groundwater	Water – Harvestable Rights	Water – Lawsons Creek	Water – Licensing	Water – Management Strategy	Water - Miscellaneous	Water – Rainfall	Water – Supply Security
Section Reference(s)						**4, 7**	**7.5**	**7.3**	**6.12**	**6.3**	**6.2**	**6.5**	**5.3.7, 6.8**	**6.2**	**6.8**	**6.9**	**6**	**5.3.1**	**6.4**
Total - Individuals Opposing the Project						**9**	**-**	**-**	**-**	**3**	**11**	**2**	**-**	**8**	**2**	**-**	**-**	**-**	**8**
SE-40974798	Withheld	Withheld	Woollahra	NSW	2025														X
SE-40974811	Tempe	Onos	Moree	NSW	2400														X
SE-40974853	Withheld	Withheld	-	NSW										X					X
SE-40974993	Richard	David Inglis	Havilah	NSW	2850						X								X
SE-40975004	Withheld	Withheld	Woollahra	NSW	2025	X													
SE-40975986	Julie	Loneragan	Mudgee	NSW	2850						X	X							
SE-40976711	Withheld	Withheld	Darling Point	NSW	2027														X
SE-40976743	Withheld	Withheld	Bellevue Hill	NSW	2023						X								
SE-40976764	Withheld	Withheld	Point Piper	NSW	2027														X
SE-40976766	Linda & Robert	Inglis Stuckey	Nullo Mountain	NSW	2849							X		X					
SE-40976773	Withheld	Withheld	Northbridge	NSW	2063						X								
SE-40976784	Phillip	Ridge	Goolma	NSW	2852						X			X	X				X
SE-40976800	Withheld	Withheld	Werombi	NSW	2570									X	X				
SE-40976809	Mary Jane	McKerihan	Paddington	NSW	2021	X													
SE-40979502	Withheld	Withheld	Burradoo	NSW	2576					X	X								
SE-40979554	Edgar	Downes	Brownlow Hill	NSW	2570									X					
SE-40979727	Lesley	Robertson	Mudgee	NSW	2850									X					
SE-40980218	Anto	White	Scone	NSW	2337					X				X					
SE-40980225	Nigel & Sabine	White	Cross Roads	NSW	2850	X													
SE-40982470	Angela	Perry	Hawthorn East	VIC	3122						X			X					
SE-42006482	Ian	Bridgefoot	Avoca Beach	NSW	2251	X													
SE-42064751	Withheld	Withheld	Sydney	NSW	2000	X													
SE-42064762	Withheld	Withheld	Monivae	NSW	2850					X									
SE-42064771	Withheld	Withheld	Granville	NSW	2142	X													
SE-42064774	Withheld	Withheld	Woodpark	NSW	2164	X													
SE-42064783	Withheld	Withheld	Castle Hill	NSW	2154						X								
SE-42064793	Withheld	Withheld	East Gosford	NSW	2250						X								
SE-42064795	Withheld	Withheld	Sydney	NSW	2000	X													
SE-42064822	Withheld	Withheld	Narellan Vale	NSW	2567						X								
SE-42064851	Withheld	Withheld	East Gosford	NSW	2250														X
SE-42064889	Withheld	Withheld	Denham Court	NSW	2565	X													
SE-42064891	Withheld	Withheld	Sydney	NSW	2000						X								

Table A1-2 (Cont'd)
Individuals Opposing the Project

Submission ID	First Name	Last Name	Suburb	State	Postcode	Matters not relating to the Water Supply Amendment	Miscellaneous	Project Planning / Planning Matters	Social Impact	Water – Agriculture	Water – Availability to Users	Water – Groundwater	Water – Harvestable Rights	Water – Lawsons Creek	Water – Licensing	Water – Management Strategy	Water - Miscellaneous	Water – Rainfall	Water – Supply Security
Section Reference(s)						**4, 7**	**7.5**	**7.3**	**6.12**	**6.3**	**6.2**	**6.5**	**5.3.7, 6.8**	**6.2**	**6.8**	**6.9**	**6**	**5.3.1**	**6.4**
Total - Individuals Opposing the Project						**18**	**-**	**-**	**-**	**-**	**14**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**
SE-42064901	Withheld	Withheld	Thornton	NSW	2322						X								
SE-42065566	Withheld	Withheld	Sydney	NSW	2000						X								
SE-42065850	Withheld	Withheld	Baulkham Hills	NSW	2153	X													
SE-42065859	Withheld	Withheld	Beresfield	NSW	2322						X								
SE-42065894	Withheld	Withheld	Cardiff Heights	NSW	2285						X								
SE-42065902	Withheld	Withheld	Glenmore Park	NSW	2745	X													
SE-42065914	Withheld	Withheld	Sydney	NSW	2000	X													
SE-42067723	Withheld	Withheld	Sydney	NSW	2000	X													
SE-42068370	Withheld	Withheld	Winston Hills	NSW	2153	X													
SE-42069342	Withheld	Withheld	Sydney	NSW	2000	X													
SE-42069344	Withheld	Withheld	Sydney	NSW	2000	X													
SE-42069415	Withheld	Withheld	NA	NSW	-						X								
SE-42069424	Withheld	Withheld	Winston Hills	NSW	2153	X													
SE-42069472	Withheld	Withheld	Orchard Hills	NSW	2748						X								
SE-42069485	Withheld	Withheld	Mudgee	NSW	2850						X								
SE-42069498	Withheld	Withheld	Sydney	NSW	2000	X													
SE-42069508	Withheld	Withheld	Denham Court	NSW	2565														X
SE-42069516	Withheld	Withheld	Beresfield	NSW	2322						X								
SE-42069574	Withheld	Withheld	Sydney	NSW	2000	X													
SE-42069957	Withheld	Withheld	Kellyville Ridge	NSW	2155						X								
SE-42069975	Withheld	Withheld	Sydney	NSW	2000	X													
SE-42072707	Withheld	Withheld	Vaucluse	NSW	2030						X								
SE-42072709	Withheld	Withheld	Stanmore	NSW	2048						X								
SE-42072723	Withheld	Withheld	Sydney	NSW	2000	X													
SE-42072725	Withheld	Withheld	Edensor Park	NSW	2176														X
SE-42072734	Withheld	Withheld	Box Hill	NSW	2765						X								
SE-42072744	Withheld	Withheld	Sydney	NSW	2000	X													
SE-42072962	Withheld	Withheld	Sydney	NSW	2000	X													
SE-42072972	Withheld	Withheld	Sydney	NSW	2000	X													
SE-42073016	Withheld	Withheld	Edensor Park	NSW	2176	X													
SE-42077412	Adam	Whalan	Denham Court	NSW	2565						X								
SE-42077422	Cheyne	Bailey	Penrith	NSW	2750						X								
SE-42078667	Abigail	Craik	Avoca Beach	NSW	2251	X													
SE-42078687	Carlie	Croese	Tarro	NSW	2322	X													

Table A1-2 (Cont'd)
Individuals Opposing the Project

Submission ID	First Name	Last Name	Suburb	State	Postcode	Matters not relating to the Water Supply Amendment	Miscellaneous	Project Planning / Planning Matters	Social Impact	Water – Agriculture	Water – Availability to Users	Water – Groundwater	Water – Harvestable Rights	Water – Lawsons Creek	Water – Licensing	Water – Management Strategy	Water - Miscellaneous	Water – Rainfall	Water – Supply Security
Section Reference(s)						**4, 7**	**7.5**	**7.3**	**6.12**	**6.3**	**6.2**	**6.5**	**5.3.7, 6.8**	**6.2**	**6.8**	**6.9**	**6**	**5.3.1**	**6.4**
Total - Individuals Opposing the Project						**17**	**-**	**-**	**-**	**-**	**15**	**-**	**-**	**2**	**-**	**1**	**-**	**-**	**-**
SE-42078691	Chloe	Parlett	Seven Hills	NSW	2147						X								
SE-42078954	Dan	Douglas	Cardiff	NSW	2285						X								
SE-42106018	Ellie	Watkins	Caringbah South	NSW	2229						X								
SE-42106028	Erie	Hood	Baulkham Hills	NSW	2153	X													
SE-42106037	Finn	Roby	Woronora	NSW	2232						X								
SE-42106048	Harry	James Hood	Baulkham Hills	NSW	2153	X													
SE-42106060	James	Bulloch	Frenchs Forest	NSW	2086						X			X					
SE-42106071	Jodie	Santarossa	Empire Bay	NSW	2257						X								
SE-42106457	Chris	Papas	NA	NSW	-						X								
SE-42106477	Darren	Rosewarne	Allambie Heights	NSW	2100						X								
SE-42106482	Ian	Bridgefoot	Avoca Beach	NSW	2251	X													
SE-42107217	Daniel	Leach	Blacktown	NSW	2148	X													
SE-42108730	Joe	Green	Umina Beach	NSW	2257	X													
SE-42108783	Maddison	Watkins	Caringbah South	NSW	2229									X					
SE-42108833	Pete	Craik	Avoca Beach	NSW	2251	X													
SE-42109712	Kate	Craik	Avoca Beach	NSW	2251						X								
SE-42109722	Kimberly	Bridgefoot	Avoca Beach	NSW	2251						X								
SE-42111557	Oliver	Craik	Avoca Beach	NSW	2251	X													
SE-42111569	Ollie	Pyle	Winmalee	NSW	2777	X													
SE-42112208	Luke	Watkins	Caringbah South	NSW	2229						X								
SE-42108882	Taj	Bateman	Kincumber	NSW	2251	X													
SE-42108927	Tiah	Santarossa	Empire Bay	NSW	2257	X													
SE-42108931	Tom	Craik	Avoca Beach	NSW	2251						X								
SE-42108933	Tully	Craik	Avoca Beach	NSW	2251	X													
SE-42108944	Yaden	Bateman	Kincumber	NSW	2251	X													
SE-42108948	Zandin	Bateman	Kincumber	NSW	2251	X													
SE-42111590	Rachel	Bateman	Kincumber	NSW	2251	X													
SE-42111603	Richard	Santarossa	Empire Bay	NSW	2257						X								
SE-42111642	Taylor	Bateman	Kincumber	NSW	2251	X													
SE-42112355	Riley	Purvie	NA	NSW	-						X								
SE-42115238	Rodney	Bake	Ruse	NSW	2560						X								
SE-42116981	Wayne	Croese	Tarro	NSW	2322	X													
SE-42117015	Claudia	Dreverman	Crows Nest	NSW	2065	X													
SE-42117034*	Rex	Plummer	Rylstone	NSW	2849	X										X			

