BHP

Annual Environmental Protection and Management Program Report

Olympic Dam

1 July 2023 – 30 June 2024

Distribution

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INTRODUCTION

Purpose and scope

This annual Environmental Protection and Management Program report (annual EPMP report) presents data relating to the environmental management of the BHP Olympic Dam (OD) operations for the period 1 July 2023 to 30 June 2024 (FY24).

The objectives are to:

- Meet the requirements of clause 11 of the Olympic Dam and Stuart Shelf Indenture (the Indenture).
- Report performance against environmental outcomes, compliance criteria and leading indicators presented in the 2023 Environmental Protection and Management Program (2023 EPMP).
- Report performance against targets and continuous improvement actions contained in the 2023 EPMP.
- Document the results of the deliverables presented in the Monitoring Programs (MPs) of the 2023 EPMP.

The 2023 EPMP was submitted to the Indenture Minister in May 2023 and subsequently approved (BHP Olympic Dam 2023a).

Report Structure

A description of the EPMP structure against which reporting is based is given below.

The reporting against outcomes is achieved through a hierarchy of data reporting (deliverables) and statements of compliance leading to an assessment of whether the environmental outcome has been met based on the methodology described in the associated MPs. The main chapters in the report are aligned to the five key environmental aspect IDs contained within the EPMP. Each ID is related to an area of the operation for which specific environmental management measures are required.

The reporting hierarchy then takes the following form:

- Deliverables from the various MPs are included in the most relevant chapter, and a presentation of data and discussion of results is provided.
- The results of the deliverables contribute to the compliance statement for the compliance criteria under which they are reported (and in some cases to other compliance criteria, in which case appropriate cross-referencing is provided).
- These compliance criteria then provide a statement of achievement of the environmental outcome.

Performance against targets and continuous improvement actions is reported separately but still within the relevant ID chapter.

Table 2 contains a summary of each Environmental Management Program (EM Program) ID. This provides an overview of the outcomes and has the following elements:

- The environmental outcome to be achieved.
- A ‘traffic light’ style indicator to indicate whether the outcome (and the associated compliance criteria and leading indicators) has been achieved (based on the findings of the assessment); and
- A statement that summarises whether the environmental outcome was achieved (based on the findings of the assessment), and why.

EPMP STRUCTURE

Background

The structure of the EPMP report is closely aligned with the structure of the BHP Olympic Dam Corporation Pty Ltd (ODC) 2023 EPMP, and in particular the EM Program contained within that document. The EPMP consists of a number of documents which form a portion of the Environmental Management System (EMS) requirements. A brief summary of each document within the EPMP is shown in Table 1.

Table 1: EPMP Structure

Document	Content Summary
Environmental Management Manual (EM Manual)	General overview of the EPMP. Purpose and scope. Regulatory framework. Background information about OD. Overview of the structure and requirements of the EMS. Glossary of defined terms. Cross-referencing of EPMP content to approval conditions and the requirements of the Mining Code.
EM Program (BHP Olympic Dam 2023b)	Addresses potentially significant environmental aspects and impacts identified through analysis and prioritisation of environmental risks, legal obligations and community concerns. Documents the processes, systems and actions used to manage those aspects and impacts including (as appropriate): • The environmental values, and the key risks to those values; • The environmental outcomes that BHP aims to achieve relating to potential environmental impacts; • Clear, specific and measurable compliance criteria that demonstrate achievement of the outcome(s); • Leading indicator(s) criteria, providing early warning of trends that indicate a compliance criteria may not be met; • The management and operational controls in place to deal with the environmental risk (of the impacts), including any regulatory conditions; and • Contingency options to be used in the event that identified risks are realised.
MPs	Addresses assessment and performance of the EM Program's outcomes, compliance criteria and targets, control mechanisms and legal and other requirements.
Actions, Targets and Major Changes	Captures continuous improvement opportunities and development opportunities that can assist in achieving future environmental outcomes and improving ODC's environmental performance, environmental improvement targets and the action plan to achieve such targets.
Closure Management and Rehabilitation Plan (CMRP)	A plan for closure and rehabilitation of the mine, including the environmental outcomes expected to be achieved indefinitely, and options for progressive rehabilitation.

EXECUTIVE SUMMARY

Overview

The FY24 annual Environmental Protection and Management Program (EPMP) report's purpose is to demonstrate compliance against the 2023 EPMP.

Data from Monitoring Programs (MPs) is presented as evidence against compliance criteria under the Environmental Management Program (EM Program) IDs.

Considerable progress against environmental outcomes and compliance criteria in the 2023 EPMP and actions and targets was made during the reporting period.

Major Achievements

Major achievements for the reporting period include:

- Approximately 9,272 tonnes of recyclable material was transported offsite during FY24. Materials included plastics, metals (including legacy stockpiles), hydrocarbons, batteries, timber, cardboard, and E-waste. The ongoing improvements at the Olympic Dam (OD) Resource Recovery Centre (RRC) continue to achieve excellent recycling outcomes.
- During FY24 OD continued setting the boundaries for Important Biodiversity and Ecosystems (IBE), quantifying impacts, prioritising controls, governing and transforming the pressure states and finally publicly disclosing the outcomes. Olympic Dam is making strides in contributing to nature positive outcomes, both inside and outside of the tenure that OD stewards. FY24 highlights included continued partnerships with the:
  - South Australian Arid Lands Landscape Board (SAALLB) to protect and enhance Great Artesian Basin (GAB) springs, a Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) threatened ecological community;
  - Coorong District Council to revegetate critical habitat for threatened migratory bird species, known to migrate through the OD region;
  - Arid Recovery to research genetic connectivity of feral cats (declared under the *Landscape South Australia Act 2019)* to understand the extent to which OD (through permanent allocation of resources) contributes to seeding the feral population; and
  - Environmental DNA (eDNA) Frontiers/Curtin University to develop eDNA monitoring tools for South Australian GAB springs to detect cryptic species.
- Olympic Dam continued to deliver the Context Based Water Targets (CBWTs) that aim to address the water challenges shared by BHP and other stakeholders in the region where we operate. These targets are based on what we heard from others and BHP's assessment of water-related risks and opportunities and include:
  - Contribute to conversation of the ecosystem function of the GAB springs; and
  - Contribute to conservation of the ecosystem of the GAB springs through direct conservation and research programs in the Arid Lands region.

COMPLIANCE SUMMARY

Table 2 lists the environmental outcomes for each EM Program ID. Next to each outcome 'traffic light' style indicators have been used to allow for overview assessment of achievement of the outcome, as follows:

Environmental outcome achieved

Significant progress towards achieving the environmental outcome

Environmental outcome not achieved

The approved 2023 EM Program contained 21 environmental outcomes, 23 compliance criteria and 13 leading indicators. Additional to these, the EPMP also contained 9 targets, and 23 actions, which are aspirational and support the environmental outcomes and compliance criteria against which ODC is assessed.

Nineteen (19) of the 21 environmental outcomes and 22 of the 23 compliance criteria were achieved or were within prescribed limits, while 12 of the 13 leading indicators were met. All targets and actions were achieved or significantly progressed.

The Community Perception Survey (CPS) is undertaken biennially and was completed in FY24. These survey results indicated that OD is viewed favourably (trusted) by 42% of respondents in its local communities, an increase of 12% from the last CPS in FY22. Actions undertaken prior to the FY24 CPS included community consultation to develop a draft Community Development Plan and provision of resources for childcare. Due to the recent CPS results the environmental outcome for ID5.1 for FY24 has been classified as 'significant progress towards achieving the environmental outcome'.

In FY24, three ground level PM_{10} dust concentrations at Olympic Village exceeded the PM_{10} 24-hour average of 50 micrograms per cubic metres ($\mu g/m^3$). These events were likely to be caused by a combination of regional dust generation and local dust generation from nearby disturbed land (i.e. the airport and surrounds). As such the environmental outcome for particulate emissions for FY24 has been classified as 'significant progress towards achieving the environmental outcome' and the compliance criteria has also been classified as 'significant progress towards achieving the compliance criteria'.

At the end of FY24, the area contained within the Wellfield B 10 m drawdown contour line was 4,004 km^2, slightly higher than the leading indicator value of 4,000 km^2 for the drawdown footprint for Wellfield B.

Table 2: FY24 Compliance Summary

ID 1 USE OF NATURAL RESOURCES		
ID 1.1 Land Use and Rehabilitation		
Environmental Outcome		**Outcome Statement**
	No **significant adverse impacts to populations of listed species** (South Australian, Commonwealth) as a result of the construction, operation and closure of Olympic Dam.	No significant adverse impacts to populations of listed species as a result of the construction and operation of Olympic Dam (OD) occurred in FY24. No closure activities impacted populations of listed species. No significant clearing of listed species or listed species potential habitat occurred in FY24. No significant adverse impact was detected for *Eriocaulon carsonii* subsp. *carsonii* (salt pipewort) as a result of aquifer level drawdown.

		No significant adverse impacts to listed species as a result of interactions with the OD Tailings Retention System (TRS) occurred in FY24. The Banded Stilt (*Cladorhynchus leucocephalus*), which is listed as Vulnerable under the *National Parks and Wildlife Act 1972* (NPW Act), was observed interacting with the TRS during FY24 (n=63 alive and n=12 dead recorded). Banded Stilts were recorded alive and interacting with the TRS on two separate occasions. Of this n=62 was recorded in a single event in February 2024. The second record was one lone Stilt later that same month. In South Australia, the largest flock of Banded Stilts recorded was 250,000 at the Coorong (Pedler 2017). Considering this flock size and the likely overall population size of the Banded Stilt, it is concluded no adverse impacts to a listed species have occurred as a result of interactions with the TRS.
ID 1.2 Aquifer Level Drawdown		
Environmental Outcome		**Outcome Statement**
●	No significant adverse impacts to existing third-party users' right to access water from within the GAB wellfield **Designated Areas** for the proper development or management of the existing use of the lands as a result of ODC activities.	No significant adverse impacts to existing third-party users' right to access water from within the GAB wellfield Designated Areas for the proper development or management of the existing use of the lands as a result of ODC activities occurred in FY24. Generally drawdown and percentage wellhead pressure loss at pastoral bores remains less than the predicted long-term impact as presented in the EIS (Kinhill Engineers 1997, updated Golder Associates 2016), and less than the maximum drawdown area defined within the 10 metre (m) contour (this is described further below).
●	No significant adverse impacts to the availability and quality of groundwater to existing Stuart Shelf third-party users as a result of groundwater drawdown associated with ODC activities.	No significant adverse impacts to the availability and quality of groundwater to existing Stuart Shelf third-party users as a result of groundwater drawdown associated with ODC activities occurred in FY24. Regional groundwater levels and quality are stable.
●	No significant adverse impact on groundwater-dependent **listed species** or **ecological communi**ties as a result of groundwater drawdown associated with ODC activities.	Drawdown remains less than the predicted long-term impact and was within compliance criteria limits for FY24. Environmental flow rates at GAB springs remained above predicted long-term impacts as presented in the EIS (Kinhill Engineers 1997, updated Golder Associates 2016). Monitoring showed no indication of a significant adverse impact on groundwater-dependent listed species or ecological communities as a result of groundwater drawdown associated with ODC activities (see Section 1.2.4).
ID 2 STORAGE, TRANSPORT AND HANDLING OF HAZARDOUS WASTES		
ID 2.1 Chemical / Hydrocarbon Spills		
Environmental Outcome		**Outcome Statement**
●	No significant site contamination of soils, surface water or groundwater, as a result of the transport, storage or handling of chemical or hydrocarbon substances	No significant contamination of soils, surface water or groundwater leading to actual or potential environmental harm due to the transport, storage or use of hazardous substances associated with ODC operational activities occurred during FY24.

	associated with ODC's operational activities.	

ID 2.2 Radioactive Process Material Spills		
Environmental Outcome		**Outcome Statement**
	No adverse impacts to public health as a result of radioactive process material spills from ODC's activities.	Olympic Dam Corporation has consistently operated in a manner that limits radiation dose to members of the public, from operational activities and radioactive emissions, to less than a small fraction of the International Commission on Radiological Protection (ICRP) 1 mSv/y limit. During FY24, two reportable radioactive process material spills occurred as a result of ODC's activities; one within the tailings disposals operational area outside of the designated bund and one off-site near the ODV sewerage lagoons. There were no adverse impacts to public health as a result of radioactive process material spills from ODC's activities.
	No **significant adverse impacts to populations** of **listed species** or **ecological communities** as a result of radioactive process material spills from ODC's activities.	No significant impacts to populations of listed species or ecological communities were recorded as a result of operational activities, including the effects from any radioactive process material spills. Impacts to listed species and ecological communities are avoided by ensuring that there is no uncontrolled loss of radioactive material to the natural environment. As there was no loss of radioactive material to the undisturbed (natural) environment in FY24, no impact to populations of listed species or ecological communities occurred.

