Environmental Defenders Office

28 July 2025

Ads Standards

PO Box 5110

BRADDON ACT 2612

Complaint lodged via website at www.adstandards.com.au

Alcoa advertisement in West Australian about impacts on Perth's drinking water

1. We act on behalf of Conservation Council of WA (**CCWA**), The Wilderness Society (**TWS**) and WA Forest Alliance (**WAFA**).

   CCWA is Western Australia's foremost non-profit, non-government conservation organisation representing close to 100 environmental organisations across Western Australia, with tens of thousands of engaged individuals state-wide. This broad collective of like-minded groups and individuals creates a vibrant and passionate community, dedicated to the conservation of our unique and diverse state.

   The WA Forest Alliance is a non-profit, non-government umbrella organisation made up of more than 25 forest conservation groups in Perth/Boorloo and the South West, working together for the protection of WA's south-west forests and wildlife. WAFA's mission is to see WA's native forests fully and securely protected and managed to maintain and restore their ecological values, and to empower the next generation to successfully defend them against future threats.

   The Wilderness Society is an independent, community-based, not-for-profit environmental advocacy organisation. Our vision is to transform Australia into a society that protects, respects and connects with the natural world that sustains us. We are committed to protecting, promoting and restoring wilderness across the continent for the survival and ongoing evolution of life on Earth. From community activism to national campaigns, we seek to give nature a voice to support the life that supports us all. We are powered by more than 150,000 supporters from all walks of life.

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2. Our clients request that Ads Standards investigate whether statements made by the Alcoa of Australia Ltd (**Alcoa**) in an advertisement in the West Australian newspaper on 7 June 2025 (**West advertisement**) are potentially misleading, in breach of sections 1(a), 1(b), 2, 3(b), 4 and/or 5 of the Environmental Claims Code (**Code**). The West advertisement is reproduced at **Annexure A** and promotes Alcoa's environmental credentials in relation to Alcoa's bauxite mining and its impacts on Perth's drinking water. The West advertisement states:

   (i) "Alcoa has operated in WA's Northern Jarrah Forest for more than half a century without negatively affecting Perth's public drinking water supply";

   (ii) "Since July 2024, we've stopped clearing for mining activities within one kilometre of drinking water reservoirs to increase the distance between Huntly and Willowdale operations and the dams"; and

   (iii) "Our commitment is long term. Our record is strong – and we are confident that we can operate in a way that continues to help protect Perth's drinking water, now and into the future – and that's the fact",

   (together, the **Statements**).

3. The Statements, alone or in combination, represent that:
   (i) Mining has occurred in the relevant area without any negative impact on Perth's drinking water quality (**historical drinking water quality claim**); and

   (ii) Mining will continue to operate in the area in a way that does not negatively impact on Perth's drinking water quality (**future drinking water claim**).

Background to Alcoa bauxite mining

4. Alcoa is a US-owned mining company that has been operating in WA since 1961 under a State Agreement with the WA Government. Alcoa has already cleared over 28,000ha of forests in WA pursuant to that agreement. Alcoa undertakes extensive bauxite mining south of Perth, in the metropolitan Perth and Southwest drinking water catchments. Alcoa's current operations include mining in Serpentine, Serpentine Pipe, North Dandalup, Sampson and Stirling catchments.

5. Currently, Alcoa have lodged an application to clear a further 11,500ha across three regions of the Northern Jarrah Forest (NJF) over a 20 year period. The WA Government has provided Alcoa with an exemption under Section 6 of the *Environmental Protection Act 1986* (WA), allowing Alcoa to continue clearing forests, despite the ongoing assessment.

Environmental Claims Code

6. The Code relevantly defines "Environment" to include "ecosystems and their constituent parts, including people and communities" and states that "an environmental claim in relation to goods or services…may include representations that state or imply…no effect

on the environment." "Environment" therefore captures claims relating to the impact of mining activities on the drinking water of Perth.

7. Section 1 (a) and (b) of the Code relevantly require that Environmental Claims should be truthful and factual and not be misleading or deceptive or likely to mislead or deceive. The correlating Practice Note 1 provides that:

> *It is not intended that legal tests be applied to determine whether advertisements are misleading or deceptive, or likely to mislead or deceive, in the areas of concern in this Code.*
>
> *Instead, consideration will be given as to whether the Target consumer would likely be misled or deceived by the Advertising.*
>
> *Care should be taken when making absolute claims that it can be substantiated as such.*

8. Section 2 of the Code requires that Environmental Claims in advertising must be supported by evidence. Practice Note 1 states in relation to section 2 that the advertiser "should have reasonable grounds for making an Environmental Claim, based on evidence held at the time the claim is made". It also states:

> *Scientific claims should be consistent with the body of evidence, not simply selective parts that can be used in a misleading way*.

9. Section 3(b) of the Code states that environmental claims must "be specific – broad, vague or unqualified claims should be avoided". Section 3(c) requires advertisements to "Include important limitations, conditions or qualifications in a way that is clear to the Target Consumer".

10. Section 4 of the Code states that environmental claims must be a genuine benefit to the environment and not overstate the environmental benefit.

11. Section 5 of the Code requires environmental claims about future objectives to be based on reasonable grounds at the time the claim is made.

12. For the reasons that follow, our client considers that Alcoa may have breached the above mentioned sections of the Code by making the Statements.

Potentially misleading claims

<u>Claim 1 – Historical drinking water quality claim</u>

Words likely to mislead or deceive – alleged breach of sections 1 and 3(b) of the Code

13. The West advertisement represents that Alcoa has operated its Bauxite mine in the region for over 50 years without any negative impact on the quality of the drinking water supply of Perth.

14. In 2018, changes to Alcoa's mining practices led to the mine coming within 300 metres of Serpentine Dam, leading to concerns that during heavy rain sediment including chemical

pollutants and disease-causing pathogens could wash into the dam.[1] Since that time, mining has been occurring in hillier areas, involved digging of larger pits and leaving more land unrehabilitated, leading to increased risk of sediment runoff.