* - It is noted that Submitter SE-42117034 provided a total of 19 separate letters in their submission. One letter raised issues regarding the water management strategy the subject of the amendment. The remaining letters raised issues that have been comprehensively addressed elsewhere. Section 4 and Section 7 of this report address matters raised previously or that have not been addressed elsewhere.

Table A1-3
Organisations and Individuals Supporting the Project

Submission ID	First Name	Last Name	Suburb	State	Postcode	General Support	Need for the Project	Economic Benefits	Employment Benefits
					Total - Supporting the Project	**8**	**17**	**20**	**20**
SE-40530952	Darren	Holden	Fremantle	WA	6160		X		
SE-40539267	Darren	Holden	Fremantle	WA	6160			X	
SE-40540797	Darren	Holden	Fremantle	WA	6160	X			
SE-40632491	Patrick	Morrissey	Lue	NSW	2850		X	X	X
SE-39672273	Withheld	Withheld	St Ives	NSW	2075	X			
SE-39706980	Withheld	Withheld	Figtree	NSW	2525		X	X	X
SE-39706992	Allan	Pryor	Figtree	NSW	2525		X	X	X
SE-39729226	Withheld	Withheld	Kudla	SA	5115	X		X	
SE-39729987	Withheld	Withheld	Kudla	SA	5115		X	X	
SE-39967125	Joaquim	Cardoso	Yangebup	WA	6164			X	X
SE-39972185	Doreen	Shelley	Rylstone	NSW	2849		X	X	X
SE-39972324	Michelle	Cardoso	Yangebup	WA	6164			X	X
SE-39992014	Peter	Shelley	Rylstone	NSW	2849	X		X	X
SE-40009752	Leonard	Leary	Oakville	NSW	2765	X		X	X
SE-40516111	Withheld	Withheld	Camboon	NSW	2849		X		X
SE-40526568	Liam	Robinson	Lue	NSW	2850			X	X
SE-40530873	Darren	Holden	Fremantle	WA	6160		X		X
SE-40536048	David	Biggs	Leura	NSW	2780		X		
SE-40583261	Aaron	Gleeson	Kandos	NSW	2848			X	X
SE-40583459	Joel	Leonard	Cudgegong	NSW	2850				X
SE-40598040	Mathew	Gouldstone	Mudgee	NSW	2850	X	X		
SE-40600202	Christina	Granger	Wembley	WA	6014		X		X
SE-40600742	Withheld	Withheld	Mudgee	NSW	2850	X			
SE-40601725	Sophia	Louison	Mudgee	NSW	2850			X	X
SE-40602273	Anthony	McClure	Lue	NSW	2850		X		X
SE-40602284	Lucy	Stuart	Mudgee	NSW	2850		X	X	
SE-40610962	Simon	Parmiter	Mudgee	NSW	2850			X	X
SE-40631736	Matthew	Butterworth	Grattai	NSW	2850		X	X	X
SE-40641290	Withheld	Withheld	Mudgee	NSW	2850		X	X	X
SE-40647764	Withheld	Withheld	Mudgee	NSW	2850		X	X	
SE-40668944	Anna	Yeates	Mudgee	NSW	2850			X	
SE-40669512	Thomas	Purcell	Mudgee	NSW	2850		X		X
SE-40685505	Withheld	Withheld	Mudgee	NSW	2850	X			

Appendix 2

Review of Harvestable Rights

(Total No. of pages including blank pages = 11)

Memorandum

Date	6 October 2022	Pages	10
Attention	Paul Ryall		
Company	R W Corkery and Co		
Job No.	1356-07-D3		
Subject	Bowdens Silver Water Balance Impact of May 2022 amendment to Harvestable Rights Order on water supply reliability		

Dear Paul,

In February 2022 WRM prepared an Updated Surface Water Assessment supporting the Water Supply Amendment Report for the Bowdens Silver Project.

During assessment of the Project, DPE requested information on the implications of a recent amendment to the Harvestable Rights Order for the project water supply. The request is outlined below:

> *In May 2022 the Harvestable Rights Orders were amended with a provision that disallows water to be moved from harvestable rights dams to excluded works or other dams in the landholding. Please provide consideration of the implications of this amendment to the project, noting that Bowdens Silver was proposing to transfer water between water storages.*

This memo outlines the results of additional water balance modelling to assess the change to the site water balance with the system modified to comply with the above amendment.

Modifications to the water balance model

During preparation of the surface water assessment, a site water balance model was developed for the Project using the GoldSim software. The site water balance model was modified for this assessment as follows:

- the water management system was modified to remove the 130 ML Clean Turkeys Nest dam – which was planned as a collection point for water captured in the Harvestable Rights Dams around the project. In the revised system, water supplies would be either drawn directly from these dams (for dust suppression use) – or transferred to the process plant.
- the climate data was updated to include rainfall and evaporation estimates from the period after December 2018. The data was sourced from the SILO database (as per the original assessment).

Level 9, 135 Wickham Terrace, Spring Hill
PO Box 10703, Brisbane Adelaide St Qld 4000

Tel 07 3225 0200
wrmwater.com.au

ABN 96 107 404 544

Memorandum

Climate data changes

SILO regularly reviews and updates data processing methods and inputs. Since the generation of the Project's original dataset, there have been three material updates. These included two updates (8 July 2020 and 15 June 2022) that incorporated revised BoM data and one (25 September 2019) that addressed an interpolation error in rainfall data for the period 1 January 2017 to 24 September 2019. The resultant changes to the mean annual rainfall and evaporation are summarised in Table 1 below.

Table 1 Effect of SILO data updates on climate averages

	Original surface water assessment	September 2022	Increase
Average annual rainfall (mm)	672	699	4.0%
Average annual Morton's lake evaporation (mm)	1,347	1,320	-2.0%
Average annual Morton's wet ET (mm)	1,325	1,298	-2.0%
Average annual pan evaporation (mm)	1,517	1,412	-6.9%

Effect of climate data changes on modelled runoff

The increases in catchment runoff resulting from the changes to the climate data are summarised in Table 2 below.

Table 2 Effect of SILO data updates on average annual runoff (mm/a)

Scenario	Parameter	Dry Tailings Beach (TSF)	Natural/ Undisturbed	Roads/ Hardstand/ Pits	Waste Rock Emplacement	Rehabilitation	Lined
Low Runoff	Original runoff	210.8	15.9	156.2	14.8	14.8	275.5
	Updated runoff	228.0	19.9	171.1	18.7	18.7	294.7
	Change	8.2%	25.4%	9.5%	26.0%	26.0%	7.0%
Base Case	Original runoff	300.0	30.7	179.1	17.8	17.8	300.0
	Updated runoff	320.0	35.5	194.8	22.1	22.1	320.0
	Change	6.7%	15.7%	8.8%	24.0%	24.0%	6.7%
High Runoff	Original runoff	300.0	53.5	249.1	89.2	89.2	403.8
	Updated runoff	320.0	61.0	267.4	99.8	99.8	426.4
	Change	6.7%	14.0%	7.3%	11.8%	11.8%	5.6%

Results

The results of the revised modelling are summarised in the following pages – the key modelling outcomes presented in the Updated Surface Water Assessment are reproduced along with the revised versions of the following outputs:

- Table 5.5 Average Annual Site Water Balance – Years 1 to 14
- Table 5.8 Project volumetric water supply reliability
- Figure 5.3 Average Annual Main Water Source Inflows
- Figure 5.4 Modelled Open Cut Pit Water Inventory
- Figure 5.5 TSF Water Inventory
- Figure 5.6 TSF Water Levels
- Table 5.11 Average Annual Site Water Balance – Years 1 to 14 – Low Runoff Scenario
- Table 5.12 Average Annual Site Water Balance – Years 1 to 14 – High Runoff Scenario
- Table 5.13 Average Annual Site Water Balance – Years 1 to 14 – Low Groundwater Inflow Scenario

In summary – the average annual water balance shows that the change to the clean water harvesting system significantly reduces the portion of clean water runoff that can be harvested. However, this represents only a small component of total site water supply.

The latest update of the model climate data increased the average volume of runoff generated by the site catchments. As a result, the reliability of water supply is marginally higher under this revised assessment.

