

Prof Neal Menzies
Chair
Mining and Petroleum Gateway Panel
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Dear Prof Neal Menzies

Thank you for your correspondence about Cadia Continued Operations Gateway Certification (GA-74105711).

As set out under the *State Environmental Planning Policy (Resources and Energy) 2021*, please find attached a technical assessment that considers the minimal impact considerations of the NSW Aquifer Interference Policy (AIP), as well as other aspects of that policy. The assessment has been undertaken by the Water Group of the NSW Department of Climate Change, Energy, the Environment, and Water (DCCEE).

The proponent has not completed an assessment against the AIP due to an interpretation that highly productive groundwater does not exist within the gateway application area. The Water Group does not support that interpretation, and as such are unable to advise on impacts to groundwater due to the project based on the information provided.

The Water Group recommends that the proponent be required to provide a groundwater impact assessment against the AIP for the Orange Basalt Groundwater Source mapped within the gateway application area.


The Water Group has also considered the Independent Expert Scientific Committee's advice in relation to the proposal's impacts on water resources and concurs with the advice provided, and the areas identified for additional work.

Should you have any further questions, Rob Brownbill, Manager Water Assessments in DCCEE, can be contacted on water.assessments@dpie.nsw.gov.au.

Should you have any further questions, Stephen O'Donoghue, Director Resource Assessments at the Department of Planning, Housing and Infrastructure can be contacted on [REDACTED] or [REDACTED]

Thank you for bringing this to my attention.

Yours sincerely


[REDACTED]
Paul Scully MP
Minister for Planning and Public Spaces

Attachment B

Technical Assessment by the NSW Department of Climate Change, Energy, the Environment and Water – Water (DCCEEW Water)

Advice on the gateway certificate application for the Cadia Continued Operations Project

Purpose

The purpose is to provide water assessment advice in response to the gateway certificate application as per the requirements of the *State Environmental Planning Policy (Resources and Energy) 2021* (SEPP). The advice takes into account:

- the minimal impact considerations of the NSW Aquifer Interference Policy (AIP), and
- other elements of the AIP.

This advice also considers the submission by the Independent Expert Scientific Committee (IESC).

Background to the Project

Cadia Holdings Pty Limited (the Proponent) is intending to apply for a new development consent to replace its existing approval PA06_0295 for the Cadia Valley Operations located 25 km southwest of Orange in the Central Tablelands of New South Wales.

The project involves extension of a tailings dam, a water storage and changes in subsidence surface expression on Biophysical Strategic Agricultural Land and the proponent is seeking a gateway certificate in relation to that land.

The gateway certificate application document has been examined in detail for this review.

Review and Comment

DCCEEW Water Gateway Assessment

DCCEEW Water advises the information provided is incomplete for the purpose of the gateway certificate application. DCCEEW Water considers that a highly productive groundwater source exists within the application area and therefore the application requires a groundwater impact assessment against the NSW Aquifer Interference Policy (2012) (AIP).

However, the proponent has not undertaken an assessment against the minimal impact considerations of the AIP for a highly productive groundwater source, as set out in the SEPP.

DCCEEW Water defines the Orange Basalt Groundwater Source as a highly productive groundwater source based on the general characteristics of the water source. This categorisation applies to a whole groundwater source as defined in the water sharing plan, not to the specific groundwater conditions at a particular location.

The map *Groundwater Productivity in NSW* was created by the then Department of Primary Industries (Office of Water) (DPI 2013) to identify areas in NSW with highly productive groundwater. The Orange Basalt Groundwater Source is classified as

highly productive groundwater. The map is available on the SEED portal (www.seed.nsw.gov.au).

The extent of the Orange Basalt in the region of the Cadia Valley Operations (CVO) was reviewed as part of Modification 15 for CVO (see Figure 1). This review relied on government and CVO geological mapping and aligns with the basalt shown in the current Gateway Application Report (Minesoils 2024) (see Figure 2). This includes mapped basalt in the gateway application area to the east of the mining zone and south within the tailings storage expansion area. It is noted the gateway application for Modification 15 included a groundwater assessment (AGE 2023) against the requirements of the AIP for the mapped basalt.