15. There were a record number of spills at the site including sediment flowing into the dam 46 times in 2021, with 137 spills with an average volume of 125L.[2] According to documents obtained under the *Freedom of Information Act 1992* (WA) which were prepared by the Water Corporation, the relevant agency responsible for water quality, the "probability of contamination of reservoirs is considered certain" based on what Alcoa has reported.[3] Reports from Alcoa included:

    (i) 38 draining failures per year between 2017-2022, with a maximum of 77 in 2021;

    (ii) 28 turbidity events per year between 2018-2022 with increasing trend in 2022; and

    (iii) On average of 130 hydrocarbon spills per year between 2017-2022 (on average 16,900 litres/year).[4]

16. The Water Corporation's assessment concluded there was a high likelihood of significant negative long-term impacts to water quality and catchment water yield arising from fundamental changes to hydrology and catchment resilience.[5] It also noted that due to the close proximity of the mining:

    Bauxite mining operations represent the single most significant risk to water quality in Perth Metropolitan and Southwest drinking water catchments. The potential long term financial implications for the Water Corporation and by extension are considerable.[6]

17. Documents obtained by our client under freedom of information processes from the Water Corporation (**Water corporation documents**) also outline the following hazardous spills on site in 2021/2022.[7]

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[1] See, for example, Brad Thompson, "WA warns Alcoa over threat to drinking water" (9 February 2023) https://www.afr.com/companies/mining/wa-warns-alcoa-over-threat-to-drinking-water-20230209-p5cjd3.

[2] Peter Milne, "Alcoa mining threatens Perth's drinking water" WA Today, 8 February 2023

[3] 'Catchment Risk Assessment Alcoa 2023 – 2027: Procedural assessment under MS 728 informing the environmental audit of Alcoa's 2023 – 2027 MMP' https://www.smh.com.au/interactive/hub/media/tearout-excerpt/30655/FOI-869---Document-8---Catchment-Risk-Assessment-Framework---Alcoa-2023---2027-MMP.pdf, p 7.

[4] Ibid, p 7.

[5] Ibid.

[6] Ibid, p 8.

[7] FOI document no 48 obtained by The Wilderness Society, p 5 (**Annexure B**).

Table 3. Alcoa's reported LOC of hazardous substances (2020/21)

	2020 - 2021		2021 - 2022	
Incident	No. of Spills	Volume (L)	No. of Spills	Volume (L)
Coolant	14	1,585	15	2,829
Hydrocarbon	150	16,499	90	8483
F3	1	240	13	2,777
PFAS	13	2,408		
Total	178	20,732	118	14,089

18. Prior to this time there was an even greater number of incidents over a longer period, as detailed below:[8]

Table 4. Reported LOC events – 2017 – 2021 (Huntley and Willowdale Mine sites combined)

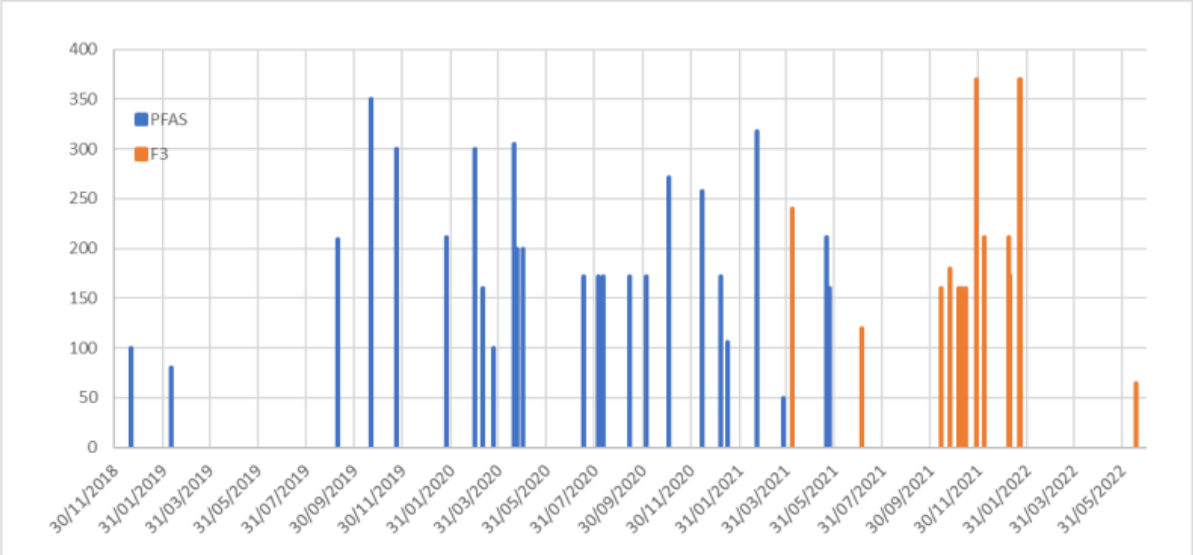
	No. of Incidents	*Volume (L)*
2017	74	9,884
2018	111	17,209
2019	132	22,436
2020	184	19,631
2021	137	14,968
2022 (to July)	*77*	*9,605*
Total	***715***	***93,734***

19. The Water Corporation documents outlined issues with Alcoa's use of PFAS on the site since 2014, which was only removed from use at the site in 2021. PFAS use is a significant environmental issue due to its persistence, potential for bioaccumulation and long-term contamination of water sources, causing a growing concern for human health and the environment.[9]

[8] https://www.smh.com.au/interactive/hub/media/tearout-excerpt/30655/FOI-869---Document-8---Catchment-Risk-Assessment-Framework---Alcoa-2023---2027-MMP.pdf, FOI document no 48 obtained by The Wilderness Society, p 5. (**Annexure B**).

[9] FOI document no 48 obtained by The Wilderness Society, p 7 (**Annexure B**).

Reported Volume (L) of PFAS Related Incidents (Huntly and Willowdale Mines sites combined)



20. The Water Corporation documents concluded that the risks to the Water Corporation assets from the mining included:
    - Increase in risk of pathogens;
    - Increase turbidity from the mine put runoff and drainage failures;
    - Changes to catchment hydrology resulting from clearing, revegetation and removal of the upper regolith (soil profile) as a result of mining;
    - Risk of contamination from hydrocarbons and chemicals of emerging concern;
    - Decline in water quality (various parameters) and impacts to catchment yield; and
    - Changes to fire behaviour and catchment stability.[10]

21. The Water Corporation also priced the treatment options for the dam, if contamination occurred, and concluded it could cost up to $1.31 billion to $2.62 billion, leading to a 55-100% increase in water costs to customers. The potential loss of a dam through contamination would significantly impact on around 250,000 customers. The Water Corporation made specific recommendations to reduce the risk of contamination, noting that previous mining operations have not been effectively regulated, primarily due to limitations associated with the outdated management framework associated with the relevant State agreement.[11] It concluded that its recommendations are considered essential to protect drinking water in accordance with the precautionary principle, and are the minimum conditions to provide a reasonable level of protection to drinking water until a more detailed assessment and research can be undertaken.[12]

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[10] FOI Document, no 49 obtained by The Wilderness Society, Water Corporation Briefing dated 16 September 2022, p4.