The increased runoff would lead to an increased likelihood of overflow from the sediment dams (especially under the high runoff scenario). For the purpose of this water balance model update, it was assumed that pump station and dam capacities would be increased during detailed design to avoid sediment dam overflows under historical climate conditions.

The increased wet-period runoff results in increased total volumes accumulating in the TSF and open cut pit. However, the additional runoff would be able to be accommodated in these storages without changes to their design capacities.

For and on behalf of

WRM Water & Environment Pty Ltd

Michael Batchelor

Director

Table 5.5a
Average Annual Site Water Balance – Years 1 to 14 – Updated Assessment

Item	Inflow ML/a	Outflow ML/a
Rainfall and runoff	856	
Net groundwater inflows to open cut pit	431	
Advanced dewatering	380	
Clean water harvesting	40	
Ore moisture	83	
Retained tailings moisture		1 142
Evaporation		448
Dust suppression demands supplied		131
Concentrate moisture		6*
Other plant losses		20
Dam overflows		0
Annual increase in stored volume		43*
Total	**1 789**	**1 789**

Table 5.5b
Average Annual Site Water Balance – Years 1 to 14 - Revised

Item	Inflow ML/a	Outflow ML/a
Rainfall and runoff	924	
Net groundwater inflows to open cut pit	431	
Advanced dewatering	380	
Clean water harvesting	27	
Ore moisture	83	
Retained tailings moisture		1 143
Evaporation		477
Dust suppression demands supplied		128
Concentrate moisture		6
Other plant losses		19
Dam overflows		0
Annual increase in stored volume		72
Total	**1 844**	**1 844**

Table 5.8a
Project volumetric water supply reliability - Amendment Report

Demand	Volumetric water supply reliability	
	Average	Lowest
Processing plant	99.4%	94.5%
Dust suppression	99.8%	99.5%

Table 5.8b
Project volumetric water supply reliability - Revised

Demand	Volumetric water supply reliability	
	Average	Lowest
Processing plant	99.6%	96.3%
Dust suppression	99.8%	99.5%

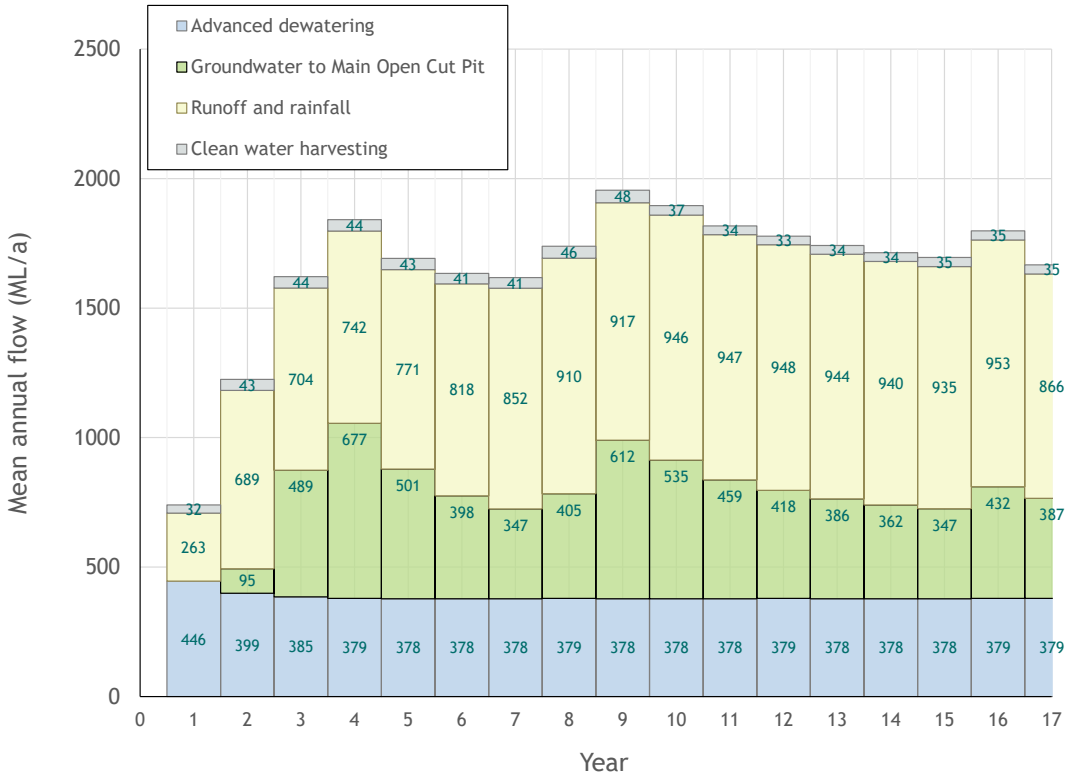


Figure 5.3a Average Annual Main Water Source Inflows - Amendment Report

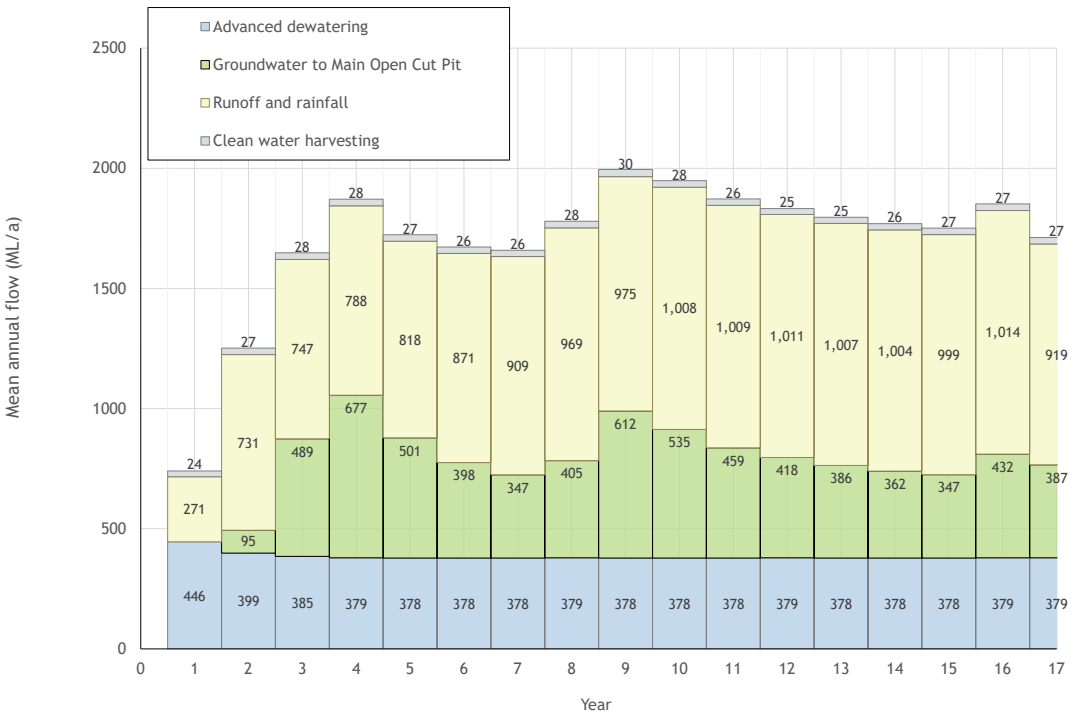
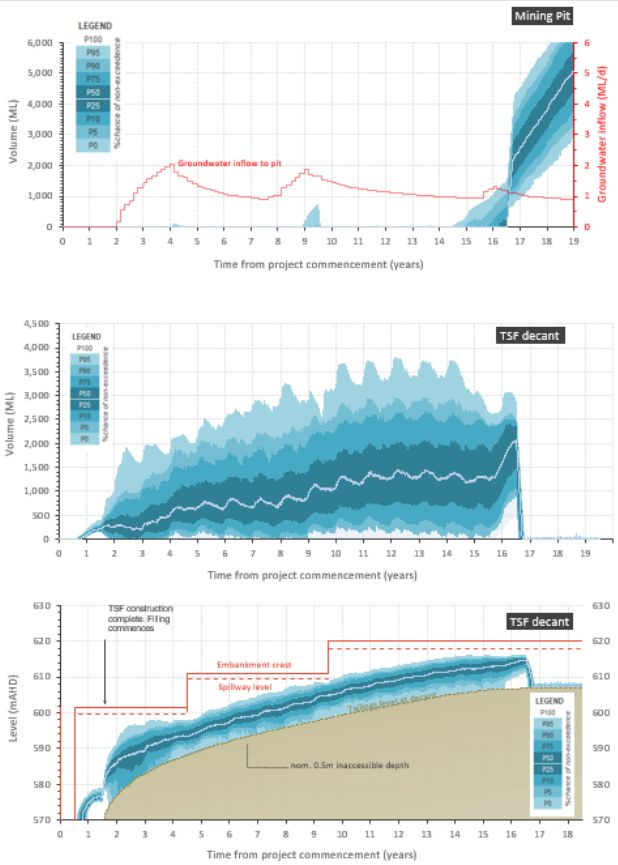
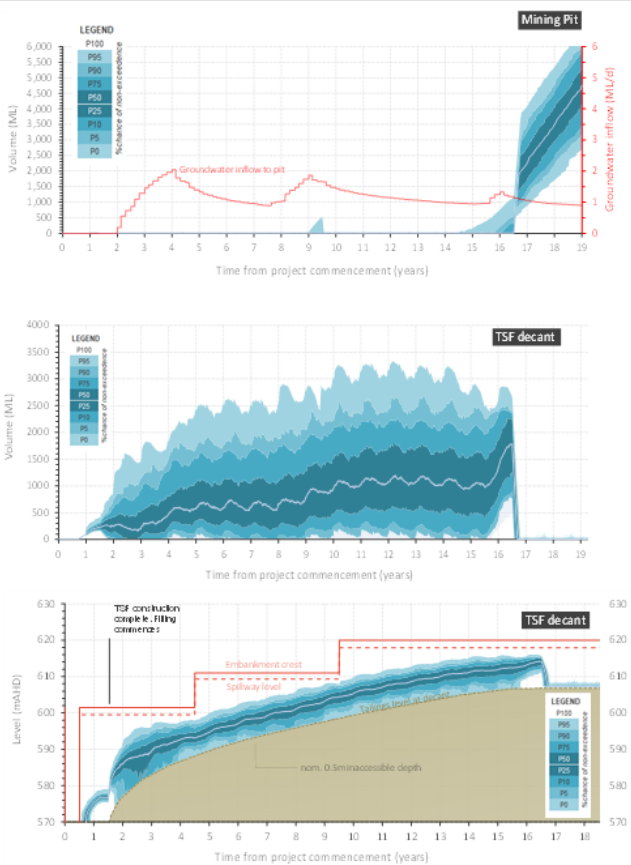


