

3-7. DEPENDENCE OF SPECIES ON GROUNDWATER

Concern:

Significant species have the potential to be impacted by changes in groundwater quantity and quality. Substantive evidence that these ecosystems will not be permanently affected is not provided in the EIS.

This concern responds to the following SEARs for SSD 5765:

- A description of the existing environment likely to be affected by the development, using sufficient baseline data;
- A description of mitigations and
 - Whether these are best practice and represent a full range of measures
 - Whether they will be effective / key performance indicators
 - Contingency plans for residual risks / monitoring and reporting on environmental performance
- An assessment of the likely impacts of all stages of the development, taking into consideration relevant legislation, environmental planning instruments, guidelines, policies, plans and industry codes of practice;
- Part 3: impacts to significant water resources or threatened species are minimised to the greatest extent practicable
- Assessment of Lawsons Creek and Price Creek
- Assessment of likely impacts to aquifers; detailed site water balance, management of excess water and reliability
- DRG, Attachment 2A requires rehabilitation methods including
 - e) monitoring for rehabilitation
 - i) details of triggering intervention
 - k) details of post rehabilitation management
 - l)i) assessment of rehabilitation techniques against objectives
 - o) consideration of controls
- DRE/DPE requires a Water Management Strategy that considers
 - the existing surface and groundwater qualities
 - a robust baseline
 - a description of how groundwater and aquatic ecosystems will be monitored, Trigger Action Response Plan and trend identification

DISCUSSION

According to SEARs, sufficient baseline data is required to characterise and describe the existing environment. A firm understanding of the existing environment enables predictions of the likely hydrogeological impacts caused by a development. If the existing hydrogeology is not well understood, there is a high chance that the tools used to predict impacts such as groundwater models will be unsuitable for decision making.

The EIS notes that Wet Swamp Creek and Black Gully, Blackmans Creek, Hawkins and Lawsons Creeks have potential for groundwater dependent ecosystems (GDEs). Furthermore;

“riverine baseflow systems include ecosystems that are dependent on groundwater derived baseflow in streams and rivers (Dresel et al., 2010). Baseflow is that part of stream flow derived from groundwater discharge and bank storage. Baseflow is considered likely to contribute year round to flows in Hawkins and Lawsons Creeks”

(Jacobs (Australia), 2020, pp. 5-67)

Fuzzy Box Woodland on alluvial soils and Swamp Oak Floodplain Forest are two listed terrestrial ecosystems that occur in or directly adjacent to the study area which may be reliant on groundwater. While EnviroKey suggest that these are 'unlikely to be wholly groundwater dependent', under the following recognised definition of a groundwater dependent ecosystem this suggestion is questionable:

"ecosystems that require access to groundwater to meet all or some of their water requirements on a permanent or intermittent basis, so as to maintain their communities of plants and animals, ecosystem processes and ecosystem services."

(Doody, et al., 2019)

The key matter is that groundwater (and baseflow) can sustain ecosystems during times of water scarcity. Without groundwater at these times, ecosystems may fail either temporarily or permanently.

Jacobs (2020) notes that the groundwater simulation model over-predicts the groundwater inflows to Hawkins Creek during periods of low or no flow (Jacobs (Australia), 2020, pp. 5-174). To retain the water mass balance, groundwater must instead be following the natural groundwater flow direction to the south and west. The model would thus under-predict groundwater connectivity and flows to the south and west, possibly supporting Lawsons creek. The Lawsons creek water Source is the subject of a water licence application in the EIS. The EIS is able to present this knowledge gap because surface flow have been installed on Hawkins Creek. This has not been done on Lawsons Creek near Lue village.

The EIS states that reductions in baseflow to Hawkins and Lawsons Creeks occur 28-34 years after mining commences.

The *Aquifer Interference Policy 2012* states:

"A risk management approach to assessing the potential impacts of aquifer interference activities will be adopted, where the level of detail required to be provided by the proponent is proportional to a combination of the likelihood of impacts occurring on water sources, users and dependent ecosystems and the potential consequences of these impacts."

The identification of potentially affected ecosystems, the pathway linking impacts from the proposed activity, and the definition of the mitigated risk to those ecosystems should be clarified in the EIS.

REFERENCES

Bowdens Silver, 2020. *Monitoring*. [Online]

Available at: <https://bowdenssilver.com.au/monitoring/>

[Accessed 21 June 2020].

Doody, T. M., Hancock, P. J. & Pritchard, J. L., 2019. *Information guidelines explanatory note: Assessing groundwater-dependent ecosystems*. , Canberra: Department of the Environment and Energy, Commonwealth of Australia.

Jacobs (Australia), 2020. *Part 5 - Groundwater Assessment*, Sydney: Silver Mines Pty. Limited.

R. W. Corkery & Co. Pty. Limited, 2020. *EIS Bowdens Silver Project*, Sydney: Bowdens Silver Pty Limited.