ID 3 OPERATION OF INDUSTRIAL SYSTEMS		
ID 3.1 Particulate Emissions		
Environmental Outcome		**Outcome Statement**
	No adverse impacts to public health as a result of particulate emissions from ODC activities.	In FY24, three ground level PM_{10} dust concentrations at Olympic Village exceeded the PM_{10} 24-hour average of 50 micrograms per cubic metres ($\mu g/m^3$). These events were likely to be caused by a combination of regional dust generation and local dust generation from nearby disturbed land). As such the environmental outcome for particulate emissions for FY24 has been classified as 'significant progress towards achieving the environmental outcome'.
ID 3.2 Sulphur Dioxide Emissions		
Environmental Outcome		**Outcome Statement**
	No adverse impacts to public health as a result of sulphur dioxide (SO_2) emissions from ODC's operations.	The GLC levels for ambient air quality are based on the protection of human health (SA Environment Protection (Air Quality) Policy 2016). The Roxby Downs Township and Olympic Village ambient sulphur dioxide (SO_2) analyser results for the reporting period showed no exceedance of the SA Environment Protection (Air Quality) Policy 2016 for ambient air quality SO_2 at either Olympic Village or the Roxby Downs Township. An annual review of monitoring data collected at sensitive receptors (ambient ground level concentrations) has shown there were no adverse impacts to public health as a result of SO_2 emissions from ODC's activities during FY24.

ID 3.3 Radioactive Emissions		
Environmental Outcome		**Outcome Statement**
●	No adverse impacts to public health as a result of radioactive emissions from ODC's activities.	Olympic Dam Corporation has consistently operated in a manner that limits radiation dose to members of the public, from operational activities, to less than a small fraction of the 1 mSv/yr public dose limit prescribed by the ICRP. As a result, there are no adverse radiation exposure impacts to the public from activities undertaken at ODC.
●	No **significant adverse impacts to populations** of **listed species** or **ecological communities** as a result of radioactive emissions from ODC's activities.	There were no significant adverse impacts to populations of listed species or ecological communities as a result of ODC's activities. Monitoring of radiation doses to the public and the deposition of ^{238}U at non-human biota (NHB) assessment sites is used as an indicator of the potential exposure of listed species to radioactive emissions. Deposition of ^{238}U at non-human biota assessment sites was at a level which poses no significant adverse impacts to non-human biota.

ID 3.4 Greenhouse Gas Emissions		
Environmental Outcome		**Outcome Statement**
●	Contribute to stabilising global atmospheric greenhouse gas concentrations to minimise **environmental impacts** associated with climate change.	BHP's climate change strategy focuses on reducing its operational greenhouse gas (GHG) emissions, investing in low emissions technologies, seeking to support our suppliers and customers to decarbonise to address Scope 3 emissions in its value chain, managing climate-related risk and opportunity, and working with others to enhance the global policy and market response. As a BHP group asset, ODC operates under the BHP group climate change strategy.

ID 4 GENERATION OF INDUSTRIAL WASTES		
ID 4.1 Embankment Stability of TSF		
Environmental Outcome		**Outcome Statement**
●	No significant TSF embankment failure.	During FY24 the TSFs were managed in accordance with the TRS Operation, Maintenance and Surveillance Manual (BHP Olympic Dam 2024a) and the Tailings Retention System Management Plan (BHP Olympic Dam 2022a) and no embankment failures occurred.

ID 4.2 Tailings Seepage		
Environmental Outcome		**Outcome Statement**
●	No significant adverse impact on vegetation as a result of seepage from the TSF.	No significant adverse impact to vegetation as a result of seepage from the TSFs has occurred. Eighty metres AHD (20 m below ground level) is considered as the level below which groundwater cannot interact with the root zone of plants in the OD region. Groundwater levels in the vicinity of the TSFs remain below 80 mAHD.
●	No compromise of current and future land uses on the SML or adjoining areas as a result of seepage from the TSF.	No compromise of current and future land uses on the SML or adjoining areas has occurred as a result of seepage from the TSFs. Groundwater levels in the vicinity of the TSFs remain below 80 mAHD and sampling indicates that seepage is being attenuated.

	No compromise of the **environmental values** of groundwater outside the SML as a result of seepage from the TSF.	No compromise of the environmental values of groundwater outside the SML has occurred as a result of seepage from the TSFs. Sampling indicates that seepage is being attenuated within the SML, and groundwater levels of bores along the SML boundary are consistent with other regional bores. Seepage modelling confirms that there are no expected future offsite impacts.

ID 4.3 Fauna Interaction with Tailings Retention System		
Environmental Outcome		**Outcome Statement**
	No significant adverse impacts to **listed species** (South Australian, Commonwealth) as a result of interactions with the Olympic Dam TRS.	No significant adverse impacts to listed fauna species as a result of interactions with the OD Tailings TRS occurred in FY24. The Banded Stilt (*Cladorhynchus leucocephalus),* which is listed as Vulnerable under the NPW Act, was observed interacting with the TRS during FY24 (n=63 alive and n=12 dead recorded). Banded Stilts were recorded alive and interacting with TRS on two separate occasions. A flock of n=62 was recorded in February 2024, across EP 6a, EP 4a, and TSF 5. The second record was one lone stilt later that same month. In South Australia, the largest flock of Banded Stilts recorded was 250,000 at the Coorong (Pedler 2017). Considering this flock size and the likely overall population size of the Banded Stilt, it is concluded no adverse impacts to a listed species have occurred as a result of interactions with the TRS. The Australasian Darter (*Anhinga novahollandiae novahollandiae*) listed as Rare under the NPW Act was also observed at the TRS in FY24 (n=17 dead).

ID 4.4 Solid Waste Disposal		
Environmental Outcome		**Outcome Statement**
	No significant adverse environmental impacts as a result of management of solid waste.	The Resource Recovery Centre (RRC) effectively managed solid waste as per the EPA approved Landfill Environmental Management Plan 2022 (LEMP) (BHP Olympic Dam 2022b). No evidence of material environmental harm was identified through routine auditing or reporting of materials disposed of to the landfill. Therefore, it can be concluded that no significant adverse impacts resulted from the management of solid waste at OD during FY24.

ID 4.5 Radioactive Waste		
Environmental Outcome		**Outcome Statement**
	No adverse impacts to public health as a result of radioactive waste from ODC's activities.	Olympic Dam has consistently operated in a manner that limits radiation dose to members of the public from radioactive waste, to less than a small fraction of the ICRP 1 mSv/y limit. As a result, there were no adverse radiation exposure impacts to the public from activities undertaken at OD in FY24.
	No **significant adverse impacts to populations** of **listed species** or **ecological communities** as a result of radioactive waste from ODC's activities.	During the reporting period there were no significant adverse impacts to populations of listed species or ecological communities as a result of radioactive waste from ODC's activities. Monitoring of radiation doses to the public and the deposition of ^{238}U at NHB assessment sites is used as an indicator of the potential exposure of listed species to radioactive waste.

		Deposition of ^{238}U at NHB assessment sites during FY24 was at a level which poses no significant adverse impacts to NHB.
ID 5 INTERACTION WITH COMMUNITIES		
ID 5.1 Community Interaction		
Environment Outcome		**Outcome Statement**
▲	Residents in Roxby Downs, Andamooka and Woomera have a favourable view of ODC.	The Community Perception Survey (CPS) is undertaken biennially and was completed in FY24. These survey results indicated that OD is viewed favourably (trusted) by 42% of respondents in its local communities, an increase of 12% from the last CPS in FY22. Actions undertaken prior to the FY24 CPS included community consultation to develop a draft Community Development Plan and provision of resources for childcare. Due to the recent CPS results the Environmental Outcome for FY24 has been classified as 'significant progress towards achieving the Environmental outcome'.

Note: Individual monitoring programs are referred to in this document with a two-letter abbreviation as follows: Fauna – FA; Flora – FL; Great Artesian Basin – GA; Groundwater – GW; Environmental Radiation – ER; Airborne Emissions – AE; Energy Use and Greenhouse Gas - EG; Waste – WA; Surface Water – SW; Social Effects – SE.

1. USE OF NATURAL RESOURCES

1.1 Land Use and Rehabilitation

1.1.1. Environmental Outcome

No significant adverse impacts to populations of listed species (South Australian, Commonwealth) as a result of the construction, operation and closure of Olympic Dam.

No significant adverse impacts to populations of listed species as a result of the construction and operation of Olympic Dam (OD) occurred in FY24. No closure activities impacted populations of listed species.

No significant clearing of listed species or listed species potential habitat occurred in FY24.

No significant adverse impact was detected for *Eriocaulon carsonii* subsp. *carsonii* (salt pipewort) as a result of aquifer level drawdown.

No significant adverse impacts to listed species as a result of interactions with the OD Tailings Retention System (TRS) occurred in FY24.

The Banded Stilt (*Cladorhynchus leucocephalus*), which is listed as Vulnerable under the *National Parks and Wildlife Act 1972* (NPW Act), was observed interacting with the TRS during FY24 (n=63 alive and n=12 dead recorded). Banded Stilts were recorded alive and interacting with the TRS on two separate occasions. Of this n=62 was recorded in a single event in February 2024. The second record was one lone Stilt later that same month.

In South Australia, the largest flock of Banded Stilts recorded was 250,000 at the Coorong (Pedler 2017). Considering this flock size and the likely overall population size of the Banded Stilt, it is concluded no adverse impacts to a listed species have occurred as a result of interactions with the TRS.

1.1.2. Compliance Criteria

No significant impact to the size of an important population of a community of native species dependent on natural discharge of groundwater from the Great Artesian Basin, including *Eriocaulon carsonii* subsp. *carsonii*.

Note: Significant impact is as defined in the Significant Impact Guidelines and greater than predicted in the Environmental Impact Statement (EIS).

Potential impacts to communities of native species dependent on natural discharge of groundwater from the Great Artesian Basin (GAB) are discussed in Section 1.2. Within the region studied, populations of *Eriocaulon carsonii* subsp. *carsonii* were found at 22 springs in the Hermit Hill, North-East and Lake Eyre spring complexes in FY24. This is the same number as detected in FY23, but in contrast to the 18 sites with *E. carsonii* subsp. *carsonii* detected in FY16 (least sites) and 24 detection sites in FY22 (most sites). However, the springs where *E. carsonii* subsp. *carsonii* was detected over the years has changed (Table 3). *E. carsonii* subsp. *carsonii* was found at HHS182 for the first time in several years (at least eight years), but it has been known to occur at the spring with records from 1983. It is likely that *E. carsonii* subsp. *carsonii* continues to be cryptic in nature and easily obscured by other species at these springs, particularly by thick growth of *Phragmites australis*.

The average abundance of *E. carsonii* subsp. *carsonii* observed in FY24 (14.73 ± 3) was similar to previous years, including FY23 (20.92 ± 2), FY22 (13.25 ± 2), FY21 (17.5 ± 2), FY20 (15 ± 2) and FY19 (14 ± 3). Using a Chi Square analysis for dependent samples, the average abundance of the 29 springs identified as suitable *E. carsonii* subsp. *carsonii* habitat from 2015-FY24 has shown that there has been no significant impact to the size of an important population of *E. carsonii* subsp. *carsonii* ($X^2 = 4.81$, $df = 8$, $p = 0.223$).

A table of the presence of *E. carsonii* subsp. *carsonii* is presented in Section 1.2 Aquifer Level Drawdown. Differences in the average abundance of *E. carsonii* subsp. *carsonii* is likely due to the cryptic nature of the

species. Using average abundance and presence of *E. carsonii* subsp. *carsonii* as indicators, it is determined that no significant impact occurred in FY24.

No loss of an important population of Plains Rat (*Pseudomys australis*).

No loss of an important population of Plains Mouse occurred as a result of land disturbed by ODC activities. No known critical habitat (as defined in the National Recovery Plan for the species) was cleared during FY24. Plains Mouse infield habitat verification surveys occurred through October 2023, January 2024, and April 2024 across over 1,900 hectares (ha) of the Special Mining Lease (SML). It was concluded that the area did not contain critical habitat/refugia for the Plains Mouse nor was there evidence of Plains Mouse detected during the surveys (e.g., runways, scats, burrows or tracks).

In a broader regional context, Arid Recovery completed annual pitfall trapping in FY24 but did not target Plains Mouse habitat. A total of 12 individuals were caught inside the Arid Recovery Reserve (ARR) at dune sites. Further trapping was undertaken within the ARR in May and June of 2024 to assess feasibility of translocating Plans Mouse individuals to external reintroduction sites. Forty five individuals were translocated out of the ARR. Trap success numbers inside the ARR compared to the outside of the ARR indicate that the Plains Mouse continue to benefit from the invasive predator free ARR, which sustains a substantial population of vulnerable species that otherwise has markedly lower persistence and occupancy of the surrounding landscape.

1.1.3. Leading Indicators

None applicable.

1.1.4. Deliverables (FA 3.1)

An annual report of monitoring and control actions undertaken within the SML and surrounding areas.

During FY24, a total of 202 cat traps were set with an average of 16.83 trap nights per month. A total of 30 cats were captured, producing an overall trap success rate of 14.9%. Areas of focus included Roxby Downs Village, Olympic Dam Village and office buildings on the SML. Deployment and operation of a Felixer device on the SML continued during FY24. One cat was fired upon by the Felixer in FY24.