Figure 5.3b Average Annual Main Water Source Inflows - Revised





Revised (from top):

- **Open cut pit water inventory**
- **TSF water inventory**
- **TSF water levels**

Amendment Report (from top):

- **Open cut pit water inventory**
- **TSF water inventory**
- **TSF water levels**

Table 5.11a
Average Annual Site Water Balance – Years 1 to 14 – Low Runoff Scenario - Updated Assessment

Item	Inflow ML/a	Outflow ML/a
Rainfall and runoff	740	
Net groundwater inflows to open cut pit	431	
Advanced dewatering	380	
Clean water harvesting	22	
Ore moisture	82	
Retained tailings moisture		1 129*
Evaporation		356
Dust suppression demands supplied		131
Concentrate moisture		6*
Other plant losses		19
Dam overflows		0
Annual increase in stored volume		14*
Total	**1 655**	**1 655**

Table 5.11b
Average Annual Site Water Balance – Years 1 to 14 – Low Runoff Scenario - Revised

Item	Inflow ML/a	Outflow ML/a
Rainfall and runoff	804	
Net groundwater inflows to open cut pit	431	
Advanced dewatering	380	
Clean water harvesting	7	
Ore moisture	83	
Retained tailings moisture		1 139
Evaporation		374
Dust suppression demands supplied		128
Concentrate moisture		6
Other plant losses		19
Dam overflows		0
Annual increase in stored volume		39
Total	**1 705**	**1 705**

Table 5.12a
Average Annual Site Water Balance – Years 1 to 14 – High Runoff Scenario - Updated Assessment

Item	Inflow ML/a	Outflow ML/a
Rainfall and runoff	1 109	
Net groundwater inflows to open cut pit	431	
Advanced dewatering	380	
Clean water harvesting	58	
Ore moisture	83	
Retained tailings moisture		1 146
Evaporation		614
Dust suppression demands supplied		132
Concentrate moisture		6*
Other plant losses		20
Dam overflows		0
Annual increase in stored volume		143*
Total	**2 061**	**2 061**

Table 5.12b
Average Annual Site Water Balance – Years 1 to 14 – High Runoff Scenario - Revised

Item	Inflow ML/a	Outflow ML/a
Rainfall and runoff	1 183	
Net groundwater inflows to open cut pit	431	
Advanced dewatering	380	
Clean water harvesting	25	
Ore moisture	83	
Retained tailings moisture		1 147
Evaporation		619
Dust suppression demands supplied		128
Concentrate moisture		6
Other plant losses		20
Dam overflows*		**0***
Annual increase in stored volume		182
Total	**2 102**	**2 102**

Table 5.13a Average Annual Site Water Balance – Years 1 to 14 – Low Groundwater Inflow Scenario - Updated Assessment

Item	Inflow ML/a	Outflow ML/a
Rainfall and runoff	811	
Net groundwater inflows to open cut pit	215	
Advanced dewatering	190	
Clean water harvesting	40	
Ore moisture	71	
Retained tailings moisture[1]		979*
Evaporation		211
Dust suppression demands supplied		119
Concentrate moisture		5*
Other plant losses		18*
Dam overflows		0
Annual increase in stored volume		-4*
Total	**1 327**	**1 327**

[1]Note that limited water supply would constrain production by approximately 15% on average under this scenario

Table 5.13b Average Annual Site Water Balance – Years 1 to 14 – Low Groundwater Inflow Scenario - Revised

Item	Inflow ML/a	Outflow ML/a
Rainfall and runoff	873	
Net groundwater inflows to open cut pit	215	
Advanced dewatering	190	
Clean water harvesting	27	
Ore moisture	73	
Retained tailings moisture[1]		1 010
Evaporation		223
Dust suppression demands supplied		116
Concentrate moisture		5
Other plant losses		18
Dam overflows		0
Annual increase in stored volume		6
Total	**1 378**	**1 378**

[1]Note that limited water supply would constrain production by approximately 12% on average under this scenario

Appendix 3

GHG Emission Reductions Under Net Zero Pathways

(Total No. of pages including blank pages = 8)

Ground floor 20 Chandos Street
St Leonards NSW 2065
PO Box 21
St Leonards NSW 1590
02 9493 9500
www.emmconsulting.com.au

28 September 2022

Nick Warren
Principal Environmental Consultant
Bowdens Silver Project
C\- RW Corkery & Co
nick@rwcorkery.com

Re: GHG emission reductions under net zero pathways

Dear Nick,

1 Introduction

Bowdens Silver Pty Limited (Bowdens Silver) is proposing to develop and operate the Bowdens Silver Project (the Project), located approximately 26 km east of Mudgee and 2 km northeast of Lue in the Central Tablelands of NSW. The Project would extract and process approximately 2 million tonnes of ore[1] per year over an anticipated operational Project life of 15 years.

An Environmental Impact Statement (EIS) was prepared as part of the Development Application for the Project and submitted to the NSW Department of Planning and Environment (DPE) for assessment. The EIS included a greenhouse gas (GHG) assessment, which estimated annual and life-of-mine GHG emissions for the Project.

The GHG assessment estimated Scope 2[2] emissions for electricity consumption based on the emission intensity of the NSW grid as reported at the time. This historical emission intensity was applied to each future year of the Project. Bowdens Silver is seeking a review of how future changes in emission intensity of the electricity supply would contribute to a reduction in GHG emissions for the Project.

EMM Consulting Pty Ltd (EMM) has been commissioned to provide updated GHG emission estimates for three future scenarios:

1. decarbonising of the NSW electricity grid in line with NSW plan to reach net zero emission by 2050;
2. establishment of a solar farm to supply a proportion of the power demand of the Project; and

[1] Mineralised ore containing silver and small percentages of zinc and lead

[2] Scope 2 emissions occur from the generation of the electricity purchased and consumed by an organisation.

3. purchase of green energy for the Project to supplement the net zero decarbonisation.

2 Assumptions and approach

2.1 Net zero pathway

The revised GHG emission estimates are underpinned by the assumption that the NSW electricity grid will decarbonise to net zero by 2050. The pathway to net zero 2050 is presented in Figure 2.1 and derived as follows.

The historical emission intensity (kg CO_2-e/kWh) of the NSW electricity grid (1990-2020) is reported in DISER (2021) and plotted in Figure 2.1. The average annual decrease in emission intensity for 1990-2020 is modest (-1.2%). During this period, two coal fired power stations in NSW were closed; Wallerawang in 2013/2014 and Redbank in 2014.

The emission intensity of the NSW electricity grid is projected out to 2030 in DISER (2020). The average annual decrease in emission intensity for 2021-2030 increases to -4.6%. During this period, three coal fired power stations in NSW are scheduled to close; Liddell in 2023, Eraring in 2025 and Vales Point in 2029 (AEMO 2022), although the Eraring and Vales Point closures have been brought forward and therefore likely not accounted for in the DISER projections.

The emission intensity is extended out to 2050, initially following a linear trend based on the annual reduction required to get from 2030 emission intensity to net zero in 2050. Under this initial projection, the average annual decrease in emission intensity for 2030-2050 is -5%. The linear projection to net zero in 2050 is then adjusted for the closure of the remaining coal fired power stations (Bayswater in 2033 and Mt Piper in 2040). The adjustment applies an increased (step change) reduction for the years following a power station closure. The step change reduction assumes a nominal doubling of the annual emission reduction for the year immediately following the power station closure (-10%). For context, it is noted that, based on DISER (2020), a reduction in emission intensity of approximately 8% is projected for the years around the closure of the Liddell Power Station. The increased (step change) reduction is also applied for the Eraring and Vales Point closures, based on the assumptions that these closures were brought forward after the DISER projections.

Each of the power station closures are presented with the pathway to net zero in Figure 2.1. The power station closures are represented by the bars on the plot, showing the year of closure (on x-axis) and the proportion of total annual NSW GHG emissions that each power station contributes (or would be removed on closure) shown on the secondary y-axis.