[11] FOI Document, no 49 obtained by The Wilderness Society Water Corporation Briefing dated 16 September 2022, p4.

[12] 'Catchment Risk Assessment Alcoa 2023 – 2027: Procedural assessment under MS 728 informing the environmental audit of Alcoa's 2023 – 2027 MMP' https://www.smh.com.au/interactive/hub/media/tearout-excerpt/30655/FOI-869---Document-8---Catchment-Risk-Assessment-Framework---Alcoa-2023---2027-MMP.pdf, p 30.

Overstate environment benefit – alleged breach of section 4 of the Code

22. The conclusive way that Alcoa claims its record is strong and it has had no impact on Perth's water quality over the course of its operations, ignores the evidence of the contamination incidents in the catchment. As indicated above, the Water Corporation's view is that contamination because of these incidents was certain, and the mining is the most significant risk to water quality in the area.
23. In our clients' view, Alcoa has thereby overstated the environmental benefit of its mining operations and/or lack of impact on water quality.

No reasonable basis – alleged breach of sections 2 and 5 of the Code

24. The Catchment Risk Assessment undertaken by the Water Corporation provides substantial analysis to demonstrate that there are significant risks with Alcoa's current mining operations and the way it has operated in recent years. It acknowledges that the mine has not been appropriately regulated to manage water quality and therefore poses a significant risk to assets. Given the circumstances, it is difficult to understand how Alcoa can substantiate its claims that its current operations have no adverse impact on water quality.

<u>Claim 2 –</u> Future drinking water quality claim

Words likely to mislead or deceive – alleged breach of sections 1 and 3(b) of the Code and overstates environmental benefit – alleged breach of section 4 of the Code

25. Alcoa claims "Our commitment is long term. Our record is strong- and we are confident that we can operate in a way that continues to help protect Perth's drinking water". Alcoa bases this claim both on its record to date and on the recent changes made to its operations including the buffer between the mining areas and dams in the catchment. We have discussed in detail above the reasons why Alcoa's record to date may be misleading in claiming that it does not negatively impact on water in the catchment.

26. The Water Corporation analysis shows that future mining continues to pose further risks to the catchment. Future mining will occur on hillier areas, with more exposed areas on the site that will not be immediately rehabilitated. While stronger conditions have been proposed in respect of the new mining areas, there are still significant risks associated with the ongoing mining in the catchment. Despite this, there are no disclaimers or limitations on the statements made by Alcoa which, in our clients' view, may thereby tend to mislead given Alcoa's record to date of spills, drainage failures and turbidity events.

No reasonable basis– alleged breach of sections 2 and 5 of the Code

27. Given that the Water Corporation report suggests there are significant risks associated with Alcoa's current operations, it is unclear what evidence Alcoa is relying on in respect of its arguments that it will be able to protect the water catchment from future mining and pollution impacts. If it is unable to show a significant change to its overall operations,

spills, drainage incidents and turbidity events will continue to occur and pose a significant risk to the catchment. The proposed one-kilometre buffer will not make any difference when operations occur in hilly and exposed areas that are not rehabilitated.

28. These future risks to Perth's water supply are confirmed by a Water Corporation briefing note. Its states that future risk to the Water Corporation can only be reduced to acceptable levels by adoption of certain Water Corporation and Department of Water and Environmental Regulation recommendations to improve the robustness and transparency of the mine planning approval consultative process.[13] The risks are considerable given the new area of proposed mining is entirely in the Serpentine River catchment which runs into the Serpentine Dam, Perth's most important water supply dam.

29. Even Alcoa's own consultants GHD acknowledge significant risks to water associated with the construction, mine development and rehabilitation, mine facilities and infrastructure and potential hazards from the proposal including:

- Generation and discharge of pathogenic microorganisms from increased human activity;
- Increases in sediment, suspended solids and turbidity from erosion during mining activities;
- Increase in stream salinity because of mining-induced saline groundwater discharge; and
- Contamination from spills, leaks and/or emissions from the storage, handling and use of hazardous materials and waste.[14]

30. GHD do propose several preventative risk management measures to prevent hazards and reduce them to acceptable levels. The report further identified long term hazards including relating to rehabilitation and climate change, including from wildfires in generating sediment, solids and organic matter, mine rehabilitation failures and remobilisation of sediments which are more difficult to manage and could still lead to unacceptable risks.[15]

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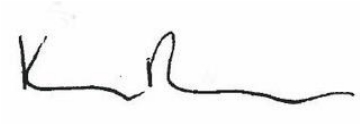
31. If you have any questions relating to this complaint, please contact Kirsty Ruddock on 0406 288 599 or by email kirsty.ruddock@edo.org.au.

[13] FOI Document, no 49 obtained by The Wilderness Society, Water Corporation Briefing dated 16 September 2022, p 5. **Annexure C**

[14] GHD Report, Drinking Water Risk Assessment for Alcoa, March 2025 found at B8.6 - GHD - Drinking Water Risk Assessment – Serpentine.PDF (accessed 1 July 2025) p i

[15] Ibid, p ii.

Yours sincerely
Environmental Defenders Office



Kirsty Ruddock

Managing Lawyer

Corporate and Commercial

Annexure A – West Australian advertisement, 7 June 2025

Is our drinking water supply impacted? We're here with the facts.

It's a serious question.

That's why we're here with the facts.
Alcoa has operated in WA's Northern Jarrah Forest for **more than half a century without negatively impacting Perth's public drinking water supply**. We are confident that our operations in the Northern Jarrah Forrest and the security of Perth's drinking water supply can continue to occur safely and successfully for many years to come.

Every part of our operations is subject to rigorous environmental assessments and stringent approvals to ensure Alcoa's ongoing compliance. We are confident these safeguards, along with our robust internal standards and processes, are working.

We're committed to meeting all necessary water protection measures. Since July 2024, **we've stopped clearing for mining activities within one kilometre of drinking water reservoirs** to increase the distance between our Huntly and Willowdale operations and the dams.