Throughout FY24, no wild dogs were observed opportunistically on the SML. OD remains committed to work in conjunction with the South Australian Arid Lands Landscape Board (SAALLB) to opportunistically control wild dog numbers (South Australia Arid Lands Natural Resource Management Board 2015). The BHP Indigenous Engagement team works with Kokatha Pastoral (subsidiary of Kokatha Aboriginal Corporation) to meet the obligations under the Landscape Act and Pastoral Act for the properties south of the wild dog fence (Andamooka, Purple Downs, Roxby Downs), where Kokatha Aboriginal Corporation has a sub-lease agreement.

The stock returns for FY24 did not indicate that any wild dogs were shot on Andamooka, Purple Downs, and Roxby Downs stations, however, baiting did occur between October-December and April-June.

In FY16, OD together with Arid Recovery re-established a historical spotlight transect program that monitors the density of rabbits, cats, foxes and kangaroos in the OD region. OD worked with the Department of Primary Industries and Resources South Australia (PIRSA) to facilitate the release of a Korean strain of rabbit haemorrhagic disease virus (RHDV K5) known as K5 in the Roxby Downs region in March 2017. A subsequent release of the RHDV K5 virus occurred within the ARR in December 2021 (Figure 1).

From July 2016 to May 2024, a significant decline in rabbit density was observed at the Andamooka transect ($F_{1,40}$ = 28.8, p <0.001; R^2 = 0.43) and at the Roxby Downs transect ($F_{1,40}$ = 30.6, p <0.001; R^2 = 0.45; Figure 1). While it appears that the release of the RHDV K5 virus may have had a negative impact on rabbit densities in the region, it must be noted that no additional evidence was observed (e.g. no rabbit carcasses were observed that could have been laboratory tested for evidence of the RHDV K5 virus). The long-term trend of rabbit densities between 1989 and 2024 (calendar year) (noting that monitoring occurred quarterly in each calendar year but did not occur in calendar years 2005, 2012-2015) are shown in Figure 2.

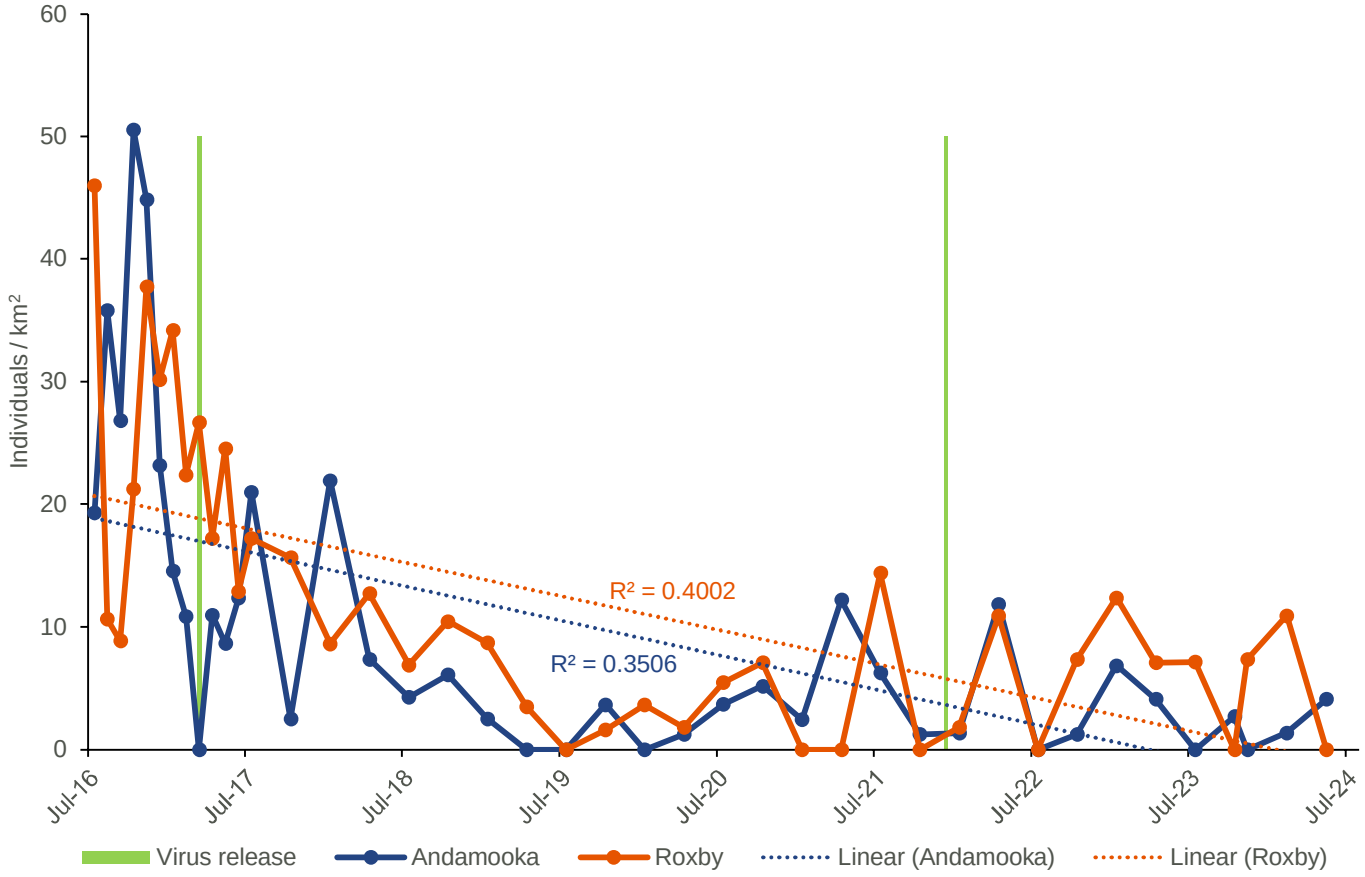


Figure 1: The density of rabbits observed pre- and post-K5 virus release

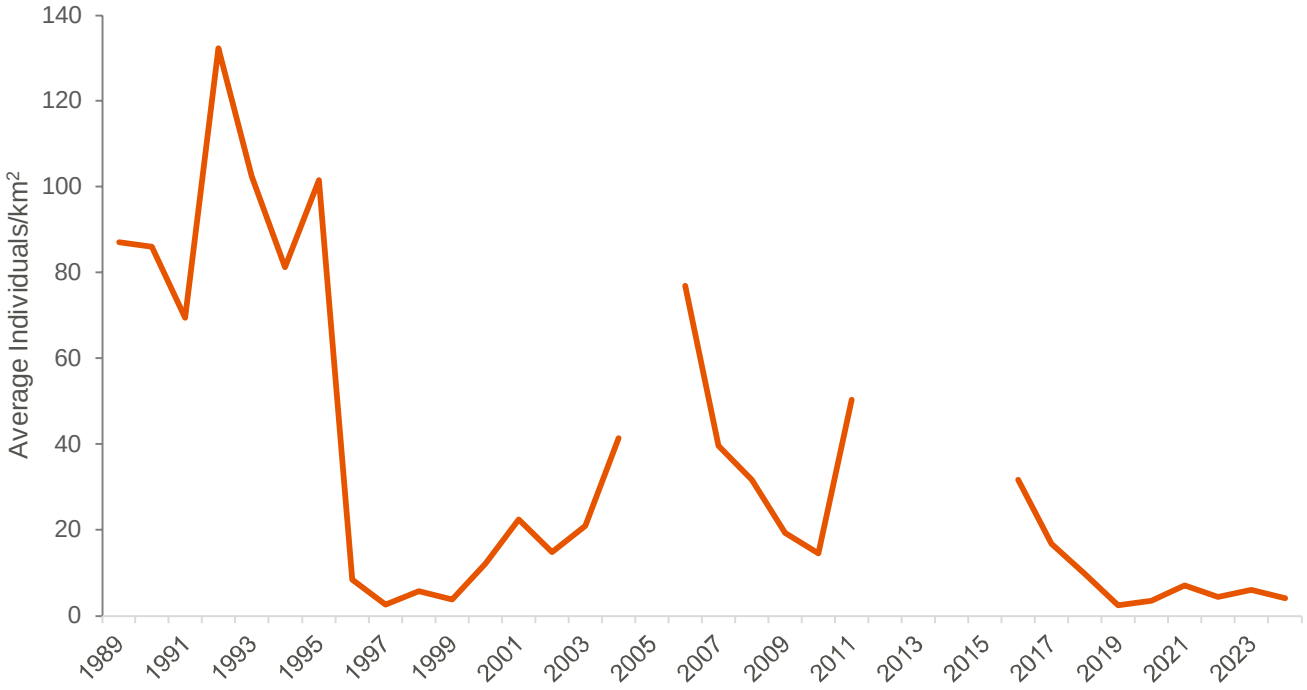


Figure 2: The average density of rabbits observed from 1989 to 2024 (calendar year) across Roxby Downs and Andamooka spotlight transects

As assessment of the abundance of specific feral and abundant species within the region.

Quarterly spotlight counts of two transects within the OD region showed that kangaroos and rabbits continued to be recorded in the highest density compared to other introduced or abundant species (i.e. foxes, cats, and wild dogs) during FY24 (Figure 3). While kangaroo numbers remain relatively high, rabbit numbers have overall continued to remain below numbers observed pre-RHDV K5 release in March 2017. Overall rabbit numbers observed during FY24 continued to fluctuate and did not appear to have a significant decline following the December 2021 re-release of RHDV K5. Due to the cautious nature of wild dogs, it is recognised that the spotlight transect method may not be the most effective method for capturing wild dog abundance data.

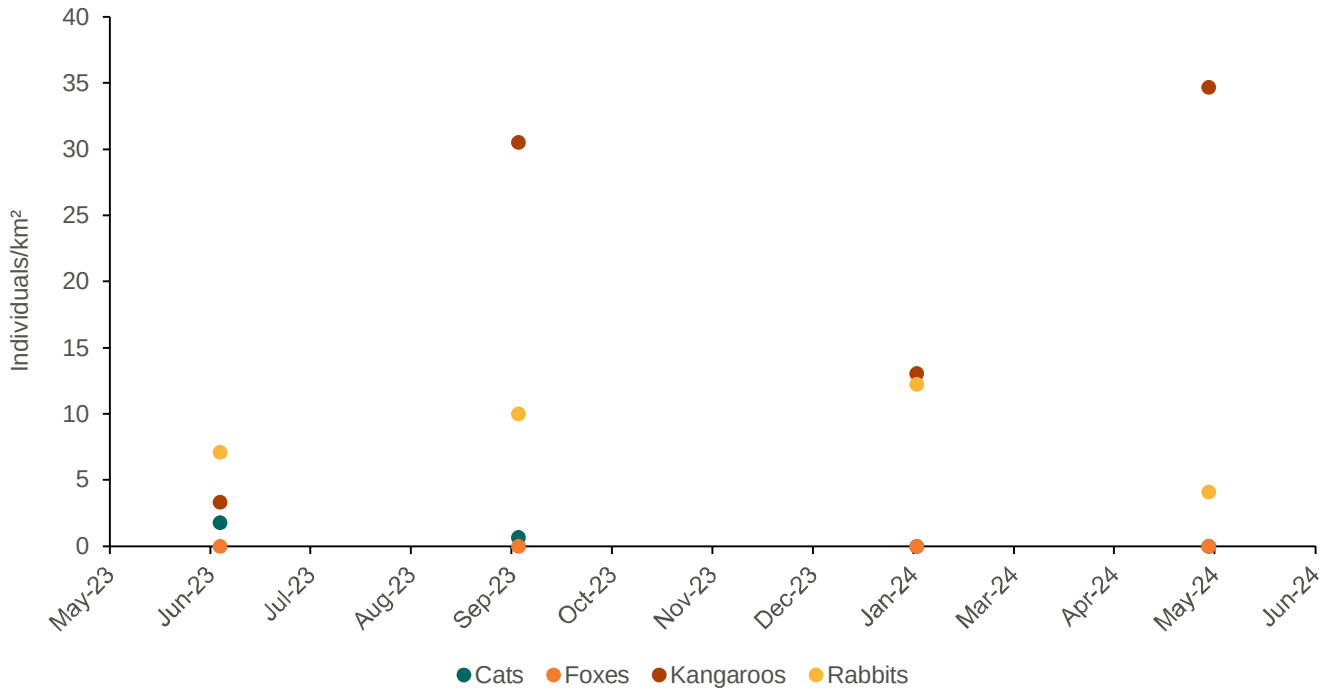


Figure 3: Density of rabbits, cats and kangaroos observed in the Olympic Dam region in FY24

1.1.5. Deliverables (FL 3.3)

Define and map the current distribution of extreme and high risk weed species within the Olympic Dam region, Roxby Downs Municipality, the SML and Gosse Springs and Emerald Springs SEB areas.

Identification of whether measures are required to control declared weeds and plant pathogens in the operations area.

Olympic Dam's Environment Department visited a total of 939 weed sites during FY24, with 147 of these registered as new sites. A total of 2,411 weed sites have been registered within the OD Area of Influence (AoI) since 2006, and 39% of these weed sites were visited in FY24.

