

CADIA

HOLDINGS

PTY LIMITED

TRADING AS  
CADIA VALLEY OPERATIONS

ABN 95 062 648 006

2 December 2019

Mandana Mazaheri  
Senior Environmental Assessment Officer  
Department of Planning, Industry and Environment  
Via Email Mandana.Mazaheri@planning.nsw.gov.au

Dear Mandana,

**RE: Cadia Valley Operations – Cadia Hill Tailings Completion Submissions Report Addendum**

We refer to your email correspondence of 21 November 2019 and provide the following responses to issues raised by the Department of Industry Planning & Environment-Water (DPIE-Water) and Natural Resource Access Regulator (NRAR) on the Cadia Hill Tailings Completion Modification (the Modification).

**NRAR Issue Raised**

*Water Take and Licencing*

*Insufficient information has been provided to quantify the change in groundwater and surface water take during operations and post closure due to the altered final pit and Cadia East void design. This information is required to confirm the variation in water take from water sources due to the modification and the adequacy of existing entitlements or where exemptions may apply.*

*Also, insufficient information has been provided to quantify water take during construction and operation of the new ventilation adit, and the adequacy of existing entitlements.*

*Therefore, it is recommended that the proponent should:*

- Provide a detailed water balance of the pit and Cadia East void to quantify the change in the groundwater inflows and surface water inflows in the relevant water sources during operations and post closure, and demonstrate the ability to hold the necessary entitlements.*
- Quantify the water take during construction and operation of the new ventilation adit, and demonstrate the ability to hold the necessary entitlement.*

**Cadia Holdings Pty Limited Response**

- As described in Appendix A of Australasian Groundwater and Environmental Consultants Pty Ltd (2019)<sup>1</sup> (Appendix A of the Modification Report), there is no additional take of water due to the Modification. There is no mechanism for any additional surface or groundwater take because the Cadia Hill open pit and underground mines would not change in dimensions and no additional surface water catchment would be affected. Filling of the Cadia Hill open pit with tailings is expected to reduce the ongoing take of groundwater over time due to the increase in standing water level of the pit. Detailed modelling of the final void is provided in Section 6 of Hydro Engineering Consultants (HEC) (2019)<sup>2</sup> (Appendix B of the Modification Report).
- Construction of the new shaft is expected by Cadia Holdings Pty Limited (CHPL) to be dry. No material water has been encountered during construction of previous shafts in this part of the Cadia East mine. Notwithstanding, CHPL would account for and report on any groundwater take associated with construction of the shaft, should any water be encountered. Review of the 2017/18 annual review indicates that a surplus of groundwater licence entitlement is available to account for any water make<sup>3</sup>.

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<sup>1</sup> Australasian Groundwater and Environmental Consultants Pty Limited (2019) Cadia Hill Tailings Completion – Groundwater Assessment.

<sup>2</sup> Hydro Engineering & Consultants Pty Ltd (2019) Surface Water Assessment for Statement of Environmental Effects.

<sup>3</sup> Refer to [http://www.cadiavalley.com.au/client\\_images/2099185.pdf](http://www.cadiavalley.com.au/client_images/2099185.pdf).

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## **NRAR Issue Raised**

### *Climate and Water Modelling*

#### *The proponent should:*

- *Provide references for climate sequence generation method used, or adopt stochastic methods consistent with the climate literature. All models reliant on this sequence may require updating.*
- *Provide details on the 'water-use reduction' methods (as stated in the EIS), if water supply is threatened through drought. Additional comments are provided in Attachment A regarding this recommendation.*
- *Quantify dam spill predictions for wet, dry and median years.*
- *Remodel streamflow including the culverts, to address the risk of localised flooding near culverts and crossings.*
- *Revise the Groundwater Assessment Report to include the water quality results from MB 95 monitoring bore in order to establish baseline conditions or ascertain any movement of tailings water from the pit.\**