We have further enhanced our drainage and monitoring systems and are committed to catchment-wide risk management.

And to **demonstrate our confidence** that our operations will not impair drinking water supplies, **we've provided a $100 million guarantee**.

Our commitment is long term. Our record is strong – and we are confident that we can operate in a way that continues to help protect Perth's drinking water, now and into the future – and that's the fact.

alcoa.com/australia

Alcoa
Here for the future

1.1 Mining

Mining activities are permitted within PDWSA, with appropriate controls as outlined in the *Land use compatibility tables of public drinking water source protection* (LUT) (*DWER Water Quality Protection Note 25*) and in the Administrative Agreement between DMIRS and DWER. The controls associated with mining activities related to management of operations within the P1 catchments and more broadly management of risks associated with, hazardous substances (including hydrocarbons), implementation of effective drainage controls, management of drilling operations, the management of organic material, and a range of other potential environmental hazards arising from mining operations. The guidelines also provide some guidance on a range of potential environmental controls including establishment of buffer etc, however these typically are not specifically related to the management of mining related risks.

Table 5 lists active mining and extraction activities currently occurring within the Perth Metropolitan Region.

Table 5 –Active mining and extraction activities occurring in PDWSAs in 2020/21

Region	Catchment	Company	Operation	Inside the RPZ
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Metro / SWR	Serpentine, North Dandalup, Samson, Stirling	Alcoa Australia	Mining for Bauxite extraction	Yes
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[redacted]

[redacted]

[redacted]

1.1.2 Alcoa

Background

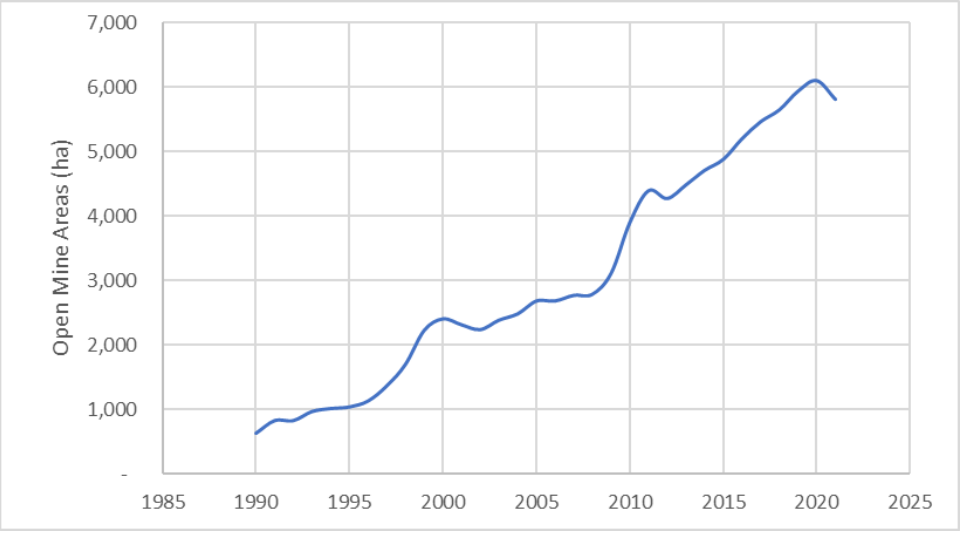
Alcoa operate an extensive bauxite mining operation in the Perth metropolitan and South West drinking water catchments. Alcoa's current operations include active mining in the Serpentine, Serpentine Pipe, North Dandalup, Sampson and Stirling catchments.

To date, mine operations associated with the Huntly and Willowdale mines have impacted over 23,400 ha of native Jarrah forest, approximately 20,000 ha of that within the P1 area.

This is in addition to the 3,980 ha of clearing that previously occurred in the Wungong catchment associated with the Jarrahdale mine which closed in 2000.

Of the 23,000 ha of clearing (Huntly and Willowdale mines), 5,800 ha of land currently remains open (ie. cleared mine area that has not yet been rehabilitated). There has been an increase in the area of open mine since the inception of the Huntly and Willowdale mines in the early 1990's (refer Figure 1).

Figure 1. Area of currently open mine site (Huntly and Willowdale Mines)



There has been a slight decease in the area of open mine area in the last two years. This is largely because Alcoa have been constrained in the area that is available for clearing, as a result of the implementation of additional controls. This has included implementation of restriction on clearing above 16% slope and to less than 30% of the area of sub catchments, and areas of shallow groundwater. These restrictions were implemented to reduce the incidents of mining related drainage failures and turbidity events.

1.1.3 Forest Clearing Advice

Alcoa submitted a single forest clearing advice (FCA) during the reporting period, in December 2021. The FCA identifying 537.2 ha for clearing (Huntley: 248.6 ha and Willowdale: 288.6 ha). This was a slight reduction from that submitted in October 2020 which was for 546.4 ha. Prior to 20202, the average area submitted in FCAs was approximately 700 ha/yr, typically submitted in two FCAs per year.

In assessing the FCAs submitted in 2021, the Water Corporation, in association with DWER, applied a catchment risk assessment framework, including a detailed analysis of the proponent's recent water management performance.

The adopted risk assessment framework identified significant risks to water quality emerging from a number of Alcoa's proposed FCA's, typically associated with proposed mining areas likely to intercept shallow groundwater. The details of the outcome of the assessment are presented in Table 1 and Table 2.

Table 1 . Summary of the Clearing Advice Assessment – Huntly Mine

Status	*1st Assessment*	*Resubmitted*	*Total*
FCA's Supported	74.9	145.8	220.7
Requiring Further Investigation Required*	165.4		
Not Supported	8.3	27.94	27.94
Total	***248.6***	***173.74***	***248.64***

* *Further investigation typically required additional groundwater investigation including monitoring of groundwater*.

The key risks arising from the assessment of the Huntly FCAs were associated with potential groundwater interception of proposed mining in areas of shallow regolith in the Mount Solus area. The Water Corporation and DWER required that the proponent undertake additional groundwater investigation associated with 165.4 ha of submitted FCAs. The FCAs were assessed according to the groundwater risk assessment framework developed by DWER and the Water Corporation.

Alcoa subsequently resubmitted the 2021 unsupported Huntly FCAs in May 2022, including a rapid groundwater assessment. Of the 173.75 ha of FCAs that were resubmitted by Alcoa (including areas either not supported or requiring further investigation in the 1st assessment), of 145.8 ha were subsequently supported for clearing. As a result of the two assessments undertaken a total of 202.7 ha was supported for clearing and a total of 27.94 ha was not supported.