A total of 12 pest plant species were recorded as active during FY24. Of these, six are declared under the *Landscape South Australia Act 2019*, three species are listed as a Weed of National Significance (WoNS) and three species are identified as Priority Weeds in the South Australian Arid Lands (and Kingoonya District Weed Strategy Priority Weeds) (Table 3).

Control efforts during FY24 were targeted towards buffel grass active sites, with a total of 387 active sites treated with a combination of chemical and pine oil mixture via a knapsack or vehicle mounted spray unit. Rainfall events throughout FY24 continued to contribute to previously dormant buffel grass infestations becoming active. Control measures will continue to be required for the ongoing management of pest plants and in particular buffel grass. Buffel grass infestations along the Oodnadatta Track within drainage depressions within the Emerald Springs

Significant Environmental Benefit (SEB) continued to be controlled in FY24 to prevent spread into the SEB areas. No new infestations were detected within the Gosse Springs SEB in FY24.

The FY24 distribution of declared and other high risk pest plant species, including infestations recorded since FY14 that are known to still be active, are shown in Figure 4, Figure 5, Figure 6 and Figure 7. African Boxthorn, Bathurst Burr, Blackberry Nightshade, Buffel Grass, Caltrop, Paddy Melon, Prickly Pear and Safron Thistle were controlled along the powerline to Port Augusta (not pictured in maps). In many cases a single GPS location may reference a large infestation area, and as such distribution of weeds may be more extensive than what is depicted in the maps. All pest plant data collected by OD since 2000 is also available via SA Nature Maps and lodged annually via the Biological DataBase of South Australia (BDBSA) under SU1235 OLYMPIC DAM PEST PLANTS.

Table 3: Declared and other high risks weed species active within the OD Area of Influence in FY24

Species	Landscape Act	Priority in SAAL	WoNS	Other High Risk
African Boxthorn	X	X	X	
Bathurst Burr	X		X	
Blackberry Nightshade				X
Buffel Grass	X	X		
Caltrop	X			
Couch Grass				X
Horehound	X			
Paddy Melon				X
Prickly Pear	X	X	X	
Ruby Dock				X
Saffron Thistle				X

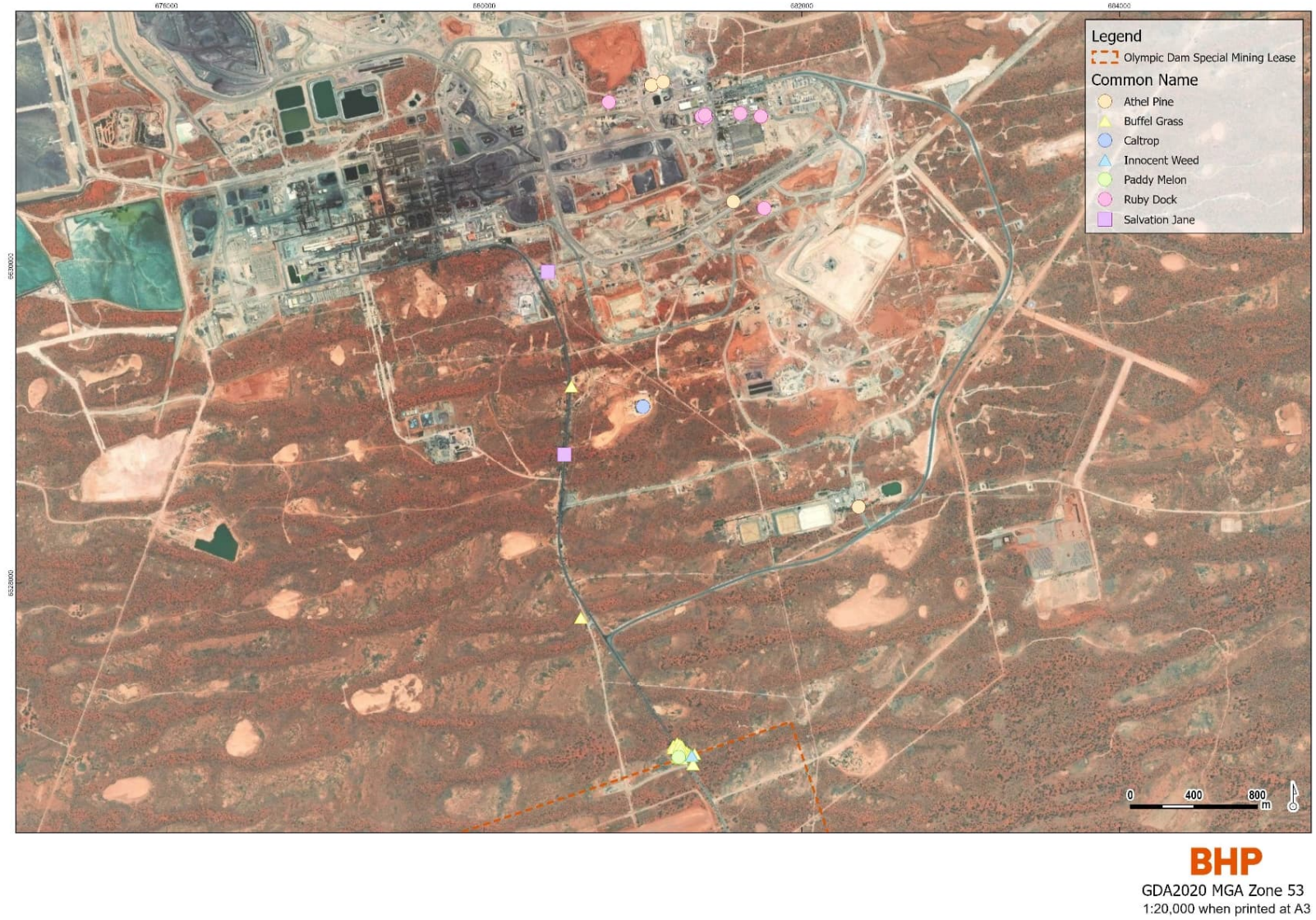


Figure 4: Locations of declared and high risk weed species active in FY24 on the Special Mining Lease

Figure 5: Locations of declared and high risk weed species active in FY24 at Olympic Dam Village and Light Industrial Area

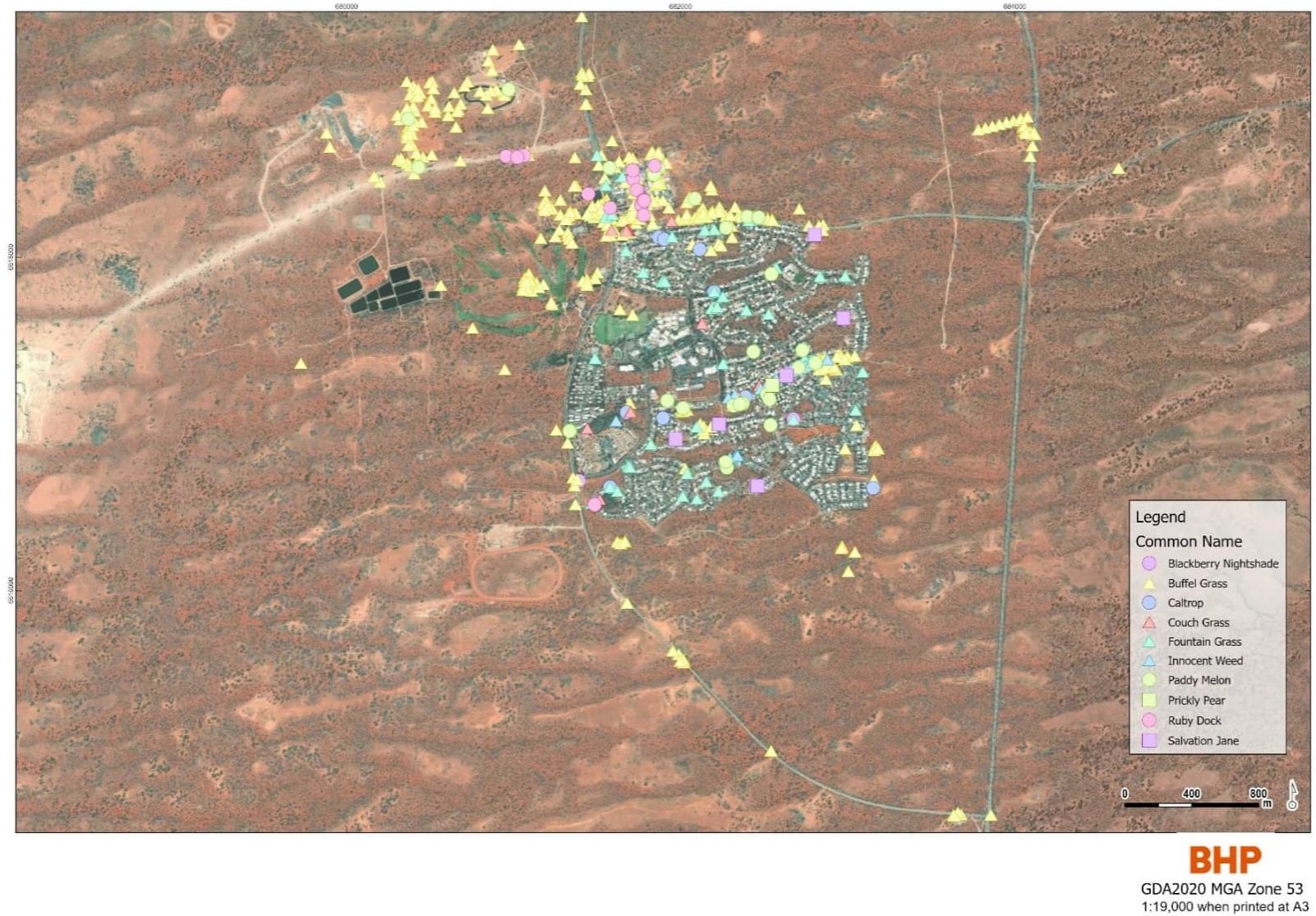


Figure 6: Locations of declared and high risk weed species active in FY24 in the Roxby Downs urban area

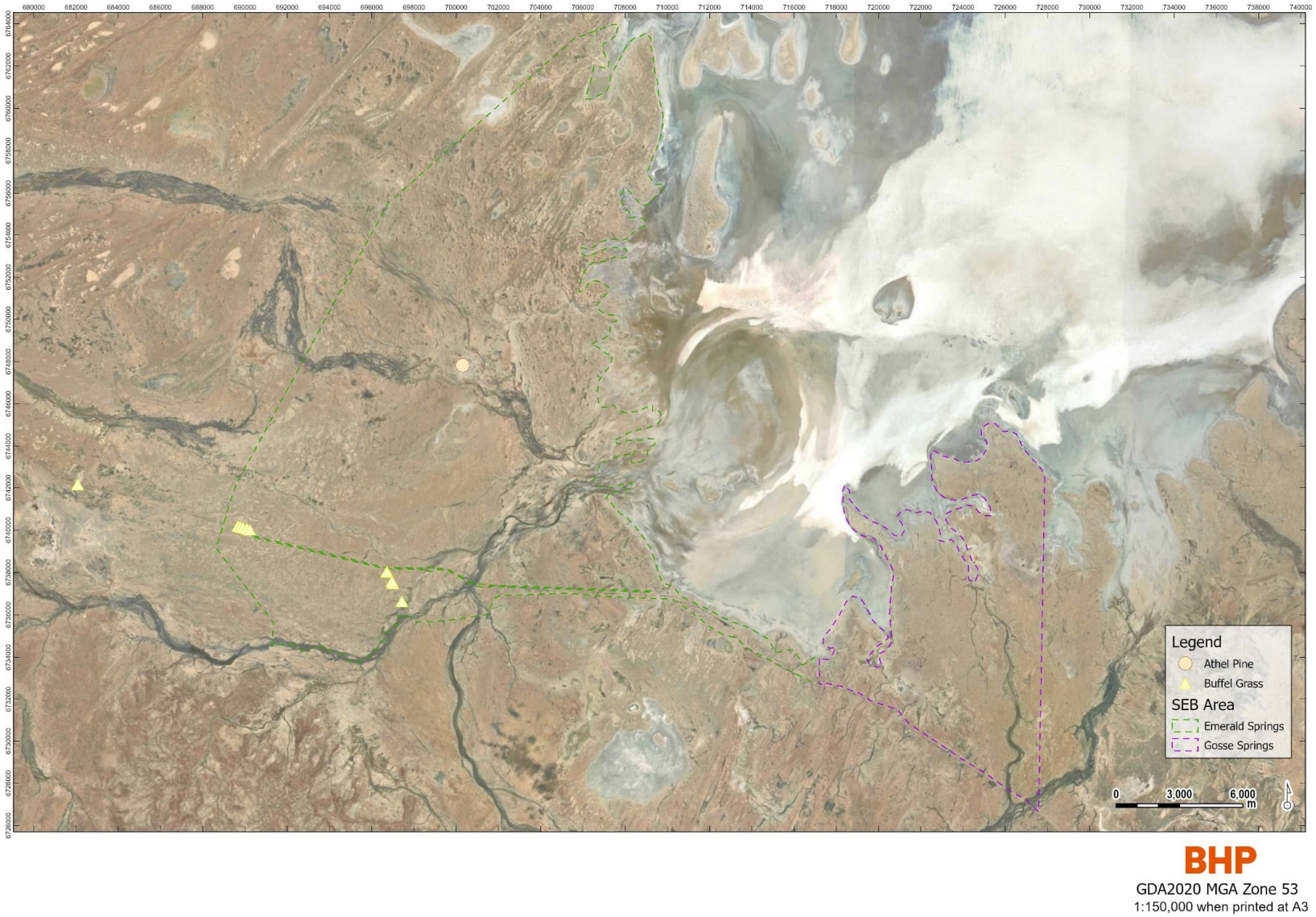


Figure 7: Locations of declared and high risk weed species in FY24 in Significant Environmental Benefit Areas

1.1.6. Deliverables (FL 3.4)

A map of the known locations of listed species within the impact area of the Olympic Dam operation.

