DOC21/968110
MP08_0150-PA-46

Nagindar Singh
Planning and Assessment Group
Department of Planning, Industry and Environment
4 Parramatta Square,12 Darcy Street
PARRAMATTA NSW 2150

Dear Ms Singh

Bulli Seam Operations - Appin Mine LWs 709-711 and 905 Extraction Plan (MP08_0150-PA-46) – post approval assessment

I refer to your request on 28 October 2021 for comments from the Environment, Energy and Science Group (EES) seeking advice on the *Appin Mine Areas 7 and 9 Longwalls 709 to 711 and 905 Extraction Plan* dated October 2021 (Extraction Plan).

EES previously provided detailed comments on the draft Extraction Plan to the applicant (South32) on 6 August 2021 (a copy of EES's comments which includes an attachment are attached).

As requested, EES has now reviewed the Extraction Plan dated October 2021. In summary, EES does not support approval of the Extraction Plan until a statistically rigorous and quality controlled/quality assured water monitoring program is in place that addresses the failures of the current surface water and groundwater monitoring program. EES's detailed comments are provided below. It should also be noted that EES could provide an assessment of the groundwater data if it were supplied.

EES's previous detailed comments on the draft Extraction Plan and other management plans provided to South32 on 6 August 2021 have not been adequately addressed.

In terms of the Water Management Plan, EES recommended the Plan incorporated:

- A proper Before-After-Reference-Impact (BACI) design that:
  - monitors surface water level in permanent (or near-permanent) pools in the third order sections of Navigation Creek, Navigation Creek Tributary 1 and Foot Onslow Creek where they are directly undermined by the longwalls
  - monitors water levels in the alluvium of the third order sections of Navigation Creek, Navigation Creek Tributary 1 and Foot Onslow Creek where they are directly undermined by the longwalls
  - monitors groundwater levels in deeper bores so that there is adequate baseline established and an adequate assessment of impact on groundwater aquifer levels can be achieved.

- An improved groundwater model for the area which addresses the mismatch between modelled and observed groundwater levels.

- To assist with water monitoring, it was recommended that South32 install:
  - water level sensors in a range of permanent (or near-permanent) pools in the third order sections of Navigation Creek, Navigation Creek Tributary 1 and Foot Onslow Creek above the longwalls and monitor pool levels on a daily basis, and
  - a range of piezometers and water level sensors in the alluvium of the third order sections of Navigation Creek, Navigation Creek Tributary 1 and Foot Onslow Creek above the longwalls and monitor alluvial aquifer levels on a daily basis

- additional groundwater bores in the vicinity of the proposed longwalls that have adequate baseline data and functional recorders with monitoring of aquifer levels on a daily basis.

None of this has occurred and the current water monitoring program is considered highly deficient because:

- There are no locations where water levels in **pools, alluvium or hard rock aquifers** are monitored directly above the proposed longwalls (see Figure 1).
- Many of hard rock piezometers are already impacted or are not recording at all.
- The majority of bores close to the extraction area do not have an appropriate baseline to assess change[1].
- The quality of the data is considered highly suspect for some piezometers[2].
- SLR (2021a) predicted 3m and 4m depressurisation of landholder bores GW072874 and GW105534 in the lower HBSS due to mining at Longwalls 709 to 711 and 905. These bores are not instrumented/monitored and nor are landholder bores GW101986, GW105388, GW106574, GW105376, GW112381 and GW105574 (likely to experience similar drawdown to that of GW105534).
- Local geological structures such as fracturing and shearing could cause significantly greater depressurisation at individual bores (SLR 2021a).
- MSEC (2021) predict that fracturing of shallow (10m to 20m depth) bedrock for the creeks could develop due to the Project, particularly in areas immediately above the longwall panels. Surface tension cracks are also likely to occur, typically with widths in the order of 25mm to 50mm.
- Use of Tammetta's equation suggests a height of connective fracturing of 338-360m for a panel width of 324m and extraction height of 3.3m. Such a height of connective fracturing would likely take it up into the Bulgo Sandstone and Hawkesbury Sandstone.