The Willowdale FCA submission included 288.6 ha identified by the proponent for clearing. The first assessment resulted in 228.5 being supported with an additional 46.16 ha supported with condition. Conditions were associated with presentation of additional information, including additional groundwater investigations.

Table 2. Summary of the Clearing Advice Assessment – Willowdale

Assessment	*1st Assessment*	*Resubmitted*	*Total*
Supported	228.5	27.43	277.89
Supported with condition	46.16		
Not Supported	13.6	10.71	10.71
Total	***288.6***	***38.14***	***288.6***

Alcoa resubmitted 38.14 ha of the Willowdale FCAs for reassessment in July 2022. 27.43 ha of resubmitted FCAs were subsequently supported for clearing, leaving 10.71 ha unsupported.

Of the total 537.2 ha submitted under the 2021 FCAs, 498.55 ha (93%) were supported for clearing. A total of 38.65 ha remained unsupported at the completion of the assessment process.

1.1.4 MMP

Alcoa's mining operations are overseen by the Mine Management Planning and Liaison Group (MMPLG). The MMPLG is responsible for undertaking consultation with the proponent and providing advice to the Minister for State Development on the Annual Mine Management Program (MMP).

Alcoa's 2021 – 2025 MMP was signed off in October 2021 after an extended period of consultation. [redacted]

[redacted]

The Water Corporation and DWER subsequently presented a series of 12 recommendations to the MMPLG to improve future iterations of the MMP. These recommendations were subsequently endorsed by the MMPLG and will be implemented in the development of the 2023 – 2027 MMP.

1.1.5 Loss of Containment (LOC) - Hydrocarbons

The Water Working Arrangements (WWA) are an agreement between Alcoa, DWER and the Water Corporation that set out the requirements for reporting and management of LOC (uncontrolled releases) of hazardous substance on the mine sites. The WWA require that Alcoa report all spills to the Water Corporation and DWER and remediate the area of the spill as soon as possible after the LOC occurs.

During 2021/22, Alcoa reported a total of 118 LOC, the majority (78%) of which occurred on the Huntly Mine.

Table 3. Alcoa's reported LOC of hazardous substances (2020/21)

	2020 - 2021		2021 - 2022	
Incident	No. of Spills	Volume (L)	No. of Spills	Volume (L)
Coolant	14	1,585	15	2,829
Hydrocarbon	150	16,499	90	8483
F3	1	240	13	2,777
PFAS	13	2,408		
Total	178	20,732	118	14,089

There was a reduction in the number of LOCs between 2020/21 and 2021/2022, in response to Alcoa implementing a range of control measures. The longer-term trend indicates a stabilisation in LOC on Alcoa mine sites.

Between 2017 – July 2022, Alcoa have reported 715 hydrocarbon LOC incidents resulting in a total of 93,734 L of spills to the environment (refer Table 4).

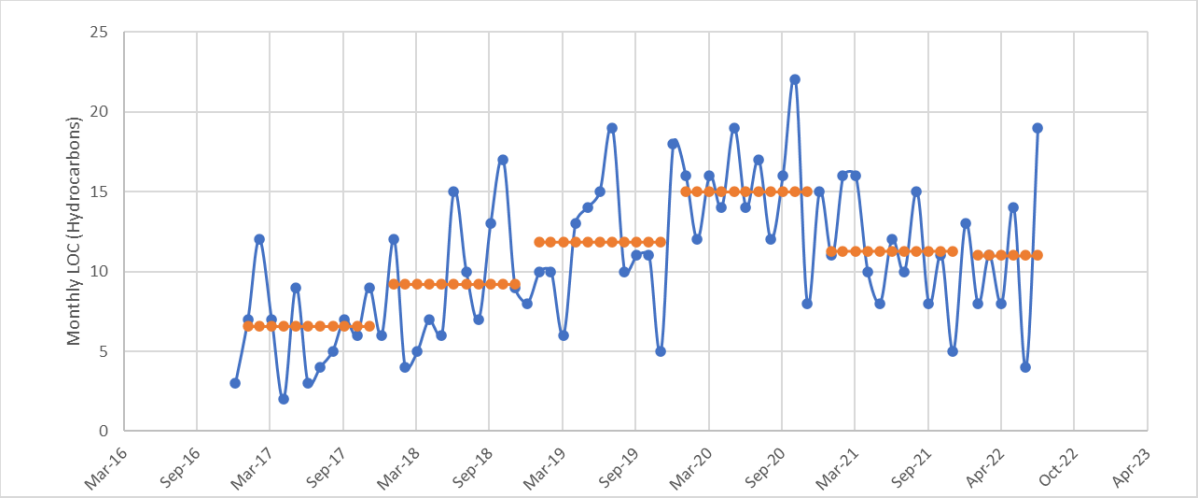
Table 4. Reported LOC events – 2017 – 2021 (Huntley and Willowdale Mine sites combined)

	No. of Incidents	*Volume (L)*
2017	74	9,884
2018	111	17,209
2019	132	22,436
2020	184	19,631
2021	137	14,968
2022 (to July)	*77*	*9,605*
Total	***715***	***93,734***

Based on current trends, Alcoa is on track for 132 LOCs (16,500 L) in the 2022 calendar year, a similar number to that reported in 2021.

Alcoa reported a dramatic increase in the frequency of spills on the Huntly Mine from 2018 – 2020, apparently arising from a reduction in the maintenance schedules. Control measures implemented by Alcoa during 2020 appear to have resulted in the return of LOC frequency to 2019 levels at approximately one LOC in three days.