A statement of impacts to, and measures undertaken to avoid listed species.

Listed species include species known to occur in the region that are either listed as threatened or greater under state, national and/or international legislation and have the potential to be adversely impacted by operations. This includes species that have a wider distribution within the state, interstate or overseas and are therefore not considered to be critically dependent on existing populations within the potential impact area.

A bi-annual desktop assessment determined that 17 listed flora species of international significance (International Union for Conservation of Nature (IUCN) Red List), 10 listed flora species of national significance *(Environment Protection and Biodiversity Conservation Act 1999* (EPBC)), 25 listed flora species and one provisionally listed community of state significance (NPW Act) were identified as potentially occurring in the OD operation AoI. Western Tarvine *(Gilesia biniflora*), listed as Rare, and the threatened ecological community (TEC) Mulga (*Acacia aneura*) low woodland on sand plains, provisionally listed as Vulnerable under the NPW Act are known to exist on the SML (Figure 8). No known listed flora species were impacted by disturbance activities during FY24 (Figure 8). Efforts are made wherever possible to avoid these species during the internal Land Use Permit (LUP) process.

The desktop assessment determined that 21 listed fauna species of international significance, 17 listed fauna species of national significance and 13 listed fauna species of state significance were identified as potentially occurring in the OD operation AoI. Fauna species re-introduced to the ARR or species known to interact with the TRS were excluded from this assessment. Nomadic and migratory species known to interact with the TRS are discussed separately in Section 4.3 Fauna Interaction with Tailings Retention System.

An important population of Plains Mouse is known to inhabit the ARR and during favourable conditions, it is known to expand its population into the SML. Vegetation types that are considered potential habitat for the Plains Mouse include chenopod shrublands (*Atriplex vesicaria* / *Maireana astrotricha*), cotton bush (*Maireana aphylla*) gilgais, canegrass (*Eragrostis australasica*) swamps and ephemeral dominated plains (Figure 9). These vegetation types are often associated with large swale areas greater than 1 km^2 that have drainage lines and cracking clays, which constitutes critical habitat for the Plains Mouse. Efforts are made wherever possible to avoid potential Plains Mouse habitat using the internal LUP process and implementation of infield verification habitat surveys.

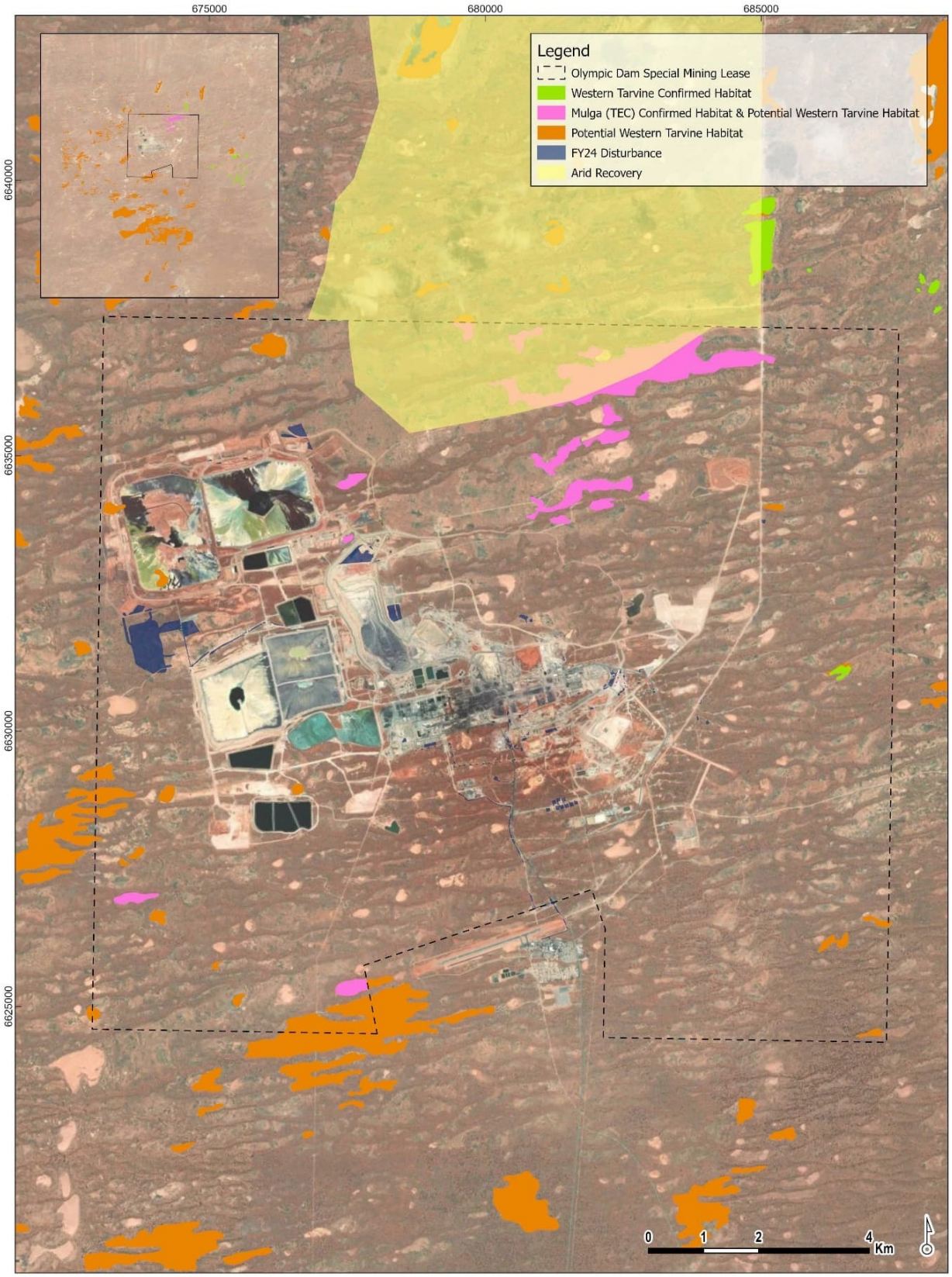


Figure 8: Potential and confirmed habitats of listed flora species

Figure 9: Listed fauna species potential habitat

A map of the direct disturbance impact footprint of ODC's activities.

A statement of comparison between the impact footprint of ODC's activities (i.e. within and outside the SML) and the offset areas under SEB processes, to account for 58.36 SEB points per hectare of native vegetation disturbed within the SML or as per the approved native vegetation management plan for disturbances outside of the SML.

At the end of FY19 the remaining Gosse Springs SEB credit was converted to SEB points to align with the *Native Vegetation Regulations 2017.* The Gosse SEB balance remaining in reserve at the end of FY19 (4,424.3 ha) was converted to 31,339 SEB points. Therefore, tracking the progress of disturbance and offset areas no longer involves the life of mine ratio of 8 ha.

In 2019, the Emerald Springs SEB Native Vegetation Management Plan (NVMP) (Barron 2018a) was approved to establish a SEB offset area of 38,022 ha that is equivalent to 267,143 SEB points. The Native Vegetation Clearance Proposal for the SML accompanied the submission, which determined that 58.36 SEB points are required to be deducted from the Emerald Springs SEB credit for each hectare of native vegetation clearance (Barron 2018b).

Spatial analysis techniques were utilised on geo-referenced ortho-imagery for FY24. During this reporting period, satellite imagery of the SML was captured on a quarterly basis, offering an accurate account of the timing of land disturbance. Disturbances identifiedJoul as occurring between these dates were digitised in ArcGIS. The total area of disturbance that occurred during FY24 was 98.86 ha (Table 4 and Figure 10). The majority of disturbance for FY24 was attributed to the clearance associated with construction of Evaporation Pond (EP) 7 and the Olympic Dam Village (ODV) optic fibre project (1.63 ha of disturbance). Other minor clearance was associated with business as usual activities to support resource exploration programs, backfill and quarry operations and southern mining area decline works.

In FY24 disturbance not previously mapped associated with the Wellfield A infrastructure was mapped. This totalled 33.31 ha and occurred in the 1980s & 1990s. Not all land clearance associated with OD previously required an offset, but all disturbance in FY20 – FY24 was subject to an offset.This brings the total disturbance relating to OD (rehabilitation areas, Roxby Downs town facilities, water pipelines and other associated infrastructure) to 5,959.08 ha.

Applying the SEB rate of 58.36 SEB points per hectare to the SML clearance (97.23 ha x 58.36 points per hectare) and a total deduction of 110.11 SEB points (for 1.63 ha) from the ODV optic fibre project, a deduction of 5,784.5 SEB points was applied to Emerald Springs during FY24. The balance of Emerald Springs SEB at the end of FY24 is 207,075 points. No deduction of points from Gosse Springs was made during FY24.

All areas that have been disturbed by OD and subject to an SEB offset are depicted in Figure 11, while disturbance not subject to an SEB is depicted in Figure 12.

Table 4: Areas of Disturbance and SEB Offset Areas as at 30 June 2024

Total land cleared by OD up to end of FY24 (ha):	**5959.08**	
Total land cleared by OD in FY24 (ha):	98.86	
	Points remaining in Gosse at end of FY24	25,706.74
	Points consumed in Gosse in FY24	No points consumed from Gosse in FY24
	Points remaining in Emerald at end of FY23	212,859.4
	Points consumed in Emerald in FY24	5,784.5
	Points remaining in Emerald at end of FY24	207,075