The AGE (2023) gateway assessment provides useful information for the basalt groundwater yields and quality in the current tailings expansion area. Yields are variable ranging from 0.04 L/s (GW052182) to 1.8 L/s (GW704196). Total dissolved solids (TDS) of the Orange Basalt Groundwater Source from sampling in April 2021 of 14 CVO monitoring bores indicates the groundwater is predominantly fresh with a TDS below 1,500 mg/L for 12 of the 14 bores.

Highly variable yields are reported for the Orange Basalt Groundwater Source. A review of registered Tertiary Basalt bore data, which was completed as part of the Cadia East EIS (AGE 2009), indicates that supplies from individual bores vary widely with a median value of 1.25 L/s, with 96% of bores reporting yields less than 10 L/s. Data from the Cadia East field investigation program reported moderate to high yields from the Tertiary Basalt in the palaeochannel to the north-east of the Project with airlift yields of between 2 L/s and 10 L/s (AGE 2009).

As the Orange Basalt Groundwater Source is defined as highly productive and the refined mapping shows the presence of basalt in the gateway application area, the applicant for the proposed Cadia Continued Operations project area must undertake groundwater impact assessment against the AIP.

Minimal Impact Considerations of the Aquifer Interference Policy (AIP)

Considerations of minimal impacts as required by the AIP have not been appropriately assessed. Advice can therefore not be provided on the acceptability of impact to highly productive groundwater due to the project.

Other Elements of the AIP

Additional considerations of the AIP have not been addressed by the proponent.

Please note detailed department advice regarding the AIP in Table 1.

IESC Review

The IESC comments on the lack of sufficient documentation and assessment to inform site characterisation, impact prediction and management, and mitigation of impact. The need for further documentation raised by the IESC applies to surface water, groundwater system, connections between surface and groundwater, groundwater dependent ecosystems, pathways conceptualisation for impact and impact management. The IESC advice also stresses that the Orange Basalt

Groundwater Source is a highly productive water source and investigations provided to date do not address the level of risks associated with the proposed modification.

DCCEE Water concur with the advice provided by the IESC, and the areas identified where additional work is required.

DCCEE Water Recommendation

The applicant be required to undertake a groundwater impact assessment against the AIP for the proposed activities within the area of refined basalt mapping. This needs to consider:

- the extent of drawdown and water take due to the expansion of underground mining for an additional 20 years,
- water quality seepage impacts from an expanded tailing storage facility, and
- construction and operation of the water storage and creek diversion.

The AIP assessment is to meet the following requirements.

- Assessment of the minimal impact considerations of the AIP for highly productive aquifers including drawdown and water quality impacts to high priority groundwater dependent ecosystems (GDEs), high priority culturally significant sites and water supply works.
- Assessment of acidity issues, waterlogging or water table rise.
- Assessment of:
 - additional water take during mining and post mining and the ability to obtain additional water entitlement where required
 - impacts to landholder bores, licensed water users, GDEs
 - saline or contaminated water impacts
 - changes to hydraulic connection between aquifers, especially in the subsidence zones.