Table 5. Trend in LOC (Huntly and Willowdale mines)

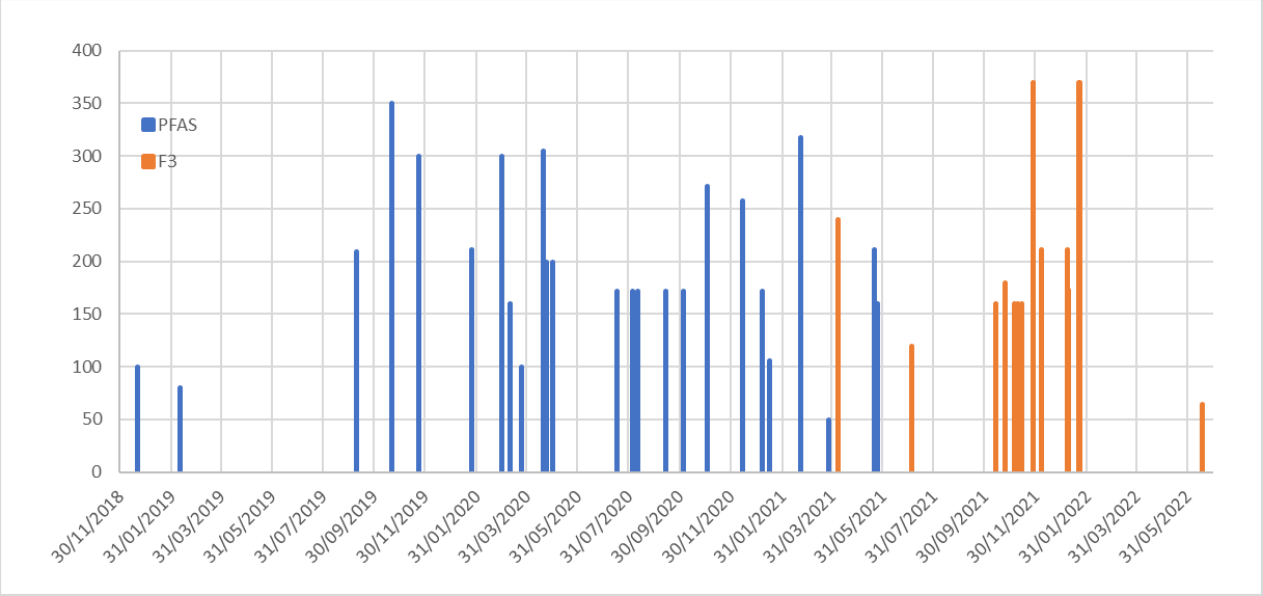


1.1.6 LOC (PFAS and F3 Trends)

Alcoa began using aqueous fire fighting foam (AFFF) containing C6 PFAS compounds in 2014, however did not begin reporting spills until Dec 2018. There were 25 reported PFAS incidents (LOC 4,925 L of C6 AFFF) involving the discharge of fire suppressant systems on the Huntley (19) and Willowdale (6) mine sites since reporting began in Dec 2018.

Alcoa removed PFAS from its fire suppression units on the mine site vehicle fleet during 2020 – 2021 and replaced it with an F3 fire suppression foam.

Reported Volume (L) of PFAS Related Incidents (Huntly and Willowdale Mines sites combined)



The vast majority (90%) of reported LOC incidents for PFAS and F3 were a result of mechanical failure, where on-board fire suppressant material was discharged in the absence of a fire, due to a malfunction or mechanical failure.

There were no PFAS LOC incidents reported during 2021 – 2022.

There were 14 x F3 LOC incidents (totalling 2,777 L) reported during 2021 – 2022. There was a significant cluster of incidents between Oct 2021 and Jan 2022, with 12 reported F3 LOC incidents in 100 days. Alcoa reported they were undertaking an investigation of the incident cluster; however no further correspondence has been received.

1.1.7 Mine Stie Drainage

Alcoa report mine site drainage failures and turbidity incidents (>25 NTU for > 1 hr) as prescribed by the WWA. During 2021/22 there were 73 reported drainage failures, 60 of which occurred during July 2021.

Drainage failures during2021 – 2022 were predominately associated with mine pit failures and haul road sump failures. There was a reduction in the proportion of water shot failures during the 2021 – 2022 reporting period, with a change in the construction of watershots considered to be the likely cause of the reduction. It is also considered that the change to construction of watershots is the likely cause of an increase in turbidity events between 2020 and 2022 (for further discussion refer to the Turbidity section 1.1.10 below).

Table 6. Reported Drainage Failures – Huntly and Willowdale Mine sites (2021 – 2022)

Incident	***#***
Rehab pit	7
Mine Pit	24
Haul Road Sump	23
Water Shot	8
Haul Road construction	4
Rehab	5
Conveyor	2
Total	***73***

1.1.8 Trends in Drainage Failures

Alcoa have report 219 drainage failures between 2017 – 2022. It is estimated that more than 75% of these reported incidents occurred during relatively minor (< 1:1 ARI) rainfall events.

Patterns of drainage failures have emerged across the Alcoa mine sites. A higher frequency of drainage failures occurred during 2018 and 2021 reflecting higher rainfall during those years (refer Table 7).

Table 7. Trend in Drainage failures (Huntly and Willowdale Mines 2017 – 2022)

Incident Class	***2017***	***2018***	***2019***	***2020***	***2021***	***2022***	***Total***
Rehab pit fail	4	9	3		14		*30 (14%)*
Pit fail	17	18	13	4	22	4	*78 (365)*
Sump fail	5	7	6	2	22	1	*43 (20%)*
Water Shot fail	4	21	6	10	13		*54 (25%)*
Haul Road		1		7	4		*12 (5%)*
Conveyor					2		*2 (1%)*
Total	***30***	***56***	***28***	***23***	***77***	***5***	***219***

The spike in the number of reported incidents during 2018 reflected a large rainfall event (~ 100 mm) during Jan 2018, resulting in 21 of the reported 56 drainage failures in 2018.

The relatively large number of incidents reported in July 2021 was as a result of a high rainfall month (~430 mm), which led to good runoff into dams but also a significant increase in drainage failures on the mine site, due to increase saturation of upper regolith.

Alcoa report that they design drainage infrastructure for a 1:100 ARI (AEP 1%) 24 hr event, however this in not reflected in the frequency of drainage failures. The relatively high frequency of drainage failures indicates that drainage design does not take into account the influence of groundwater and in particular surface – groundwater interactions that occur in association with clearing for mining.

The reduction in reported drainage failures was evident during 2022. It is considered that this reduction is likely a reflection of the lower rainfall during the 2022 wet season (certainly when comparted to 2021) in addition to clearing controls initiated by the DWER and the Water Corporation from 2020. Drainage failures typically occur in the early stages of pit development. As a result, the implementation of clearing controls, including avoidance of high slope and shallow groundwater areas from 2020 onwards, is considered likely to be resulting in a reduction in drainage failures.

1.1.9 Turbidity Exceedances

In line with the WWA, Alcoa report turbidity events in mined catchments (where compliance moniroting exists) where turbidity exceeds 25 NTU for more than one (1) hour.