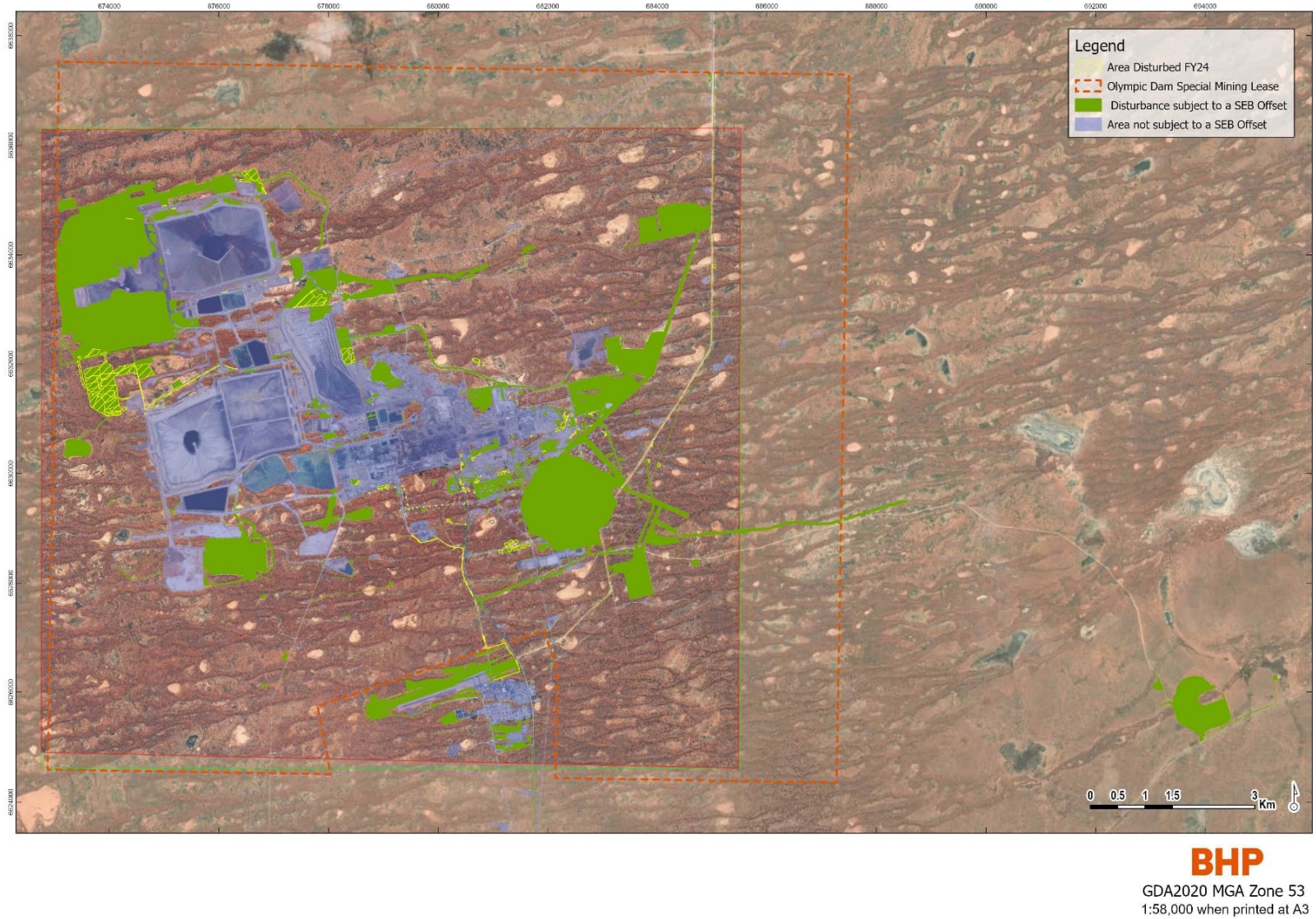


Figure 10: Areas of disturbance as at 30 June 2024

Figure 11: Areas of disturbance subject to an SEB offset as at 30 June 2024

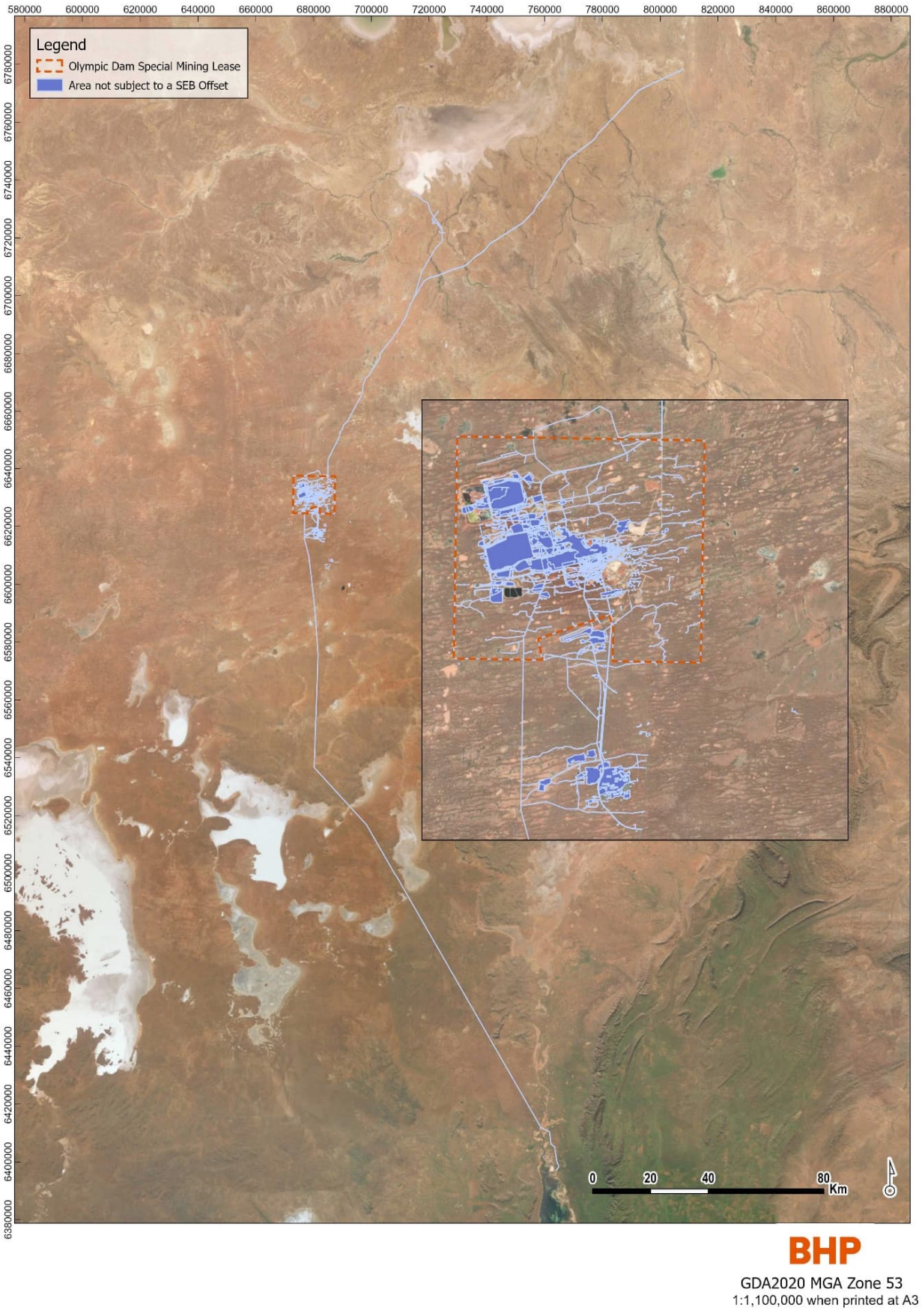


Figure 12: OD areas of disturbance not subject to an SEB offset

1.1.7. Deliverables (FL 3.5)

A summary of actions achieved from the SEB implementation plans within the fiscal year through the Annual EPMP Report.

An annual report to the government on SEB management outcomes through the Annual EPMP Report.

Shapefiles of the SEB areas for inclusion in relevant departmental databases.

To meet the requirements of the Native Vegetation Council (NVC) annual standard monitoring and progress report for the SEB areas, the following data is presented for both the Emerald Springs SEB (Table 5, Table 6, Table 7) and Gosse Springs SEB (Table 8, Table 9).

Due to the size of Emerald Springs SEB, annual photo points at the Rangelands Assessment sites was not recommended and instead photo points of the springs occurs annually as part of the Flora Monitoring Program. As part of the Native Vegetation Heritage Agreement, shapefiles for Emerald Springs and Gosse Springs SEB were sent to PIRSA and DEM in FY22.

Emerald Springs SEB

In FY19, ODC obtained approval for the Emerald Springs SEB in accordance with Schedule 1, Part 5 (Mining and petroleum activities), Division 1 – Mining Operations, 28 - Operations of the *Native Vegetation Regulations 2017* under the *Native Vegetation Act 1991*. The Native Vegetation Heritage Agreement has not yet been secured and is with the State government for assessment.

During August of FY24, a 5-year Rangelands Assessment was completed within the Emerald Springs SEB area in accordance with the NVC Rangelands Assessment Manual (2020). The assessment of Emerald Springs SEB area indicated that on average, across all landform types, the vegetation condition has improved by 38% since 2018. The largest increase in vegetation condition score was seen at the Spring landforms, recording a 105% increase. The conservation significance score was also recorded as increasing by 20% on average across all sites and landforms. Consequently, the Unit Biodiversity Score and subsequent Total Biodiversity Scores improved on average by 70% across all landform types and sites.

Table 5: Photographic Monitoring Record Sheet of Emerald SEB

Site Reference	Photo Point
LES001; Emerald Spring vent	

Site Reference	Photo Point
LES001; Athel pine within the Emerald Spring tail that cannot be removed as it is of Heritage significance	
LWS007; Part of the Walkarinna spring group within the Emerald Springs SEB	

Site Reference	Photo Point
LWS009; Part of the Walkarinna spring group within the Emerald Springs SEB	
LWS012; Part of the Walkarinna spring group within the Emerald Springs SEB	

Site Reference	Photo Point
LWS014; Part of the Walkarinna spring group within the Emerald Springs SEB	
LWS015; Part of the Walkarinna spring group within the Emerald Springs SEB	

Site Reference	Photo Point
LWS016; Part of the Walkarinna spring group within the Emerald Springs SEB	

The Emerald Springs SEB Management Plan (Barron 2018a) outlines the management actions and timing of the agreed actions. Once-off actions are outlined in Table 6.

Table 6: Once-off management actions required for the Emerald Springs SEB up to and including FY24

Action		Timing
1.	Cattle are to be mustered and removed.	Completed in FY20.
2.	Fence along the northern side of the Oodnadatta Track (~50 km), including a gate at the main access points for springs and monitoring bores.	OD has sought an amendment to the NVMP to reflect the reincorporation of this action following its removal in FY21. OD in FY24, completed construction of a boundary fence along the Oodnadatta track and Curdimurka paddocks. Final survey and as-built details of the fence line shall be provided to the Native Vegetation Branch in FY25. The updated NVMP for Emerald Springs will also be provided in FY25. Stock continues to be excluded from the Emerald Springs SEB.
3.	Improved signage, including at the Lake Eyre Lookout, Curdimurka Siding and at regular intervals along the Oodnadatta Track to encourage tourists to remain in controlled areas.	New signage was installed in April 2024 along the newly constructed Oodnadatta fence and at each spring group.
4.	NVC approved OD's commitment to the Arabana people to not remove the athel pine within the Emerald Spring 1 km^2 fence line. This decision was for Heritage reasons.	The Athel Pine remains at the Emerald Spring.

Action		Timing
5.	In late FY21 the NVC agreed to review both the Gosse and Emerald Springs NVMP updates in the same cycle as other EPMP documentation.	Ongoing (as above).

Ongoing management is captured through BHP's Work Management system. This entails quarterly inspections of the SEB areas, with a focus on fence maintenance and pest plant and animal control. In FY24 existing pest plant infestations along the Oodnadatta Track were visited to conduct routine herbicide control. Stock was detected inside the Curdimurka Paddock in February 2024, with the event managed via OD's internal event management system and the stock were subsequently removed from the Curdimurka paddock. Several camels were observed in the areas neighbouring Emerald Springs and evidence of damage to boundary fences detected in FY24. Despite this, no large feral herbivore (horse or camel) damage was observed in the Emerald Springs SEB in FY24.

Based on the continued quarterly inspections conducted by the OD Environment Department and ongoing monitoring completed by the Stuart Creek Station sub-lessee the management actions for Emerald Springs SEB are deemed to be effective and no negative changes to native vegetation have occurred.

Table 7: Progress works record for the Emerald Springs SEB

Action as listed in the NVMP	Action undertaken in FY24	Effectiveness of action
Domestic Livestock	During monitoring by the Environment team and Stuart Creek Station sub-lessee, no impacts from cattle or their tracks and scats.	Effective
Public Access	Unauthorised access of Emerald increased during FY24. Remote cameras will be installed on entry tracks to understand unauthorised activity. The installation of the Oodnadatta fence is also expected to reduce unauthorized access.	Effective
Feral herbivores	Camel tracks detected in Emerald. No evidence of camels at springs. No notable increase in rabbit activity occurred in FY24, mapping of warrens to commence.	Effective
Invasive and declared weeds	Ongoing control of weed infestations detected in Emerald Springs SEB along the Oodnadatta Track (Figure 7).	Effective
Health of GAB springs	Continued monitoring cover and abundance of vegetation within GAB springs within Emerald Springs SEB including Walkarinna as part of the GAB Springs monitoring program.	Effective

Gosse Springs SEB

During FY24 the Gosse Springs Native Vegetation Plan (Environmental & Biodiversity Services 2010) was adhered to and management actions undertaken. Quarterly inspections for feral animals and pest plants continued during FY24. In late FY21 'poo-plot' photo points were introduced to the Gosse Springs SEB. All large herbivore manure was removed from a key location between LGS001, LGS002, and LGS003 and has been monitored quarterly for feral tracks and scats (Table 8). Although feral camel tracks were detected within the Gosse Springs SEB area, the inspections did not record feral animals or new pest plants in the SEB area. Evidence of feral animals was raised and investigated via OD's event management system.

During FY24, environmental DNA (eDNA) monitoring of the Gosse Springs detected traces of feral pig DNA. OD has commenced an investigation and has notified SAAL and PIRSA of the possible detection. Further eDNA sampling in FY25 will assist in determining the reliability of this detection. Public access controls were improved in FY24 following construction of the new Oodnadatta and Curdimurka fence, whilst the inspection of gates, signage and access routes also continued in FY24.

Remote cameras were established within the Gosse Springs SEB for continuous monitoring of wildlife visiting LGS001 and LGS002. Photopoints are established for all spring vents within the Gosse Springs SEB, with selected images displayed in Table 8. The progress works record for the Gosse Springs SEB is recorded in Table 9.

Table 8: Photographic Monitoring Record Sheet of Gosse SEB

Site Reference	Photo Point
PP1; 'Poo plots' established to monitor for large herbivore incursion. All camel, cattle and horse dung was removed in January 2021 from a designated section between springs and is monitored quarterly for the presence of new dung. No new dung has been recorded.	

Site Reference	Photo Point
PP2; 'Poo plots' established to monitor for large herbivore incursion. All camel, cattle and horse dung was removed in January 2021 from a designated section between springs and is monitored quarterly for the presence of new dung. No new dung has been recorded.	
PP3; 'Poo plots' established to monitor for large herbivore incursion. All camel, cattle and horse dung was removed in January 2021 from a designated section between springs and is monitored quarterly for the presence of new dung. No new dung has been recorded.	