The surface water and groundwater monitoring program that is currently in place is poor and insufficient to assess the surface water and groundwater impacts of the proposed Longwalls 709 to 711 and 905 Extraction Plan; or whether performance measures under the approval are met.

[1] IMC state that it has established four groundwater monitoring boreholes in the Longwalls 709 to 711 and 905 Study Area:

- S2536 – single piezometer at a depth of 15.6 m in the alluvium, established 27 August 2021.
- S3536A – single piezometer at a depth of 136.6 m in the HBSS, established 27 July 2021.
- S2537 – single piezometer at a depth of 129.5 in the HBSS, established 5 July 2021.
- S2538 – single piezometer at a depth of 129.5 m in the HBSS, established 12 July 2021.

[2] The Water Management Plan suggests that *Updated hydrographs for Boreholes used in the groundwater modelling for S1913, S1941, S2060, S2281, S2282, S2283, S2080, S2315 and S2308 are included in Appendix C.* Reference to one of these (S2308) suggests that water levels in the HBSS at 70m have potentially risen by 40m, without any explanation or validation. Many other piezometers in the area and cited to be part of an 'extensive' groundwater monitoring program but are not included in the assessment or have any appropriate impact assessment (eg a rigorous and objective BACI assessment) applied.

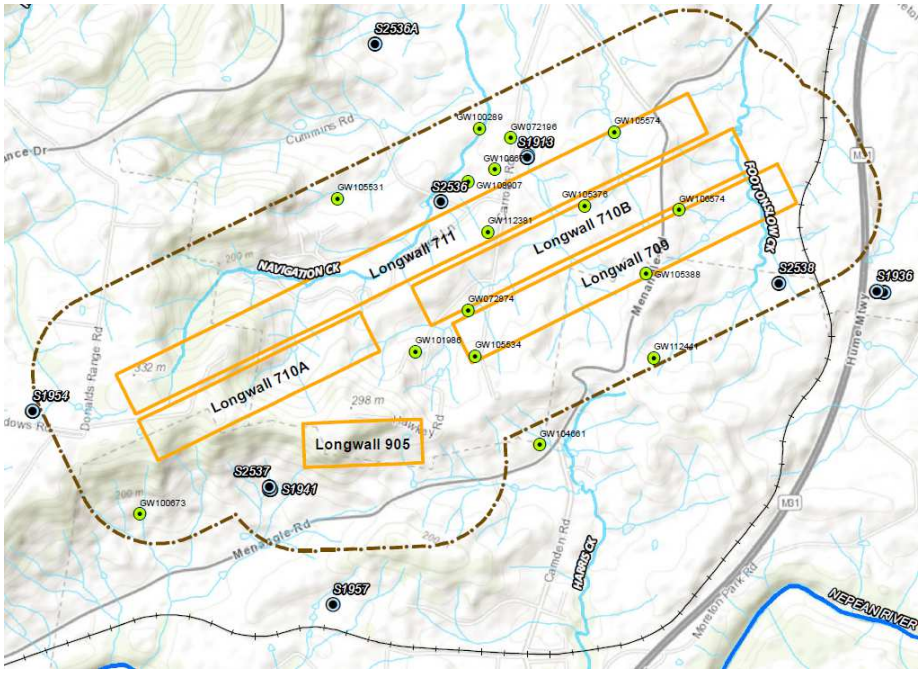

Figure 1. Location of landholder bores and South32 monitoring bores for the Longwalls 709 to 711 and 905 Extraction Plan. Note the lack of any monitored bores in pools, alluvium or hard rock aquifers directly above the longwalls.

Should you have any queries regarding this advice, please contact Marnie Stewart, Senior Project Officer at Marnie.stewart@environment.nsw.gov.au or on 9995 6861.

Yours sincerely

S. Harrison

24/11/21

Susan Harrison
Senior Team Leader Planning
Greater Sydney Branch
Biodiversity and Conservation