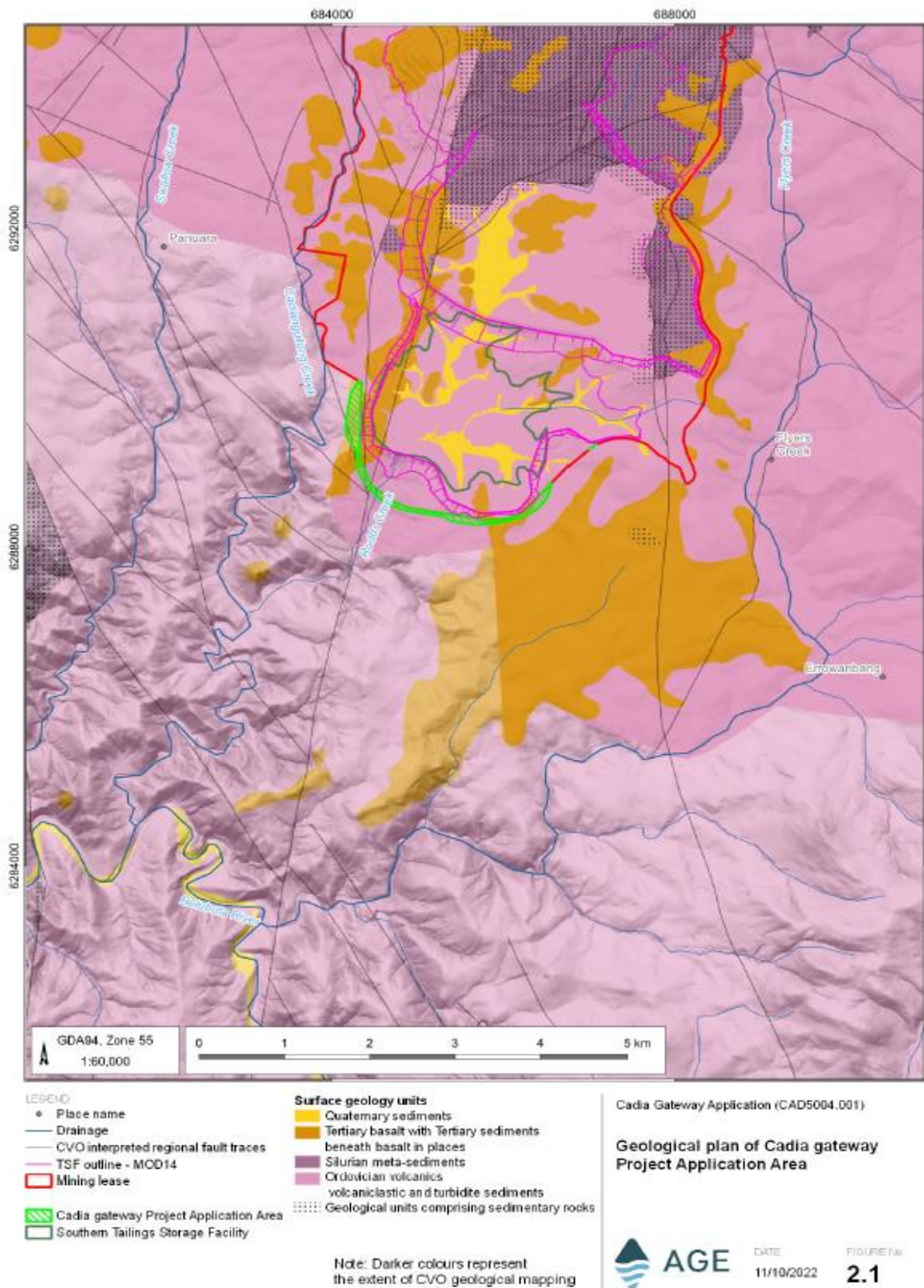


Figure 1. Geological mapping submitted with CVO Modification 15 gateway application showing basalt in southern area of CVO.