Site Reference	Photo Point
PP4; 'Poo plots' established to monitor for large herbivore incursion. All camel, cattle and horse dung was removed in January 2021 from a designated section between springs and is monitored quarterly for the presence of new dung. No new dung has been recorded.	
LGS004; Gosse Spring with largest population of *Eriocaulon carsonii* subsp. *carsonii*.	

Site Reference	Photo Point
LMS004; Within the McLachlan Spring group within the Gosse Springs SEB.	
LFE006; Within the Fred Spring group within the Gosse Springs SEB.	

Site Reference	Photo Point
LFE007; Within the Fred Spring group within the Gosse Springs SEB.	

Table 9: Progress works record for the Gosse Springs SEB

Action as listed in the NVMP	Action undertaken in FY24	Effectiveness of action
Domestic Livestock	During monitoring by the Environment Department and Stuart Creek Station sub-lessee there were no observations of cattle or their tracks and scats.	Effective
Public Access	Increase in off-road driving observed after rainfall particularly in Gosse. Remote cameras will be installed in early FY25 to understand unauthorised activity. The installation of the Oodnadatta fence is also expected to reduce unauthorised access.	Effective
Road Maintenance	No road maintenance occurred in FY24.	Effective
Exploration Activities	BHP did not conduct exploration activities in the Gosse Spring SEB (Figure 7).	Effective
Feral Herbivores	Traces of camels were detected in Gosse Springs in FY24. An investigation was promptly undertaken, and no impacts identified. Rabbit activity is to be mapped in the future.	Effective
Invasive and Declared Weeds	No new weed infestations were detected in Gosse Springs SEB.	Effective

Action as listed in the NVMP	Action undertaken in FY24	Effectiveness of action
Health of GAB springs	Continued monitoring of cover and abundance of vegetation was completed for the GAB Springs and within the Gosse Springs SEB including Gosse, Fred and McLachlan as part of the GAB springs monitoring program. EDNA monitoring of spring vents within the Gosse Springs SEB area was initiated in FY24.	Effective

1.1.8. Targets FY24

None applicable.

1.1.9. Actions FY24

Continue to implement actions and identify progressive rehabilitation opportunities in the Mine Closure Plan.

Several actions associated with the cessation of the 2011 OD expansion pre-commitment works continued throughout FY24. The Rehabilitation Strategy actions associated with these works are described in Table 10. Regular photo point monitoring has shown that in some areas where specific stabilisation measures were adopted, an increase in vegetation coverage has occurred (Figure 13, Figure 14, Figure 15, and Figure 16). Areas where compaction and saline water were used to minimise passive dust generation have showed signs of natural re-vegetation. The open pit area is now surrounded by works associated with the underground expansion of the southern mine area. Therefore, no further rehabilitation plans are in place for areas associated with pre-commitment works. The decommissioning of the Roxby Downs Town Dam site was completed during FY24, with works involving the final respreading of topsoil to the disturbed area. Six-monthly rehabilitation photo points have been established to track the rehabilitation in this area.

Due to the underground mining method used at OD, large scale rehabilitation works were not required during FY24. The internal LUP process requires temporary disturbances (i.e. excavation for pipe maintenance and cable installations) to be remediated through topsoil replacement and scarification to promote natural re-vegetation. In FY24 progressive rehabilitation continued where possible but was limited due to the relatively low annual clearance undertaken.

Table 10: Rehabilitation Strategy actions undertaken in FY24

Rehabilitation Strategy Action	Comment
Set-up photo monitoring points for the area cleared for the proposed contractor's village on Andamooka Station to visually monitor soil stability.	Six monitoring sites were established in May 2012 and continue to be monitored on a biannual basis through photo points. The area continues to show progressive re-establishment of local plant species.
Regular inspection of proposed contractor's village area for erosion.	The site of the proposed contractor's village is inspected during biannual photo point monitoring and other time-in-field excursions. Minor erosion from high rainfall events is visible within the Hiltaba area but does not warrant corrective action.

Figure 13: Photopoint ENV492 at Hiltaba taken May 2013

Figure 14: Photopoint ENV492 at Hiltaba taken March 2024

Figure 15: Photopoint ENV490 at Hiltaba taken May 2013

Figure 16: Photopoint ENV490 at Hiltaba taken March 2024

Review closure risks and assumptions through annual workshop.

BHP's closure strategy is to set objectives and deliver optimised closure outcomes for the assets in consultation with relevant stakeholders. The closure management process is designed to integrate decision-making and implementation activities at appropriate stages during the life cycle of OD. This process is set out in BHP's mandatory minimum performance requirements for closure (as per BHP's Closure and Legacy Management Global Standard) and considers social and environmental values, obligations, safety, costs and risks (both threats and opportunities) to inform each asset's closure strategy.

Stakeholder and partner engagement is integral to the development of OD's closure strategy and management plan. Annual closure planning workshops are held with the relevant internal stakeholders to ensure integration into planning, decision-making, and implementation activities.

No significant changes were made to the OD Closure Management and Rehabilitation Plan (CMRP) in FY24 (BHP Olympic Dam 2023c).

Align pest plant and animal control with South Australia Arid Lands Landscape Board (SAALLB) objectives outlined in the SAAL Regional Landscape Plan (2021-2026)

OD has worked with the SAALLB on regional priorities. OD is working towards expanding its influence with pastoral leaseholders with pest plant and animal management education. ODC initiatives carried out in FY24 that align with SAALLB regional priorities are set out below in Table 11.

Table 11: Alignment of OD initiatives with SAALLB Regional Landscape Plan FY24

SAAL Regional Landscape Plan Priority	ODC Aligned Initiatives
Protecting and Enhancing Biodiversity	• Monitoring of water dependent species at GAB springs. Sharing of work instructions and monitoring methodology with SAALLB. • Ongoing control of pest plant and animal species, including control efforts on pastoral leasehold land. • Ongoing assessment of impacts to threatened species and ecosystems within the OD operational area. • Construction of a new fence line along the Oodnadatta track and Curdimurka paddock, preventing stock and public impacts to the Emerald Springs and Gosse Springs SEB areas. • Construction of fencing at Jacobs Spring (outside of the SEB) on Stuart Creek Station. Upgrade of fences around Anna Springs to protect from herbivore grazing. Commencement of flora and fauna monitoring of Anna Springs and Jacobs Springs to record recovery and to inform future management strategies.
Water Management	• Development of Context Based Water Targets (CBWTs), including targets for implementation of a permanent daily abstraction limit on Wellfield A of 5 Megalitres per day (ML/d). • Continued assessment of potential impacts to communities of native species dependent on natural discharge of groundwater from the GAB (further discussed in 1.2 Aquifer Level Drawdown).

1.1.10 Continuous Improvement Opportunities FY24

Limited management of short-term surface rehabilitation has occurred on site due to the small areas involved, planned areas for expansion of the operations, and the low level of risk associated with these areas. Rehabilitation requirements of short-term surface disturbance, permitted under the Olympic Dam LUP System, including backfill areas, sand acquisition facilities, exploration areas, temporary storage facilities, temporary access routes and maintenance facilities. All other rehabilitation requirements are addressed through the Olympic Dam Rehabilitation Strategy.

Opportunity: Implement actions as identified in the Olympic Dam Rehabilitation Strategy.

Photo points have been established to monitor regrowth following decommissioning and rehabilitation of the Roxby Downs Town Dam. Ongoing photo point monitoring continued during FY24 at the OD Airport and Hiltaba rehabilitation sites.

Opportunity: Clarify closure risks and assumptions identified in the Olympic Dam Closure Management and Rehabilitation Plan.

The annual review of the OD CMRP did not identify any significant changes to the closure strategy or underlying assumptions. Closure risks are reviewed annually using BHP's risk management methodology for all operational areas, and the accounting provision for closure is recalculated each year. Tailings Storage Facility (TSF) 1-3 closure trials continued through study phases in FY24. Execution trials are expected to progress in FY25.

Considerable work has been undertaken to formalise weed monitoring and management at Olympic Dam.

Opportunity: Continue to undertake a regional approach to weed management through the coordination of annual workshops with Arid Recovery, Roxby Downs Council, Kingoonya Landscape Group and relevant pastoralists and contractors.

Ongoing collaboration throughout the OD operational area has continued in FY24. The OD Environment Department held pest plant toolbox talks with information distributed to contractors and partners including Arid Recovery. Local control in Roxby Downs has included targeted buffel grass control in a number of council operated properties and recreational areas. Engagement with pastoral stakeholders saw continued collation of quarterly pastoral reports in FY24 and ongoing control in the OD SEB areas. Ongoing collaboration with SAALLB and Traditional Owner ranger groups has highlighted areas for targeted control during FY24.

During FY24, OD received the outcomes of funding provided to the Alinytjara Wilurara Landscape Board to purchase innovative technology for the control of buffel grass. The funding supported Rangers in their protection of high biodiversity areas and the information will be used to educate other stakeholders in their buffel grass control efforts. OD will further explore opportunities in FY25 to collaborate with the Alinytjara Wilurara Landscape Board, other landscape boards, and researchers on a state-wide working group for the management of buffel grass.

Opportunity: Contribute to a regional database, in collaboration with the wider SAAL Landscape Group to record areas of known weed infestations and management actions.

OD has continued its contribution of pest plant data to the public domain through the Biological Database of South Australia (BDSA) via annual data returns under SU1235 OLYMPIC DAM PEST PLANTS.

Declared plant species under the *Landscape South Australia Act 2019* are present on ODC owned land within the Roxby Downs township (e.g. Buffel Grass).

Opportunity: Implement highest standard of vehicle hygiene in collaboration with the SAAL Landscape Board where development is planned in known weed infestation locations.

Vehicle hygiene requirements and conditions for vehicle and plant access continued to be implemented via the OD internal LUP procedure.

Opportunity: Continue to progress control of Buffel Grass within the SML and Roxby Downs Municipality through ongoing control in the weeks following rain.

Continued on-ground weed control activities implemented during FY24 as discussed in Section 1.1.5.

Opportunity: Actively engage with SAAL Landscape and implement actions from the State Buffel Grass Strategic Plan: 2019 to 2024 where appropriate.

During FY24 OD extended existing funding to the SAALLB to implement the Lake Eyre Basin Springs and Riparian Project, which will be executed over subsequent years. One of the aims of the Project is to reduce impacts of pest plants and feral animals at culturally and ecologically significant Lake Eyre Basin (LEB) water sites that provide critical habitat for threatened species. The collaborative Project sees involvement from the Friends of Mound Springs, Arabana Rangers and landowners to reduce buffel grass in the region particularly on the Oodnadatta track and tracks that could transmit the pest into springs. The future phase of this Project will continue the threat management of springs and focus on establishing monitoring of springs.

Opportunity: Continue to improve community and BHP employee knowledge about the impacts of pest plants and animals in the Roxby Downs region.

Annual pest plant toolbox materials were distributed to BHP staff and contractors in FY24. Information covered identification of common weeds in the OD region, why they are a threat and how to manage these weeds.

1.2 Aquifer Level Drawdown

1.2.1 Environmental Outcome

No significant adverse impacts to existing third-party users' right to access water from within the GAB wellfield Designated Areas for the proper development or management of the existing use of the lands as a result of ODC activities.

No significant adverse impacts to existing third-party users' right to access water from within the GAB wellfield Designated Areas for the proper development or management of the exisitng use of the lands as a result of ODC activities occurred in FY24.

Generally drawdown and percentage wellhead pressure loss at pastoral bores remains less than the predicted long-term impact as presented in the EIS (Kinhill Engineers 1997, updated Golder Associates 2016), and less than the maximum drawdown area defined within the 10 metre (m) contour (this is described further below).

No significant adverse impacts to the availability and quality of groundwater to existing Stuart Shelf third-party users as a result of groundwater drawdown associated with ODC activities.

No significant adverse impacts to the availability and quality of groundwater to existing Stuart Shelf third-party users as a result of groundwater drawdown associated with ODC activities occurred in FY24. Regional groundwater levels and quality are stable.

No significant adverse impact on groundwater-dependent listed species or ecological communities as a result of groundwater drawdown associated with ODC activities.

Drawdown remains less than the predicted long-term impact and was within compliance criteria limits for FY24. Environmental flow rates at GAB springs remained above predicted long-term impacts as presented in the EIS (Kinhill Engineers 1997, updated Golder Associates 2016). Monitoring showed no indication of a significant adverse impact on groundwater-dependent listed species or ecological communities as a result of groundwater drawdown associated with ODC activities (see Section 1.2.4).

1.2.2 Compliance Criteria

A 4 m drawdown limit at the point on the designated area for Wellfield A that is mid-way between GAB8 and HH2 based on the 12-month moving average.

At the end of FY24 average drawdown between GAB8 and HH2 was 1.5 m (BHP Olympic Dam 2024b).

A 4 m drawdown limit for Wellfield B at the point between monitoring bores S1 and S2 (measured as the average drawdown of the two bores) and based on the 12-month moving average.