Alcoa reported 56 turbidity exceedances from 14 turbidity meters during the 2021 – 2022 reporting period. This is an increase from 19 turbidity exceedances, across 10 turbidity meters reporting during 2020 -2021 reporting period.

The vast majority of turbidity events reported by Alcoa have gone unexplained, in that Alcoa are unable to link the reported turbidity event to an identified upstream drainage failure.

1.1.10 Trends in Turbidity

There have been 140 turbidity events reported in the period 2017 – 2022. Previous to 2020, the majority of reported turbidity events were associated with sump failures, however since 2020 Alcoa have not provided an explanation for the majority of reported turbidity events (unexplained in Table 8).

Table 8. Trend in Reported Turbidity events

Name	2017	2018	2019	2020	2021	2022
Haul Road	1				1	
NMR			4	3		
Pit fail					5	
Rehab pit fail		1			2	
Sump fail	2	17	3	2	6	
Unexplained		4	8	20	31	30
Total	***3***	***22***	***15***	***25***	***45***	***30***

There has been a dramatic increase in reported unexplained turbidity events during after 2020. The increase in occurrence of reported turbidity events has coincided with an increase in the risk profile of mining activities (mining on steeper slopes) and a change to the implementation of drainage control slots (otherwise referred to as Watershots).

A drainage review commissioned by Alcoa in 2020 recommended an increase in the fracturing associated with implementation of watershots. Watershots are an area of blasting and/or ripping on the downstream margin of the pit designed to infiltrate turbid mine pit runoff prior to runoff entering the stream zone. There has been an increase in the prevalence of turbidity events downstream of areas of new pit development where watershots have been constructed in relatively close proximity to stream zones and where the watershots are likely to intersect shallow groundwater. It is considered likely that the increase in unexplained turbidity events is in part associated with discharge of turbid pit runoff into stream zones via preferred pathways resulting from the establishment of watershots in areas of shallow groundwater.

Annexure C

Autor: [redacted]
Origin: WQBU – Source Protection

Water Corporation
Briefing Note

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Introduction

This Briefing Note provides background information relevant to concurrent bauxite mining operations in the Northern Jarrah Forest and associated cumulative impacts requiring strategic assessment of Water Corporation (surface water) drinking water catchments and assets in the Perth Metro and Southwest regions.

Background

Alcoa currently operates two bauxite mines (Huntly and Willowdale) in the Northern Jarrah Forest, three alumina refineries (Kwinana, Pinjarra, and Wagerup), and owns a 45% stake in the operation of an aluminium smelter, located in Portland, Victoria. Alcoa's mining operations in the Northern Jarrah Forest (on the Darling Plateau) are within Mining Lease 1 SA, which encompasses an area of 712,000 ha, incorporating all 15 metro and southwest drinking water catchments (refer Figure 2).

Alcoa's mining operations commenced in 1961 in a joint venture with the then Western Mining Company and are managed under three (3) state agreements.

- *Alumina Refinery Agreement Act 1961*
- *Alumina Refinery (Pinjarra) Agreement Act 1969*
- *Alumina Refinery Agreements (Alcoa) Amendment Act 1987*

Supporting the State Agreements are a series of Ministerial Statements under Part IV of the *Environmental Protection Act 1986 (EP Act)* that outline the approval framework to manage Alcoa's operations, including the establishment of the Mine Management Planning and Liaison Group (MMPLG). The MMPLG is an interagency committee chaired by JTSI with representation from DWER, DBCA, DMIRS and the Water Corporation.

Alcoa submit rolling annual 5 year Mine Management Programs (MMP) to the MMPLG through a consultative process. This ensures that adequate consultation has occurred with relevant agencies prior to the MMP being submitted to the Minister for State Development, who consults with the Minister for Environment.

Alcoa's access to ore is associated with ministerial endorsement of the 5 Yr MMP, that facilitates a Clearing Exemption Order granted to Alcoa in 2004 and allows Alcoa to clear areas of state forest identified in the annual MMP.

MMPLG member organisations, including the Water Corporation and DWER have identified an increasing risk profile associated with Alcoa's mining operations.

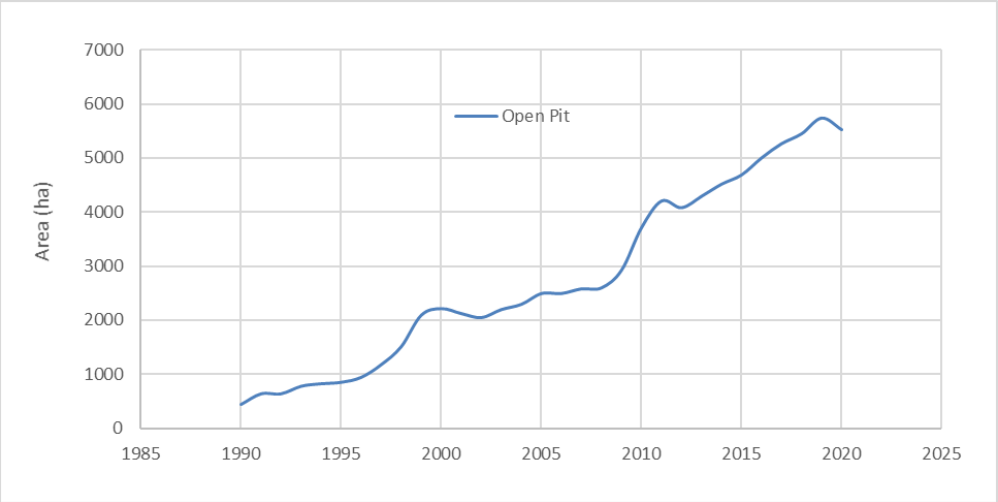
The increased risks profile is associated with:

- Increased mining in close proximity to key Water Corporation assets.
- Mining operations impacted more than 30% of sub catchment areas.
- Increased mining of steep slope (> 16%).
- Greater interactions between mining and areas of shallow groundwater.
- Cumulative impacts including the proposed expansion of mining into previously unmined areas.

- Plans by Alcoa to undertake additional mining in previously mined areas, effectively creating a second wave of disturbance.

A key indicator of risk is the area of open mine area, which has double in the last 10 years (refer Figure 1). The increase in open mine area has occurred because Alcoa have cleared 30% more land than they have revegetated in the period 2000 - 2020.