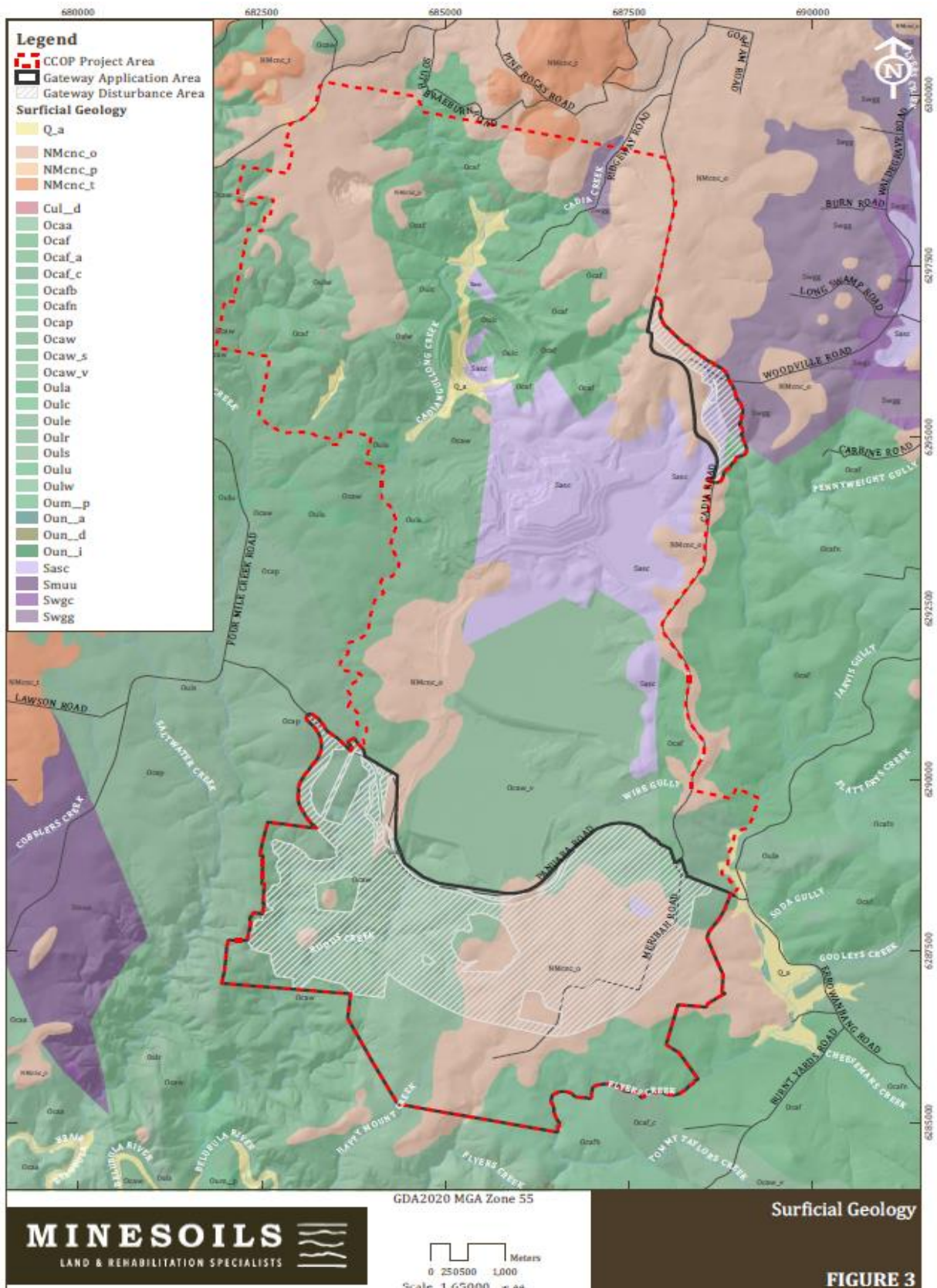


Figure 2. Geological mapping submitted with Continued Cadia Operations Project gateway application showing basalt as NMnc_p.

Table 1. Assessment of the Cadia Continued Operations Project Gateway Certificate application against the AIP