It is noted that, for this assessment, a simplified assumption is applied that a net zero electricity grid is a zero-carbon grid. In reality this would not be the case, with some residual carbon in the grid (ie from gas generation) being offset to achieve net zero.

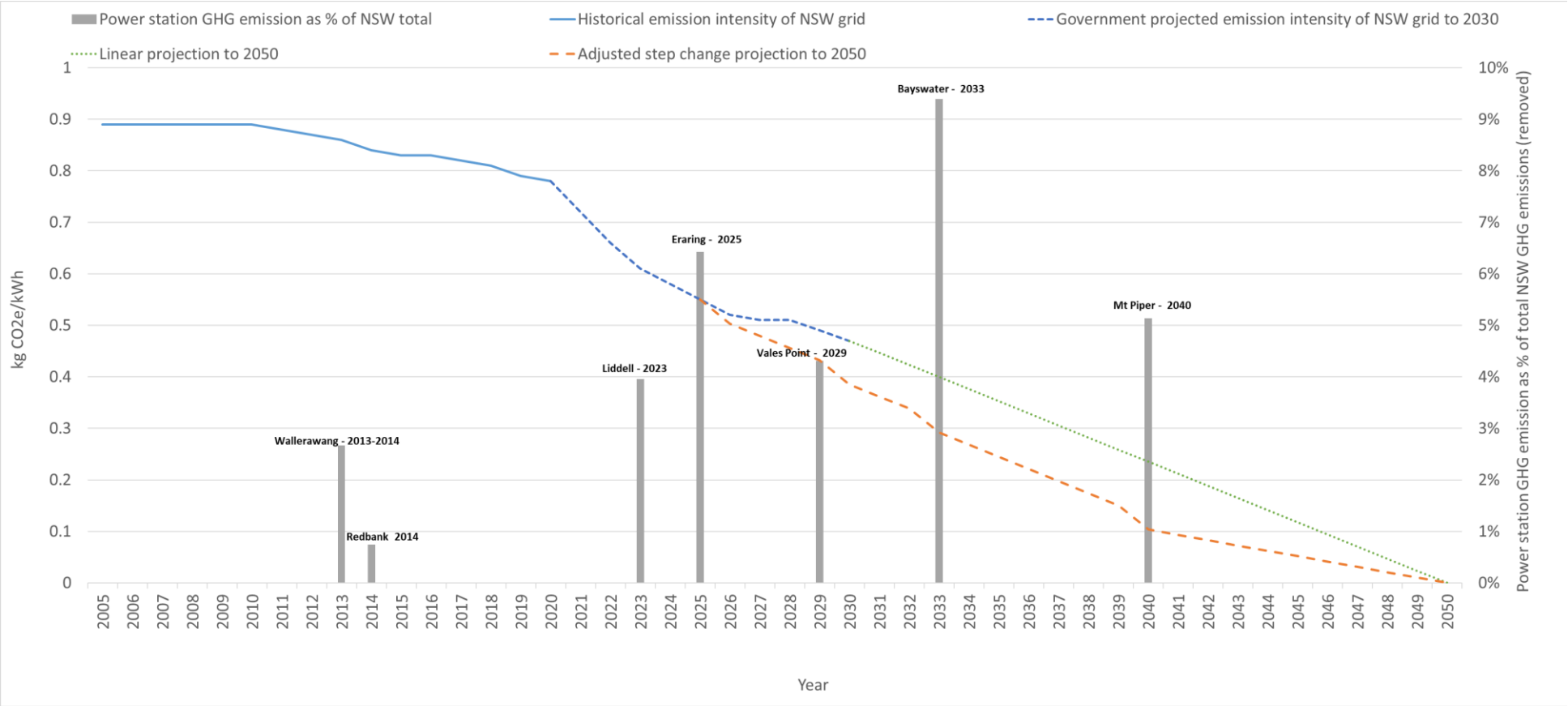


Figure 2.1 **Derived projection in emission intensity under a decarbonising of the grid pathway to net zero 2050**

2.2 Solar farm and green power options

The assumptions made for the solar farm option are:

- an installed capacity of 12.4 MW with a generating capacity (annual solar production) of 2193.5 MW/MWh (PWR 2021) would provide a proportion of the Project electricity demand, with the remaining demand coming from the net zero projected NSW grid;
    - note, 100% of the Project electricity demand would be provided by solar for a couple of project years, when production is lower.
- an annual degradation in solar production of 0.5%;
- the solar tariff for the purchase of solar electricity would be 98 $/MWh (PWR 2021);
- the cost of grid electricity is assumed as a fixed cost of 152 $/MWh (GHD 2021); and
- the price to sell solar back into the grid is assumed as a fixed cost of 50 $/MWh (GHD 2021).

The assumptions made for the green power option analysis are:

- 35% of the Project electricity demand would come from green power (no GHG emissions) with the remaining 65% coming from the net zero projected NSW grid; and
- the purchase of green power as an extra fixed cost of 50 $/MWh on the grid electricity costs.

3 Revised GHG emission projections

The Scope 2 GHG emission estimates for each scenario are presented in Table 3.1 and compared to the GHG emission estimates presented in the EIS.

The GHG emission estimates using the net zero pathway emission intensity are projected to reduce Project total emission by 54% (compared to what was presented in the EIS). The GHG emissions reduction increases to 72% with the addition of the solar farm option, relative to what is presented in the EIS). In the absence of the solar farm, the purchase of 35% green power would achieve a similar reduction (70%) relative to what is presented in the EIS.

Table 3.1 Revised Scope 2 GHG emissions (t CO_2-e/year) under various emission reduction scenario

Project year	Calendar year (nominal)	Project electricity demand (MWh)	Estimated emissions (tonnes CO_2-e / annum)			
			As presented in EIS	Net zero 2050 pathway	Solar farm option	Purchase 35% green power
1	2023	4,614	3,876	2,815	0	1,830
2	2024	70,791	59,465	41,059	25,362	26,688
3	2025	77,427	65,039	42,585	27,774	27,680
4	2026	69,092	58,037	34,753	21,276	22,590
5	2027	79,355	66,658	38,051	25,267	24,733
6	2028	81,584	68,530	37,202	25,106	24,181
7	2029	84,000	70,560	36,330	24,915	23,615
8	2030	83,124	69,824	32,044	21,920	20,829
9	2031	59,963	50,369	21,706	12,247	14,109
10	2032	20,216	16,982	6,843	0	4,448
11	2033	53,306	44,777	15,539	7,997	10,100
12	2034	55,883	46,942	14,977	8,078	9,735
13	2035	68,143	57,240	16,661	10,399	10,830
14	2036	67,420	56,632	14,900	9,268	9,685
15	2037	60,907	51,162	12,029	7,021	7,819
16	2038	31,220	26,225	5,432	1,042	3,531
17	2039	0	0	0	0	0
18	2040	0	0	0	0	0

Table 3.1 Revised Scope 2 GHG emissions (t CO_2-e/year) under various emission reduction scenario

Project year	Calendar year (nominal)	Project electricity demand (MWh)	Estimated emissions (tonnes CO_2-e / annum)			
			As presented in EIS	Net zero 2050 pathway	Solar farm option	Purchase 35% green power
19	2041	0	0	0	0	0
20	2042	0	0	0	0	0
21	2043	0	0	0	0	0
Project total			**812,319**	**372,926**	**227,673**	**242,402**
(% reduction on EIS estimate)				**(-54%)**	**(-72%)**	**(-70%)**

4 Conclusion

Scope 2 GHG emission estimates for the Project are provided for three scenarios, progressively combining decarbonisation of the NSW electricity grid with the establishment of a solar farm or the purchase of green energy.

The GHG emissions reduction from what was presented in the EIS is significant, with a 54% reduction estimated for decarbonising of the grid. The GHG emissions reduction increases to 72% with the addition of the solar farm (relative to what is presented in the EIS). The addition of the solar farm has a GHG emissions reduction benefit equivalent to the purchase of 35% green power, which in the absence of the solar farm, would achieve a 70% reduction relative to what is presented in the EIS.

Yours sincerely

Scott Fishwick
National Technical Leader - Air Quality
sfishwick@emmconsulting.com.au

References

AEMO 2022, Generating Unit Expected Closure Year, Australian Electricity Market Operator. https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-planning-data/generation-information

DISER 2020, Australia's emissions projections 2020, Department of Industry, Science, Energy and Resources. https://www.industry.gov.au/data-and-publications/australias-emissions-projections-2020

DISER 2021, National Greenhouse Accounts Factors. Commonwealth Department of Industry, Science, Energy and Resources, August 2021. https://www.industry.gov.au/data-and-publications/national-greenhouse-accounts-factors

GHD 2021 Bowdens Silver Mine Solar Pre-Feasibility Study, 5 October 2021.

PWR Hybrid 2021, Bowden Solar Farm Project, Bowden Silver Project, December 2021.