Figure 1 Area of open mine 1900 – 2020



Current Situation:

Alcoa's mining operations currently impact nine (9) drinking water catchments. To date 22,258 ha have been cleared for mining in drinking water catchments of which 5,150 ha is considered currently open (cleared and being mined) (refer Table 1).

Table 1: Water Supply Dams - Catchment area cleared

Mine	Catchment	Catchment Area (ha)	Cleared Area (ha)	Proportion of catchment Cleared	Currently Open (ha)
Huntly	Serpentine Main	65,389	6,655	10%	3,054
	North Dandalup	14,709	4,433	30%	778
	Conjurunup	3,916	1,654	42%	31
	South Dandalup	29,611	2,113	7%	-
	Lower South Dandalup	3,805	574	15%	18
	Serpentine Pipehead	2,836	169	6%	71
Willowdale	Samson Brook	6,287	2,040	32%	808
	Samson Brook Pipehead	1,080	142	13%	-
	Stirling Dam	25,024	389	2%	389
Jarrahdale	Wungong	12,495	4,090	33%	
	Totals	***165,153***	***22,258***		***5,150***

Bauxite mining activities are predominately associated with the western part of the Darling Plateau and in close proximity to reservoirs. This activity reflects the higher concentrations of bauxite reserves coinciding with areas of higher value Northern Jarrah Forest. Current mining under State Agreement processes is

expected to increase the footprint area of disturbance within Serpentine Man dam, North Dandalup and Stirling catchments, with additional exploration identified in the Canning, Mundaring and Harris catchments.

[redacted]

Alcoa's mining operations represent risks to water Corporation Assets including:

- Increase in risk of pathogens.
- Increase turbidity from mine pit runoff and draining failures.
- Changes to catchment hydrology resulting from clearing, revegetation and removal of the upper regolith (soil profile) as a result of mining.
- Risk of contamination from hydrocarbons and chemicals of emerging concern.
- Decline in water quality (various parameters) and impacts to catchment yield.
- Changes to fire behaviour and catchment stability.

Alcoa report hydrocarbon spills, drainage failures and turbidity exceedances (high turbidity events) to the Water Corporation and DWER via the Water Working Arrangements (WWA). A summary of the frequency of failures is presented in Table 1.

Table 1 Average annual reporting of incidents reported 2018 – 2022 (via the Water Working Arrangements)

Hydrocarbon Spills	140 spill / year (18,150 L/yr)
Drainage Failures	42 / yr
*PFAS / P3	13 / year
Turbidity exceedances	30 / yr

** Alcoa have phased out PFAS from their operations replacing Aqueous Fire Fighting Foam in operational vehicles with P3 based compound during 2020 2021.*

Risk to the Corporation

Impacts associated with the mining operational phase and the potential for longer term cumulative impacts associated with significant changes to the post-mining landscape need to be considered at a strategic level. The Water Corporation (AIP and TARR) have undertaken a strategic risk assessment of the risks of Alcoa's mining operations to drinking water assets in response to the increasing risks stemming from bauxite mining operations.

The risk profile associated with mining operations is impacted by key geographical factors including extent of mining operations, proximity of mining to reservoirs, steepness of slope, and proximity of mining to areas of shallow groundwater and stream zones. The assessment revealed that risks are predominately linked to long term increases in turbidity and risk of contamination with hydrocarbons and PFAS.

Suitable water treatment options considered suitable to address potential contamination included Carbon Adsorption and Speciality Anion Exchange Resin. Reverse Osmosis was not considered a viable option due to the underlying complexities associated with its operation, including management of the resultant residue.

TotEx for treatment on dams subject to Alcoa's mining operations (including proposed exploration) ranged from $1.31 B - $2.62 B. This expenditure translates into an increase in costs of water to customers of between $0.32 and $0.58 /kL (~ 55% - 100% increase).

The potential loss of a dam though temporary contamination would significantly impact the IWSS distribution capacity, particularly in the central part of the system, where 250,000 customers can only be supplied water directly from key dams due to the nature of the distribution system. In addition, the security of supply of the IWSS is reliant on dams providing redundancy for potential outages and failures within the system.

The loss of a water supply dam (especially those in which desalinated water is banked) would have significant implications to the overall security of supply. The estimated value of critical storages is approximately $6.5 B. The loss of a critical dam would potentially result in billions of dollars investment in replacement storage and potential long-term impacts to the IWSS capacity to supply customers and support development.

It is noted that risks to Water Corporation assets from mining operations in the Darling Plateau extends beyond Alcoa's mining operations. [redacted].

Recommendations:

The nature and extent of Alcoa's mining operations represent a very significant intergenerational risk to water quality and security of supply in drinking water catchments. This may result in dramatic cost implications for the Corporation and its customers unless key risks are effectively mitigated. Previous mining operations have not been effectively regulated, primarily due to limitations associated with the outdated management framework associated with the relevant State Agreements.

More recently, the Water Corporation and DWER have applied a catchment risk assessment framework to better assess and manage risk to key Water Corporation assets arising from Alcoa's mining operations. The application of this risk assessment framework has resulted in protracted negotiations associated with the last two 5 yr MMPs. It is considered that the application of the sub - catchment risk has resulted in a reduction in the overall risk profile to the Water Corporation.

Reducing risks of mining operations to acceptable levels to date has involved:

- *Restricting mining to areas where slope < 16% slope.*
- *Restricting mining operations to < 30% of sub catchment areas.*
- *Maintaining 2m separation from groundwater during and post mining operations.*

The above-mentioned measures have been negotiated for Alcoa's recent clearing operations (post 2020) and are reflected in the current 2021 – 2025 MMP and therefore apply to mining operations being considered under the State Agreement.

[redacted]

- [redacted]

Public access is restricted to RPZ areas to prevent contamination of drinking water. As a result, public scrutiny of Alcoa's access through the State Agreement is likely to be challenged by the community due to the extent and scale of disturbance associated with its mining activity. Maintenance of source protection is currently offsetting considerable state expenditure associated with additional treatment to account for water quality contamination risk. Access to the RPZ raises policy implications currently being examined by DWER concerning water security and the water industry the IWSS supports.

The Water Corporation and DWER have developed 12 recommendations to contemporise mine planning approvals and have been endorsed by the Ministers for Water and Environment in concurrence with the Minister for State Development. These recommendations will improve the robustness and transparency of the MMP consultative process. Adoption of these recommendations is considered essential to reducing future risk to the Water Corporation to acceptable levels.

[redacted]

[redacted]