Conditions	Proponent comment	Department comment
(2) The Minister for Regional Water, when providing advice under this section on the impact of the proposed development on water resources, must have regard to —	-	-
(a) the minimal impact considerations set out in the Aquifer Interference Policy	<p>Gateway Report (Minesoils 2024), Section 2.2 Hydrogeology: <i>In considering impacts on these mapped groundwater sources, it should be noted that the mapped regulatory extent and continuity of the Orange Basalt Aquifer Source and the actual extent of the Tertiary Basalt differ significantly, particularly in the centre and south of Cadia and the area underlying the GAA (Advisian, 2023). The Tertiary Basalt in the GAA to the south are disconnected from that to the north and therefore disconnected from the main Orange Basalt Aquifer Source located to the north of the site towards Orange. Furthermore, bores within the Tertiary Basalt within the southern parts of the GAA indicate yields of significantly less than 5L/s with most well below 1L/s (Advisian, 2023). This would indicate that the groundwater aquifers present in at least the part of the area mapped as being highly productive in the 2013 DILW mapping do not meet the criteria for being highly productive aquifers and would therefore not meet the criteria outlined in the SEPP for consideration of impacts on highly productive water resources that support the agricultural productivity of BSAL.</i></p> <p>Gateway Report (Minesoils 2024), Section 5.4 Water Impacts: <i>Detailed groundwater modelling and impact assessments are currently being prepared to inform the Project EIS and ascertain the potential incremental and cumulative groundwater impacts associated with the existing Cadia operations and CCOP. Specific areas of focus in this assessment include groundwater quality, drawdown, groundwater dependent ecosystems and impacts on water availability (including to surface water base flows). Conceptual impact pathways associated with these Project changes are outlined below: ...</i></p> <p><i>Assessment Approach</i> <i>Groundwater modelling and a detailed impact assessment is being undertaken as part of the EIS. These assessments will</i></p>	<p>Not assessed.</p> <p>The proponent has not conducted an AIP groundwater impact assessment on highly productive groundwater resources that support the agricultural productivity of BSAL. Conceptual impact pathways associated with the Project have been provided which is not sufficient.</p> <p>The Orange Basalt Groundwater Source is defined as a highly productive groundwater source, based on the general characteristics of the water source. This categorisation applies to a whole groundwater source as it is defined in the water sharing plan, not to the specific groundwater conditions at a particular location.</p> <p>Since the Orange Basalt Groundwater Source is considered highly productive and the refined mapping shows the presence of basalt in the GAA, the applicant must undertake an AIP groundwater impact assessment.</p> <p>5.2 Groundwater source categories</p> <p>Section 3.2.1 in the Policy defines the two types of groundwater source categories for which minimal impact considerations have been developed. All NSW groundwater sources have been categorised as being either highly productive, or less productive, based on the general character of the water source meeting, or not meeting, the criteria of 1500mg/L total dissolved solids and a bore yield rate of greater than 5L/s. This categorisation applies to a whole groundwater source as it is defined in a water sharing plan, not to the specific groundwater conditions at a particular location. Applications to change category because of local conditions will not be accepted.</p> <p>A list of highly productive groundwater sources is given in Appendix 1 and a list of less productive groundwater sources is given in Appendix 2. A map of groundwater productivity is available at</p> <p>http://www.water.nsw.gov.au/Water-management/Law-and-policy/Key-policies/Strategic-Regional-Land-Use</p> <p>Note – the map only shows the shallowest groundwater source; in most cases there will be other water sources under these.</p> <p>From time to time these lists, and the map, may be updated to reflect any new information or other changes, including the commencement of new water sharing plans.]</p> <p>Source: <i>Guideline to the Aquifer Interference Policy</i>, NOW 2014 (internal guideline - Advice for NSW Office of Water staff)</p>

Conditions	Proponent comment	Department comment
	<p><i>be prepared in consideration of the Australian Groundwater Modelling Guidelines (Commonwealth of Australia, 2012), NSW Aquifer Interference Policy (DPI Water 2012), relevant NSW Water Sharing Plans, Australian and New Zealand guidelines for fresh and marine water quality (Australian New Zealand Guidelines 2018), Minimum Groundwater Modelling Requirements for SSD/SSI Projects (DPE, 2022a), and Guidelines for Groundwater Documentation for SSD/SSI Projects (DPE, 2022b).</i></p> <p><i>The Groundwater Impact Assessment will quantify and assess the CCOP against relevant policy and guideline requirements and the requirements of the SEARs and will be independently peer reviewed. In this regard, it can be expected that in addition to meeting standard requirements for groundwater assessment, the EIS will address a range of interrelated water resource considerations stipulated in the SEARs...</i></p>	
<p>AIP Section 3.2.1 Aquifer Impact Assessment</p> <p>Assessment criteria for the minimal impact considerations of the NSW Aquifer Interference Policy (AIP) for <i>highly productive aquifers</i></p>	-	-
<p>Water Table</p> <p>1. Less than or equal to 10% cumulative variation in the water table, allowing for typical climatic "post-water sharing plan" variations, 40m from any:</p> <p>(a) high priority groundwater dependent ecosystem; or</p> <p>(b) high priority culturally significant site;</p> <p>listed in the schedule of the relevant water sharing plan.</p> <p>A maximum of a 2m decline cumulatively at any water supply work.</p> <p>2. If more than 10% cumulative variation in the water table, allowing for typical climatic "post-water</p>	Refer to the above.	<p>Not assessed.</p> <p>Refer to comments above.</p>