## **Cadia Holdings Pty Limited Response**

- Climate sequence data used for the site water balance was sourced from the Bureau of Meteorology, as described in HEC (2019):  
*Daily climatic data used in model forecast simulations, as outlined in Section 3.0, was sourced from the SILO Data Drill. The Data Drill is a system which provides synthetic data sets for a specified point by interpolation between surrounding point records held by the Bureau of Meteorology<sup>4</sup>. Both rainfall and pan evaporation data were obtained from this source. Different rainfall data sets were obtained for different storage catchments – e.g. the mine site itself, Cadiangullong Creek Dam and Flyers Creek Weir.*
- CHPL's use of external (make-up) water has reduced this year due to the increased ability to recover water from in-pit tailings deposition in comparison to deposition in the Northern Tailings Storage Facility or Southern Tailings Storage Facility (STSF). Net water recycling rates have increased from approximately 65-70% to approximately 85%. This higher rate of water recycling has been driven by improving the level of water recycled from the tailings thickeners in the process plant and by exceptionally high water recycle rates being delivered from the Cadia Hill open pit tailings storage facility. This has reduced the reliance on off-site water and has provided additional water security for the site.
- The predicted spills of the Site Runoff Pond, Southern Leachate Dam and STSF Seepage Reclaim Pond are unrelated to the Modification. However, the storages are maintained at the correct capacity<sup>5</sup> and risk of spill is frequently reviewed by CHPL. Mitigation measures to increase storage or pumping capacity are periodically implemented.
- The flood modelling included in Appendix B of the Modification Report (HEC, 2019) was to confirm the existing predicted flooding risk on the Cadia Hill open pit. The flood modelling indicated that flows would not overtop the Cadiangullong Creek diversion into the Cadia Hill open pit in rainfall events up to a 1 in 1,000-year event. The flood modelling shows some localised ponding in the vicinity of an existing light vehicle access road culvert, which is conservatively assumed to be blocked for modelling purposes. CHPL considers this to be a very minor impact which does not warrant further modelling incorporating a fully functioning culvert because:
  - The impacts are very minor and limited to an area of existing water management infrastructure adjacent to the diversion and site access road i.e. no impact to the receiving environment.
  - The culvert is maintained in a functioning condition, which would serve to reduce predicted impacts.

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<sup>4</sup> Refer to <https://legacy.longpaddock.qld.gov.au/silo/>.

<sup>5</sup> Refer to [http://www.cadiavalley.com.au/client\\_images/2099185.pdf](http://www.cadiavalley.com.au/client_images/2099185.pdf).

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- An assessment of MB95 water quality and levels was made by GHD as part of the FY19 AEMR (GHD, 2019<sup>6</sup>). This assessment concluded that: *The assessment found that it is likely that seepage from the pit is influencing localised groundwater, however since the hydraulic gradient is generally towards the pit, it is unlikely that decant water is influencing groundwater at greater distances from the pit (ie localised influence only).* This localised mixing of groundwater and pit water at MB95 (which is occurring due to the current filling of the pit) is inconsequential as there is no pathway to the broader groundwater system. Notwithstanding, water levels and quality at MB95 (or its replacement bore) and other bores surrounding the pit would continue.

### **NRAR Issue Raised**

#### *Post Project Determination*

#### *Water Monitoring and Management*

*Should the project be approved, it is recommended that the proponent should:*

- *Update the Site Water Balance within the Water Management Plan to reflect the altered pit and void characteristics and associated water take.*
- *Recalibrate the water balance, final void and water management models after 3 years to confirm the parameters chosen are updated and relevant. The final void water level model should be updated every 3-5 years throughout the life of the project.*
- *Include a groundwater quality monitoring plan and reporting procedure for bore MB95 (or alternate bore(s)) in the broader Groundwater Monitoring Program required as a condition of project approval.\**
- *Progressively extend the bore casing of monitoring bore MB 95 above the tailings level to facilitate ongoing monitoring. If not feasible or practical, design an alternative proposal which allows groundwater quality monitoring to occur in locations at greatest risk to tailings water ingress. This could include at least one monitoring bore to a depth level with the bottom of the pit as part of the proposed additional groundwater monitoring bores between the south west rim of Cadia Hill Pit and Cadiangullong Creek.\**

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### **Cadia Holdings Pty Limited Response**

- CHPL agrees to review and, if necessary, revise the Water Management Plan following the determination of the Modification.
- CHPL is currently collaborating with Water New South Wales (NSW) to assist with updating their water catchment model for the Belubula catchment. Outputs from the Water NSW Belubula model are required to update and calibrate CHPL's site water balance model, hence a 5-year calibration interval is proposed by CHPL.
- Water quality monitoring and triggers for MB95 are included in the existing draft Water Management Plan (October 2019 version).
- Extending the stickup height of MB95 is not feasible. However, CHPL plans to progressively install new monitoring bores prior to the inundation of MB95. This would be documented in a revision of the Water Management Plan.

Yours sincerely

A handwritten signature in black ink, appearing to be 'Jane Chung', written over a light blue grid background.

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Jane Chung  
Approvals and Community Superintendent  
Cadia Valley Operations

<sup>6</sup> Refer to GHD (2019) CVO AEMR - Surface and Groundwater Assessment Report.