Appendix 4

Summary of Environmental Management and Monitoring Measures

(Total No. of pages including blank pages = 14)

Table A4.1
Environmental Management and Monitoring Measures

Desired Outcome	Measure		Timing*
1. Noise			
Minimise noise-related impacts from all mobile earthmoving equipment.	1.1	Use noise attenuated mobile equipment comprising low noise or extra quiet mobile equipment where practical.	Ongoing.
	1.2	Restrict bulldozers to operate in 1st gear when operating out of the open cut pits.	Ongoing.
	1.3	Install broadband noise “quacker” style reversing alarms on all mobile equipment.	Ongoing.
	1.4	Progressively construct the lower embankment noise barrier around the WRE and southern barrier.	Ongoing.
	1.5	Position acoustic barriers up to 8.5m high adjacent to the main open cut pit haul road and northern exit to the ROM pad.	Prior to evening mining operations.
Minimise noise-related impacts from fixed plant.	1.6	Use full or partial enclosures to attenuate noise from fixed plant where practical.	Construction stage.
	1.7	Use low noise specifications, low noise idlers, soft-flow chutes and silencers.	Ongoing.
	1.8	Install mid-high frequency noise conveyor alarms.	Construction stage.
	1.9	Position nearfield acoustic barriers around the TSF crushing/screening plant.	During TSF embankment construction stage.
Continuous delivery of waste rock of an evening and ore at night.	1.10	Optimise the evening waste rock haul route to maximise the barrier effect from the existing topography and temporary acoustic bunds within the active WRE areas.	Prior to evening mining operations.
	1.11	Optimise the night-time ore haul route to maximise the barrier effect from the existing topography and acoustic barriers adjacent to the main open cut pit haul road to the ROM pad.	Prior to night-time mining operations.
Manage noise generated by the Project to levels that are compliant with conditional noise criteria.	1.12	Schedule potentially intrusive activities in day-time and/or favourable weather conditions, where feasible.	Ongoing.
	1.13	Establish and operate a real-time noise monitoring network at key residential receivers or at intermediate locations to identify the need to modify operations or shut down plant and equipment during noise enhancing weather conditions.	Ongoing.
	1.14	Establish and maintain a continuous meteorological monitoring network for the Project-life.	Ongoing.
Proactive Liaison with potentially affected residents.	1.15	Discuss planned activities and effectiveness of noise controls with residents in close proximity to each construction site.	During site establishment and construction stage.
	1.16	Discuss with all residents/occupiers of properties at which noise levels are predicted to exceed the Project Noise Trigger Level their actual experience of the noise that is audible.	Ongoing.

Table A4.1 (Cont'd)
Environmental Management and Monitoring Measures

Desired Outcome	Measure		Timing*
2. Blasting and Vibration			
Proactively record baseline conditions for ongoing assessment of structural change impacts (where they are suspected to occur).	2.1	Commission structural surveys of all privately-owned residences within 2km of all open cut pits (subject to the agreement of the landowner and/or occupier).	Prior to the first blast (where agreement of the landowner and/or occupier has been provided).
Compliance with blasting criteria at all privately-owned residences / receivers.	2.2	Design all blasts within the Mine Area to meet airblast overpressure and ground vibration criteria at all privately-owned residences / receivers without VLAMP agreements.	All blasts.
	2.3	Provide notification of blasts to occupants of residences within 2km of each blast (subject to individual arrangements with landowners and/or occupiers).	At least 24 hours prior to each blast.
	2.4	Maintain a blast notification board at locations in Lue with notifications posted at least 24 hours prior to each blast.	At least 24 hours prior to each blast.
3. Air Quality			
Reduce dust generated by vehicles on site.	3.1	Apply site-wide vehicle speed limits and confine vehicle travel to designated routes.	Ongoing.
	3.2	Actively maintain and apply dust suppression to haul roads (with records kept of daily application rates).	Ongoing.
Reduce dust generated during extraction and processing.	3.3	Minimise travel speed and the distance travelled by bulldozers and coordinate activities to reduce push and haul distances and double handling.	Ongoing.
	3.4	Use of water sprays and/or dust aprons/collectors for drill rigs.	During drilling.
	3.5	Confirm proper stemming column length in each hole.	Prior to each blast.
	3.6	Minimise drop heights when loading ore, waste rock and soil.	Ongoing.
	3.7	Enclose the ROM feed hopper on three sides and operate water sprays during ore placement into the hopper.	Ongoing.
	3.8	Apply water during crushing operations.	During crushing operations.
	3.9	Progressively rehabilitate (both temporary and long-term) disturbed areas as applicable to the temporary / long-term use.	Ongoing as areas become available.

Table A4.1 (Cont'd)
Environmental Management and Monitoring Measures

Desired Outcome	Measure	Timing*
3. Air Quality (Cont'd)		
Undertake site activities without exceeding EPA air quality criteria or goals.	3.10 Implement a proactive dust management system through a combination of the following. i) Meteorological forecasts - to predict when the risk of dust emissions may be high (due to adverse weather) ii) Visual monitoring - to provide an effective mechanism for proactive control of dust at source, before it leaves the Mine Site. iii) Real-time meteorological and air quality monitoring – to provide alerts for appropriate personnel when short-term dust levels increase, to allow management of the location and intensity of activities or increased controls.	Ongoing during operations and rehabilitation works involving earthmoving.
	3.11 Test the concentration of lead and other metals, initially monthly and then at frequencies determined through ongoing review.	At commencement of air quality monitoring and ongoing (with frequency regularly reviewed).
4. Greenhouse Gas		
Reduce GHG emissions during the design, construction, and operation of the Mine.	4.1 Rehabilitate and supplement areas cleared of vegetation within additional biodiversity offset areas, which would be improved through ongoing management of the vegetation.	Progressively during operations and ongoing.
	4.2 Consider energy efficiency during the final design of processing plant with energy efficient systems installed where reasonable and practicable.	Prior to construction stage.
	4.3 Operate plant and equipment to maximise efficiency, with mine planning used to minimise vehicle wait times and idling.	Ongoing.
	4.4 Procure locally produced goods and services where feasible and cost effective to reduce transport fuel emissions.	Ongoing.
	4.5 Review cut and fill balances for earthworks to make sure that material is transported the least possible distances.	Prior to and during construction activities.
5. Groundwater		
An accurate understanding of the characteristics of the groundwater inflows to the open cut pits from all sources.	5.1 Conduct monitoring in nominated groundwater bores within and surrounding the Mine Site.	As documented in the Water Management Plan.
	5.2 Record water pumped from the advanced dewatering (production) bores and open cut pit sumps and assess annually to compare against licenced entitlements.	Ongoing with review annually.
Proactive awareness and understanding of potential changes to groundwater availability and quality.	5.3 Conduct monitoring in nominated groundwater bores within and surrounding the Mine Site, including 'regional control' sites.	As documented in the Water Management Plan.

Table A4.1 (Cont'd)
Environmental Management and Monitoring Measures

Desired Outcome	Measure		Timing*
5. Groundwater (Cont'd)			
Minimal contamination of groundwater resources by surface activities.	5.4	Management of surface water flows in accordance with the Water Management Plan.	Ongoing.
	5.5	Construction of the TSF in accordance with detailed design.	Ongoing.
	5.6	Monitoring of groundwater quality and implementation of remedial actions.	Ongoing and in the event of an exceedance of any agreed parameters.
Appropriate compensation for any actual loss of groundwater availability in registered groundwater bores.	5.7	Establish acceptable contingency measures with potentially impacted landowners, should they be required in the event that the predicted lowering of the groundwater table eventuates.	Prior to operations intercepting the groundwater table for those landowners predicted to be impacted. In response to monitoring data for all others.
An accurate groundwater model.	5.8	Review groundwater model prepared by Jacobs (2022) once data is available and use this data to validate the model.	Within 2 years of extraction intercepting the regional groundwater table.
A plan for groundwater management post-mining.	5.9	Prepare a Final Void Management Plan that takes into account management requirements post-mining.	Prior to completion of mining.
6. Surface Water			
Maximise diversion of clean water around disturbed areas to maintain flows to downstream watercourses.	6.1	Divert runoff from a 50ha area in upper Blackmans Gully catchment to Price Creek.	Site establishment and construction stage.
	6.2	Divert Blackmans Gully away from the main open cut pit and satellite open cut pits.	Site establishment and construction stage.
Maximise discharge of water from sediment dams to downstream watercourse (after treatment) as a preferential approach for management. Capture, store and re-use water where this is not feasible.	6.3	Construct and manage sediment dams to collect sediment-laden water from the TSF, TSF NAF stockpile area, southern barrier, oxide ore stockpile, WRE perimeter embankments.	Site establishment and construction stage and ongoing.
	6.4	Construct all sediment dams in accordance with Volume 2E of *Soils and Construction – Managing Urban Stormwater* (DECC, 2008)	Site establishment and construction stage.
Maintain the active storage capacity of all sediment dams.	6.5	Discharge water satisfying EPL conditions within 5 days of rainfall event, i.e. after confirming acceptable water quality – assuming either sediment settlement or flocculation.	Following rainfall event and treatment period.