Conditions	Proponent comment	Department comment
<p>sharing plan" variations, 40m from any:</p> <p>(a) high priority groundwater dependent ecosystem; or</p> <p>(b) high priority culturally significant site;</p> <p>listed in the schedule of the relevant water sharing plan then appropriate studies will need to demonstrate to the Minister's satisfaction that the variation will not prevent the long-term viability of the dependent ecosystem or significant site.</p> <p>If more than 2m decline cumulatively at any water supply work then make good provisions should apply.</p>		
<p>Water Pressure</p> <p>1. A cumulative pressure head decline of not more than a 2m decline, at any water supply work.</p> <p>2. If the predicted pressure head decline is greater than requirement 1.(a) above, then appropriate studies are required to demonstrate to the Minister's satisfaction that the decline will not prevent the long-term viability of the affected water supply works unless make good provisions apply.</p>	<p>Refer to the above.</p>	<p>Not assessed. Refer to comments above.</p>
<p>Water Quality</p> <p>1. Any change in the groundwater quality should not lower the beneficial use category of the groundwater source beyond 40m from the activity.</p> <p>2. If condition 1 is not met then appropriate studies will need to demonstrate to the Minister's satisfaction that the change in groundwater quality will not prevent the long-term viability of the dependent ecosystem, significant site or affected water supply works.</p>	<p>Refer to the above.</p>	<p>Not assessed. Refer to comments above.</p>

Conditions	Proponent comment	Department comment
(b) the other provisions of that Policy. and also the following:	See AIP provisions 3.2.2 and 3.2.3 below	See AIP provisions 3.2.2 and 3.2.3 below
(a) in relation to biophysical strategic agricultural land— that the proposed development will not significantly reduce the agricultural productivity of any biophysical strategic agricultural land, based on a consideration of the following— (iv) any impacts on highly productive groundwater (within the meaning of the Aquifer Interference Policy),	Proponent did not address impacts on highly productive groundwater for the proposed Project.	Not assessed. Refer to comments above.
AIP Section 3.2.2 Additional considerations In addition to the considerations specified in section 3.2.1 any advice provided to a gateway panel, the Planning and Assessment Commission or the Minister for Planning on a State significant development or State significant infrastructure will also consider the potential for:	-	-
<ul style="list-style-type: none"> acidity issues to arise, for example exposure of acid sulphate soils; 	Proponent did not address acidity issues for the proposed Project.	Not assessed. Refer to comments above. Assessment of acidity issues is required.
<ul style="list-style-type: none"> waterlogging or water table rise to occur, which could potentially affect land use, groundwater dependent ecosystems and other aquifer interference activities. Specific limits will be determined on a case-by-case basis, depending on the sensitivity of the surrounding land and groundwater dependent ecosystems to waterlogging and other aquifer interference activities to water intrusion. 	Proponent did not address waterlogging or water table rise for the proposed Project.	Not assessed. Refer to comments above. Assessment of waterlogging or water table rise is required.
AIP Section 3.2.3 What is required from proponents In addition to the volumetric water licensing	See below.	See below.

Conditions	Proponent comment	Department comment
<p>considerations specified in section 2, the proponent of an activity that may result in aquifer interference will need to provide the following to enable the assessment of the activity against the minimal impact considerations in Table 1 and the additional considerations in section 3.2.2:</p>		
<ul style="list-style-type: none"> establishment of baseline groundwater conditions including groundwater depth, quality and flow based on sampling of all existing bores in the area potentially affected by the activity, any existing monitoring bores and any new monitoring bores that may be required under an authorisation issued under the Mining Act 1992 or the Petroleum (Onshore) Act 1991 	<p>Gateway Report (Minesoils 2024), Section 2.3 Groundwater Licences: <i>As an active mining operation, Cadia has an extensive groundwater monitoring network consisting of 224 bores, of which 148 are active, with additional bores recently installed. Cadia conducts routine groundwater monitoring, with 124 bores monitored on a quarterly basis and 53 bores monitored monthly. Groundwater quality samples are taken from 67 of the quarterly monitoring bores and 21 of the monthly monitoring bores.</i> <i>This extensive monitoring network provides a good understanding of the local groundwater environment including groundwater levels and quality. The GAA is located to the south and east of the existing Cadia operations as shown in Figure 1.</i> <i>Detailed groundwater modelling and impact assessments are currently being prepared to inform the CCOP EIS. These studies will include a review of the adequacy of the existing groundwater monitoring network and if necessary, recommend rationalisation and / or additional bores be installed as part of this extensive monitoring network.</i> The most recent review of the data from the monitoring network was completed for the 2022-2023 financial year by AGE (2023) (Cadia Annual Groundwater Monitoring Review 2022/2023 Water Year).</p>	<p>Assessed as acceptable. Baseline conditions are well established. Replacement monitoring bores will be required in the STSF expansion area as well as targeted additional monitoring bores in areas such as the Cadiangullong Creek diversion. Placement and coverage to be considered during review of EIS application and/or post-determination.</p>
<ul style="list-style-type: none"> a strategy for complying with any water access rules applying to relevant categories of water access licences, as specified in relevant water sharing plans. For example, returning water of an acceptable quality to the affected water source during periods when flows are at 	<p>Proponent did not address additional water take for the proposed Project.</p>	<p>Not assessed. Refer to comments above. Assessment of additional water take during mining and post mining is required.</p>

Conditions	Proponent comment	Department comment
<p>levels below which water users are not permitted to pump;</p>		
<ul style="list-style-type: none"> details of potential water level, quality or pressure drawdown impacts on nearby water users who are exercising their right to take water under a basic landholder right. Consideration will need to be given to any relevant distance restriction requirements that may be specified in any relevant water sharing plan or any remediation measures to address these impacts; 	<p>Proponent did not address impacts to landholder bores due to the proposed Project.</p>	<p>Not assessed. Refer to comments above. Assessment of landholder bore impacts is required.</p>
<ul style="list-style-type: none"> details of potential water level, quality or pressure drawdown impacts on nearby licensed water users in connected groundwater and surface water sources; 	<p>Proponent did not address impacts to licensed water users due to the proposed Project.</p>	<p>Not assessed. Refer to comments above. Assessment of licensed water user impacts is required.</p>
<ul style="list-style-type: none"> details of potential water level, quality or pressure drawdown impacts on groundwater dependent ecosystems; 	<p>Proponent did not address impacts to GDEs due to the proposed Project.</p>	<p>Not assessed. Refer to comments above. Assessment of GDE impacts is required.</p>
<ul style="list-style-type: none"> details of potential for increased saline or contaminated water inflows to aquifers and highly connected river systems; 	<p>Proponent did not address saline or contaminated water impacts due to the proposed Project.</p>	<p>Not assessed. Refer to comments above. Assessment of saline or contaminated water impacts is required.</p>
<ul style="list-style-type: none"> details of the potential to cause or enhance hydraulic connection between aquifers; 	<p>Proponent did not address the potential to cause or enhance hydraulic connection between aquifers due to the proposed Project.</p>	<p>Not assessed. Refer to comments above. Assessment of changes to hydraulic connection between aquifers is required, especially in the subsidence zones.</p>