Table A4.1 (Cont'd)
Environmental Management and Monitoring Measures

Desired Outcome	Measure		Timing*
6. Surface Water (Cont'd)			
Avoid discharge of any contaminated water from the containment zone.	6.6	Pump water from the open cut pit sumps to the plant water supply control for use in the processing plant.	As required.
	6.7	Pump all reclaim water to the plant water supply control for use in the processing plant.	Continuous.
	6.8	Collect all runoff from the processing plant area and mining facility in the processing plant dams.	Ongoing.
	6.9	Pump water from the Leachate Management Dam to the raw water dam or open cut pit dewatering pond.	Continuous.
	6.10	Pump brine from on-site Reverse Osmosis Plant to raw water dam.	Ongoing.
	6.11	Construct and maintain bunding around all tanks containing chemicals	Site establishment and construction stage and ongoing.
	6.12	Undertake regular inspections of all pipelines and containment structures to monitor for leaks.	Ongoing during use of water supply pipeline.
Avoidance of overflow from the TSF to downstream watercourses.	6.13	Monitoring the water level in the decant pond.	Continuously.
	6.14	Pump to open cut pit when TSF water level is $\leq$4.7m below the emergency spillway invert level.	As required.
Ensure all hydrocarbons contained within the Mine Site.	6.15	Store all diesel and waste oil in self-bunded above ground tanks	Ongoing.
	6.16	Refuel all mobile equipment (in the mining facility) in dedicated areas with perimeter bunding and spill kits.	Ongoing.
	6.17	Store all 205L/20L drums in bunded storage area(s)	Ongoing.
	6.18	Collect and remediate hydrocarbons – contaminated earth.	As required.
	6.19	Maintain an oil-water separator within the workshop / maintenance area.	Ongoing.
Manage the storage, use and spill management of other potential contaminants.	6.20	Store a range of potentially hazardous materials within bunded areas or containers at the Mine Site in accordance with a chemicals management system.	Ongoing.
	6.21	Implement and maintain a pump-out sewage management system by a licenced contractor.	Ongoing.
	6.22	Reuse all brine generated by the reverse osmosis plant in processing.	Ongoing.

Table A4.1 (Cont'd)
Environmental Management and Monitoring Measures

Desired Outcome	Measure		Timing*
7. Health Risks			
Ensure dust is controlled on site to prevent further contamination.	7.1	Prepare and implement an Air Quality Management Plan outlining the measures to manage air emissions (consistent with those considered and outlined in the Air Quality Impact Assessment).	Prior to site disturbance activities and ongoing.
Prevent contamination of surface water downstream of the Mine Site to maintain water quality standards.	7.2	Implement the Project's Water Management Plan.	Ongoing.
Manage and minimise noise and blasting impacts from the Project on the surrounding population.	7.3	Develop and implement a Construction Noise Management Plan, Blast Management Plan and Operational Noise Management Plan.	Ongoing.
Management of perceived risks and confirmation of actual impacts.	7.4	Offer lead blood level testing to Lue and district residents.	Prior to site disturbance activities and at regular intervals during operation.
	7.5	Publication of environmental monitoring results relating to lead in air and water to reduce uncertainty regarding the extent of impacts.	Ongoing during operations.
	7.6	Maintain an open-door policy and implement a good neighbour program involving regular and ongoing community engagement, providing opportunity to discuss and provide information in relation to impact monitoring and management.	Ongoing.
Management of potential mental health impacts and maximisation of positive mental health benefits.	7.7	Provide support for health service programs in the region as part of Bowden Silver's Community Investment Program.	Ongoing.
	7.8	Maximise local employment to reduce fly-in/fly-out and drive-in/drive-out employees.	Ongoing.
	7.9	Management of noise impacts so as to reduce potential for sleep disturbance (and associated mental health impact).	Ongoing.
8. Visibility and Lighting			
Reduce the impact of the Project on the visual amenity at private residences and public roads.	8.1	Undertake progressive rehabilitation of the Mine Site focusing particularly on the revegetation of visible disturbed areas.	Ongoing.
	8.2	Enhance the existing tree screen adjacent to Pyangle/Powells Roads.	Ongoing and expanded from site establishment and construction.
	8.3	Plant tree screens around the outer southern perimeter of the southern barrier and TSF.	As it is developed.
	8.4	Adopt a dark grey/green colour scheme for site buildings and roadside noise barriers.	During site establishment and construction.

Table A4.1 (Cont'd)
Environmental Management and Monitoring Measures

Desired Outcome	Measure	Timing*
8. Visibility and Lighting (Cont'd)		
Ensure Project-related lighting does not unreasonably impact the surrounding environment or operations at the Siding Spring Observatory and local astronomical observatories.	8.5 Ensure all lighting complies with AS/NZS 4282:2019 – Control of the Obtrusive Effects of Outdoor Lighting (as amended from time to time).	Ongoing.
	8.6 Ensure all light sources have appropriate correlated colour temperatures.	Ongoing.
	8.7 Ensure all floodlights have a maximum upcast angle of 10 degrees.	Ongoing.
	8.8 Ensure that lights with diffusing covers or with visible bare lamps that emit light above the horizontal plane are not used on the outside of buildings or structures.	Ongoing.
	8.9 Restrict the use of floodlight towers to periods of active operation.	Ongoing.
9. Terrestrial Ecology / Biodiversity		
Avoid and minimise impacts on terrestrial vegetation and animal habitats wherever possible.	9.1 Delineate areas of native vegetation that are to be removed to prevent accidental damage or removal of retained vegetation.	Prior to each vegetation clearing program.
	9.2 Restrict vehicles, persons and machinery from entering areas of retained vegetation (unless for required environmental monitoring or other valid purpose) to avoid unnecessary impacts to vegetation and habitat.	Ongoing.
	9.3 Implement a pre-clearance Survey Protocol for areas of native trees and shrubs including a two-stage clearing protocol for all hollow-bearing trees.	Prior to each vegetation clearing program.
	9.4 Mark all hollow-bearing trees to be removed and catalogue their species and approximate dimensions.	Prior to each vegetation clearing program.
	9.5 Implement a seed collection plan with measures and procedures to collect, maintain and propagate from native seed sources.	Ongoing to the extent required for rehabilitation.
	9.6 Prepare and implement a feral animal management plan including an inspection program to monitor for feral animal issues.	Ongoing.
	9.7 Prepare and implement a weed management plan to monitor and, as required, control weed species within the Mine Site.	Ongoing.
Rehabilitate disturbed areas to create a final landform that maintains or improves biodiversity values of the Site.	9.8 Prepare a Rehabilitation Management Plan in accordance with contemporary NSW Resources Regulator requirements / guidelines.	Prior to any ground disturbance.
Secure biodiversity offsets to offset residual biodiversity impacts.	9.9 Implement an approved biodiversity offset strategy.	Progressively in accordance with approved staging.

Table A4.1 (Cont'd)
Environmental Management and Monitoring Measures

Desired Outcome	Measure	Timing*
9. Terrestrial Ecology / Biodiversity (Cont'd)		
Minimise the risk of fauna interaction with the TSF / Cyanide.	9.10 Construct the TSF in a way that minimises the risk of shallow ponds forming on uneven ground after rain events.	During TSF construction.
	9.11 Contour the floor of the TSF during construction to avoid island formation.	During TSF construction.
	9.12 Prepare and implement a Cyanide Management Plan including measures to contain cyanide, maintain levels within the prescribed limits, monitor and inform the need for contingency measures.	Prior to use of cyanide.
10. Aquatic Ecology		
Avoid and minimise impacts on aquatic vegetation and habitats where possible.	10.1 Where practical, treat water to be released from all existing dams to eradicate the invasive eastern gambusia.	Prior to any discharge of water from existing dams.
	10.2 Screen any discharge pipes to minimise any eastern gambusia from entering surrounding watercourses, if treatment in 10.1 is not successful.	Ongoing during water discharges.
	10.3 Implement a monitoring program within Hawkins and Lawsons Creeks and associated alluvial aquifers to monitor potential impacts to aquatic biota, habitat and stygofauna.	Prior to the commencement of construction activities and ongoing throughout operations.
11. Traffic and Transport		
Achieve safe and efficient road transport operations.	11.1 Prepare and implement a detailed Traffic Management Plan, incorporating a Driver's Code of Conduct, to safely manage any traffic impacts during all stages of the Project.	3 months prior to commencement of the site establishment and construction stage and for the Project-life.
	11.2 Deliver equipment and consumables necessary for the construction and operation of the Project and despatch mineral concentrates outside heavy vehicles restriction periods designated as school bus operation times.	Ongoing.
Mitigate potential traffic impacts to local road users.	11.3 Spread commencement and finish times of operational shifts at different times throughout the day.	Ongoing.

Table A4.1 (Cont'd)
Environmental Management and Monitoring Measures

Desired Outcome	Measure	Timing*
12. Soils and Land and Soil Capability		
Minimise the clearing of native vegetation for the stockpile.	12.1 Undertake a weed control program (if required) in areas to be stripped of topsoil.	Prior to soil stripping.
	12.2 Where practical, transfer salvaged subsoil and topsoil directly to rehabilitation areas.	During soil stripping campaigns.
	12.3 Limit topsoil stockpile heights to 2m and stabilise with a well-fertilised non-persistent cover crop.	Ongoing.
	12.4 Limit subsoil stockpiles height to 5m and 1m of topsoil and stabilise with a well-fertilised non-persistent cover crop.	Ongoing.
Encourage organic carbon accumulation, promote microbial activity and minimise erosion.	12.5 Increase the thickness of topsoil and subsoil placed on the southern barrier to effectively provide an additional area to stockpile soil.	During southern barrier construction.
Minimise losses through erosion caused by the practices of soil stripping to maximise the value of soil as a resource for rehabilitation purposes.	12.6 Selectively strip topsoil and place in rehabilitation areas or in nominated stockpile areas.	During soil stripping campaigns.
	12.7 Add lime to the topsoil and subsoil prior to each scraping pass.	During soil stripping campaigns.
	12.8 Apply coarse grade gypsum prior to stripping and stockpiling of the 'Alluvium – medium quality' Soil Landscape Unit where required.	During soil stripping campaigns.
	12.9 Avoid stripping or spreading soils when either very dry or wet.	During soil stripping campaigns.
Minimise the impact on soil resources, terrestrial vegetation during stockpiling.	12.10 Prevent vehicle access on soil stockpiles, except where required for monitoring, seeding, addition of soil ameliorants, or weed control.	Ongoing.
	12.11 Place silt-stop fencing immediately down-slope of all stockpiles until stable vegetation cover is established. Return all material recovered from the silt-stop fencing to the stockpile.	Ongoing.
	12.12 Implement a weed eradication program should unacceptable weed generation be observed on soil stockpiles.	Ongoing.
	12.13 Establish and maintain an inventory of topsoil and subsoil resources (available and stripped) and reconcile with rehabilitation requirements.	Ongoing.

Table A4.1 (Cont'd)
Environmental Management and Monitoring Measures

Desired Outcome	Measure	Timing*
13. Aboriginal Cultural Heritage		
Provide appropriate protection to the existing and any unknown Aboriginal artefacts.	13.1 Undertake archaeological field surveys with the local Aboriginal community of the areas within the water supply pipeline corridor and the proposed relocated Maloneys Road corridor that have not yet been surveyed.	Prior to any surface disturbance within the subject areas.
	13.2 Prepare and implement a Heritage Management Plan to manage those identified and any potentially unknown sites of Aboriginal heritage value within the Mine Site, relocated Maloneys Road and the water supply pipeline corridor.	3 months prior to commencement of the site establishment and construction stage and for the Project-life.
	13.3 Install and maintain protective barriers around all identified Aboriginal cultural heritage sites within the Mine Site that are located in areas that would not be disturbed by Project-related activities.	Prior to the commencement of the site establishment and construction stage.
	13.4 Install and maintain protective barriers around identified Aboriginal cultural heritage sites in the vicinity of the proposed relocated Maloneys Road corridor for the duration of construction activities.	During the site establishment and construction stage.
	13.5 Arrange for the full salvage and storage in a "Keeping Place" of Aboriginal objects at all identified Aboriginal cultural heritage sites that would be directly impacted as the result of Project-related disturbance.	Prior to disturbance commencing and in accordance with a Heritage Management Plan.
Prevent further inadvertent impact if any Aboriginal cultural heritage sites are identified.	13.6 Stop work immediately and report the find to BCD and a qualified archaeologist to assess the significance of the site. If the site contains bones indicative of a human burial, notify the Police immediately.	Ongoing.
14. Historic Heritage		
Provide appropriate protection to the existing and any unknown historic heritage sites.	14.1 Prepare and implement a Heritage Management Plan to manage those identified and any potentially unknown sites of historic heritage value within the Mine Site and the relocated Maloneys Road corridor.	3 months prior to commencement of the site establishment and construction stage and for the Project-life.
Prevent further inadvertent impact if any historic heritage sites are identified.	14.2 Stop work immediately and report the find to BCD and a qualified archaeologist to assess the significance of the site.	Ongoing.

Table A4.1 (Cont'd)
Environmental Management and Monitoring Measures

Desired Outcome	Measure	Timing*
15. Public Safety Hazards		
Ensure the risk of bush fire attack is minimised at key Mine Site components.	15.1 Maintain appropriate Asset Protection Zones around key Mine Site components.	Ongoing.
	15.2 Ensure employees are trained in the proper use of firefighting equipment held on site.	Ongoing.
	15.3 Make Mine Site firefighting equipment available to the local Rural Fire Service in the event of a bush fire on land surrounding the Mine Site.	As required.
Minimise the risk of bush fire ignition from mining operations.	15.4 Restrict work in heavily vegetated areas.	During high fire danger periods.
	15.5 Develop procedures for hot works to prevent ignition sources for a bush fire.	Ongoing.
	15.6 Consult with the local Rural Fire Service.	Prior to each bush fire season and any controlled burns.
Ensure leaks and spills of sodium cyanide and cyanide solution are avoided on site and leaks and spills of sodium cyanide during transport are avoided.	15.7 Ensure bunding around the on-site mini sparge system complies with AS NZS 4452:1997.	Ongoing.
	15.8 Ensure the processing area is bunded to contain any processing leaks.	Ongoing.
	15.9 Ensure operators in contact with cyanide are licenced and trained in emergency response and/or HAZMAT.	Ongoing.
	15.10 Ensure cyanide transporters are certified as compliant with the Cyanide Code's Principles and Transport Practices.	Ongoing.
	15.11 Ensure cyanide transporters are compliant with the *Australian Dangerous Goods Code* with drivers and vehicles licensed to transport DGs.	Ongoing.
Minimise risks associated with the on-site use and storage of blasting agents (e.g. ANFO and ANE).	15.12 Implement quality assurance procedures to ensure blasting agents meet required specifications.	Ongoing.
	15.13 Ensure blasting agents are packaged in accordance with the *Australian Dangerous Goods Code*.	Ongoing.
	15.14 Ensure appropriate separation distances between blasting agents and the Mine Site boundary are maintained.	Ongoing.
	15.15 Ensure emergency response and evacuation procedures are in place.	Ongoing.
16. Economic		
Maximise local employment training, and engagement.	16.1 Develop and implement a Local Employee and Procurement Strategy.	Site establishment and construction.
	16.2 Give preference to local employees.	Ongoing.
	16.3 Provide ongoing training and certification opportunities for local community members to ensure they have the necessary skills to work in mining.	Ongoing.

Table A4.1 (Cont'd)
Environmental Management and Monitoring Measures

Desired Outcome	Measure	Timing*
16. Economic (Cont'd)		
Involvement with local businesses to boost local economy.	16.4 Inform local businesses of the goods and services required for the Project.	Ongoing.
	16.5 Provide service provision opportunities and compliance requirements of business to secure contracts.	Ongoing.
	16.6 Collaborate with local businesses and encourage local businesses to meet the requirements of the Project for supply contracts.	Ongoing.
	16.7 Develop relevant networks to assist qualified local and regional businesses tender for provision of goods and services to support the Project.	Ongoing.
Support local sporting, social and community groups to ensure community directly benefits from the Project.	16.8 Implement a Planning Agreement with the Mid-Western Regional Council.	Agreement in place prior to commencement of site establishment and construction.
	16.9 Develop and implement a Community Investment Program.	Initial funding released within 12 months of commencement of mining operations. Then ongoing during operations.
17. Social		
To enhance local values and address community needs within the Lue, Rylstone, Kandos, Mudgee and surrounding localities.	17.1 Develop and implement a Community Investment Program.	Ongoing. Expanded program prior to commencement of mining operations. Then ongoing.
Contribution to the provision of public amenity and public services, transport or other infrastructure requirements as agreed with Council.	17.2 Implement a Planning Agreement with the Mid-Western Regional Council.	Agreement in place prior to commencement of site establishment and construction.
Maximisation of the economic benefits of the Project within in the Mid-Western Regional LGA.	17.3 Develop and implement a Local Employee and Procurement Strategy.	Prior to the commencement of site establishment and construction.
Maintenance and further development of Company-community relationships.	17.4 Develop and implement a Good Neighbour Program which outlines ongoing and effective communication and engagement.	Prior to the commencement of mining operations.
	17.5 Employ a dedicated Community Liaison officer to manage the ongoing engagement and monitoring and management commitments.	Ongoing.

Table A4.1 (Cont'd)
Environmental Management and Monitoring Measures

Desired Outcome	Measure	Timing*
17. Social (Cont'd)		
Wholistic and adaptive management based upon monitoring/feedback and evaluation to minimise potential negative impacts and enhance benefits from the Project.	17.6 Develop and implement a Social Impact Management Plan that provides for monitoring and evaluation of social and community aspects of the Project and applies adaptive management to minimise potential impacts and maximise benefits.	Prior to commencement of mining operations.
	17.7 Prepare and implement appropriate complaint receipt / response and incident notification / reporting processes.	Ongoing during operations.
Keeping the community informed, maintaining transparency, and remaining accountable.	17.8 Public reporting of relevant statistics, monitoring results and engagement outcomes.	Ongoing during operations.
18. Seepage Management		
Reduce and manage seepage risks from the TSF.	18.1 Install a system of vibrating wire and standpipe piezometers upstream and downstream of the foundation grouting, beneath the embankment, at the toe of the embankment.	During site establishment and construction.
	18.2 Install groundwater monitoring bores downgradient of the TSF to monitor for any seepage migration.	During site establishment and construction.
	18.3 Monitor all vibrating wire and standpipe piezometers as well as groundwater monitoring bores during and following TSF operations.	As described in a Water Management Plan.
	18.4 Undertake inspections of the tailings transfer and discharge pipelines, water return pipelines, discharge points, decant system and decant pond, all of which would be fully documented, and where appropriate photographed.	As described in a TSF Operations and Maintenance Plan.
	18.5 Undertake weekly inspections of the external embankment and associated structures, the tailings beach, decant pond level and all monitoring installations.	As described in a TSF Operations and Maintenance Plan.
	18.6 Prepare a comprehensive Trigger Action Response Plan that is associated with monitoring outcomes.	As described in a Water Management Plan.
	18.7 Comply with all reporting and regulatory requirements of DPIE, EPA and Dams Safety NSW throughout the life of the development.	As required.
	18.8 Undertake independent reviews and audits against contemporary engineering and environmental standards.	As required.