At the end of FY24, the average drawdown between S1_New and S2 was 0.7 m (BHP Olympic Dam 2024b). The pressure monitored in S1_New, a replacement of the failed S1 bore, is considered representative of the aquifer and analogous to S1.

A drawdown footprint for Wellfield B, measured as the area contained within the 10 m drawdown contour, that is less than or equal to 4,450 km^2.

At the end of FY24, the area contained within the 10 m drawdown contour line was 4,004 km^2 (BHP Olympic Dam 2024b).

No material change in the availability and quality of groundwater at existing bores in the Stuart Shelf area operated by third-party users.

Monitored water levels and quality in the Stuart Shelf area are consistent with historical levels, and do not indicate any change in the availability of groundwater at existing third party users (see sections 1.2.7 and 1.2.8).

1.2.3 Leading Indicators

A drawdown trend at monitoring bore S1 that may exceed 4.5 m in the next 12 months.

The drawdown monitored at S1_New, a replacement of the failed S1 bore, is not showing a trend of exceedance of 4.5 m in the next 12 months (BHP Olympic Dam 2024b).

A drawdown footprint for Wellfield B, measured as the area contained within the 10 m drawdown contour that is greater than 4,000 km^2.

At the end of FY24, the area contained within the 10 m drawdown contour line was 4,004 km^2 (BHP Olympic Dam 2024b), slightly higher than the leading indicator.

A hydraulic gradient between wells in the NESB and HH2 exceeding 0.0009 m/m calculated as the six-monthly moving mean hydraulic gradient between HH2 and NESB wells GAB7, GAB8, GAB10, GAB11 and GAB19.

The FY24 hydraulic gradient between wells in the North-East Sub-Basin (NESB) (GAB7, GAB8, GAB10, GAB11, and GAB19) and HH2 remained above or equal to the leading indicator of 0.0009 m/m (6 month moving average) during the reporting period (BHP Olympic Dam 2024b).

A combination of the following factors that can be attributed to water extraction from Wellfields A and B:

- **Evidence that flow reductions at GAB springs in the vicinity of the wellfields may exceed the predictions made in the Olympic Dam Environmental Impact Statements of 1982 and 1997.**
  - GAB spring flow reductions did not exceed the predictions made in the OD EIS' of 1982 and 1997.
- **Evidence of water quality change (measured as pH or conductivity) at GAB springs.**
  - The increasing trend observed at Bopeechee HBO007 did not continue in FY24 and has been lessening since FY23. This small spring has seen an increase in large herbivore disturbance in recent years causing the minor discharge from the vent pool to slow down. This may be causing the vent pool water to increase salinity concentration. The other monitored springs in the Bopeechee group do not display an increasing salinity trend. The Bopeechee spring group is on third party land and BHP has no management control of herbivores at this site. The decreasing salinity trend observed since the mid 2000's continued at a reduced rate at Old Finniss HOF033 in FY24.

A continuing drawdown trend at GAB pastoral bores that may exceed the predictions of the Olympic Dam Environmental Impact Statement of 1997.

In general, drawdown at pastoral bores remains less than the predicted long-term impact as presented in the EIS (Kinhill Engineers, 1997, updated Golder 2016). Maximum drawdown (8.7 m) was at Muloorina in FY24 (BHP Olympic Dam 2024b). In FY24 Wellfield B abstraction was 1.7% more than during FY23, aligned with normal processing rates since the smelter maintenance shutdown in FY23.

A drawdown trend or changes in groundwater quality in the Stuart Shelf area that may impact on existing third-party users.

No drawdown trend or changes in water quality were detected in FY23 that could impact on existing third-party users. There are no third-party groundwater users within 45 km of the OD mining lease. Data presented in Sections 1.2.7 and 1.2.8 of this report demonstrates no drawdown trend or changes to groundwater quality within the Stuart Shelf area.

1.2.4 Deliverables (FL 3.2)

An evaluation of the composition of vegetated wetlands within the GAB springs.

In FY24 GAB spring flora monitoring was completed in August and September 2023. During FY24, flora monitoring of 109 GAB springs was undertaken. Usually, 111 spring vents are attempted to be monitored, however LMS001 and HOF033 were not accessed in FY24 due to difficulty in finding specific vents in dense vegetation.

In total, 34 flora species were observed. The greatest number of species observed on one spring was 10 at LGS006, while the least number of flora species observed on one spring was zero (WWS013). WWS01 was removed from all analysis due to the lack of all flora species.

The abundance of plant species observed was plotted against the occupancy, where occupancy is calculated as the percent of springs on which a species occurred and abundance is the percent of quadrats for each spring, on which a species occurred, averaged over all springs.

Similar to previous years, *Cyperus laevigatus* and *Phragmites australis* were the most abundant species and occupied the most springs. This was followed by *Fimbristylis dichotoma*, *Sporobolus virginicus*, *Machaerina juncea* and *Eriocaulon carsonii* subsp. *carsonii,* which was also moderately abundant. Springs with *E. carsonii* subsp*. carsonii* are targeted in this survey.

Using the Bray-Curtis dissimilarity metric, springs with a species composition greater than 50% similarity were grouped together. WWS013 was excluded from the analysis as it had no flora species present. Similarly, LMS001 and HOF033 were not analysed as they were not monitored. Monitoring results from FY24 identified seven dendrogram groups (n=108 springs) (Figure 17). In comparison, the FY17 analysis identified 12 dendrogram groups and the FY18, FY19 and FY20 analysis identified 9 dendrogram groups. In FY21 there were 7 and FY22 had 10. In FY22, 4 spring vents were unique enough to be in their own individual groups, however they were clustered with other vents in FY23 to create 6 groups. Modifications to the Bray-Curtis metric used by Datasticians (Griffin and Dunlop 2016) and GHD (2017) were not documented and are therefore impossible to recreate. This could then result in discrepancies in dissimilarities presented in years prior to FY18.

In FY24, HOW025 formed Group 1 on its own and was distinguished from other springs by dominance of *S. virginicus* (60%) along with *C. laevigatus* (42.86%) (Table 12). HOW025 is distinguished from the two springs, HHS125 and LWS016 which clustered together to form Group 2, which is also dominated by *S. virginicus* (90.98%) but notably have no *C. laevigatus*. Instead, Group 2 has a relatively high percentage of *M. juncea* (29.21%) and *Juncus kraussii* (16.18%). LWS016 and HHS125 also clustered together in FY23 and FY22. LWS015 was the only spring within Group 3 and was dominated by *Melaleuca glometra* (70%) and *Phragmites australis* (46.67%). Group 4 contained the most springs (n=73) which is similar to previous years where the group with the largest number of springs has had 70 springs clustered together in both FY23 and FY22. Group 3 was distinguished by a high percentage of *P. australis* (76.62%), followed by *C. laevigatus* (24.54%) and *F. dichotoma* (20.18%). Group 4 also had the highest species richness with 24 species present.

The Gosse Springs without standing water, LGS0003, LGS0005 and LGS0006 had been clustered together in FY21, FY22, FY23 and again clustered together in FY24 to form Group 5. Similar to FY23, this Group also clustered with HOF004. Group 5 was dominated by *Calocephalus platycephalus* (60.8%), *C. laevigatus* (37.5%), and *Trianthema sp.* (16.88%). Group 6 consisted of five springs that were dominated by *C. laevigatus* (63.98%) and *Typha domingensis* (55.45%). LES001 (Emerald Spring) was the only other spring that had *T. domingensis* present, however it was far less abundant than the five springs that clustered together in Group 6. 22 springs clustered together in Group 7 and this group was distinguished from the other Groups by high abundance of *C. laevigatus* (92.21%) and high species diversity (20 species).

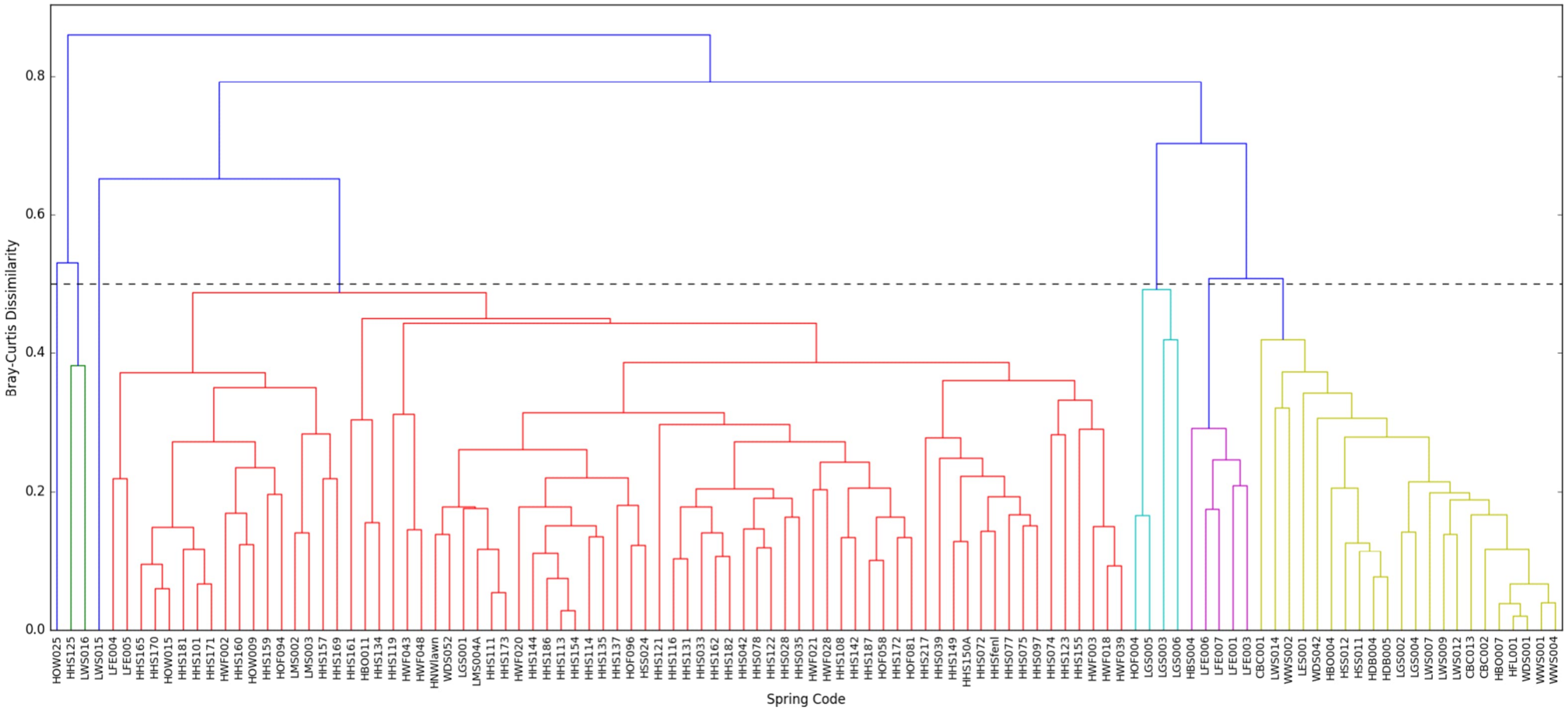


Figure 17: GAB springs grouped according to species composition (>50% similarity) using hierarchal clustering

**Note: Springs groups are depicted by different colours and are in order 1-7 from left to right.*

Table 12: Average abundance (%) of species within each dendrogram group

Species	1 (n = 1)	2 (n = 2)	3 (n=1)	4 (n = 73)	5 (n = 4)	6 (n = 5)	7 (n = 22)
Acacia stenophylla	5.71		3.33	0.55			0.45
Atriplex limbata					13.75		
Atriplex holocarpa			3.33	0.21	3.75		
Atriplex nummularia ssp.		3.33	3.33	0.94		1.17	0.5
Atriplex sp.					0.71		
Calocephalus platycephalus	14.29			2.12	60.8		0.97
Centipedia thespidioides				0.06			0.3
Cyperus laevigatus	42.86		6.67	24.54	37.5	63.98	92.21
Enchylaena tomentosa				0.48			
Eragrostis dielsii					4.38		
Eriocaulon carsonii ssp. *carsonii*				3.5			3.11
Fimbristylis dichotoma				20.18			9.05
Frankenia foliosa							2.3
Frankenia sp.							0.91
Gahnia trifida				4.93			
Juncus kraussii		16.18		1.25			
Machaerina juncea		29.41		13.72			
Maireana tomentosa ssp *tomentosa*				0.74	1.25		
Melaleuca glometra			70				2.42
Myoporum montanum				2.23	0.63	0.67	0.26

Species	1 (n = 1)	2 (n = 2)	3 (n=1)	4 (n = 73)	5 (n = 4)	6 (n = 5)	7 (n = 22)
Nitraria billardierei				0.05			0.63
Osteocarpum dipterocarpum		1.67		0.07	0.63		
Phragmites australis			46.67	76.62			2.81
Pterocaulon sphacelatum				0.11			
Salsola australis				0.11	0.63		
Schoenoplectus litoralis							0.33
Sclerolaena diacantha	5.71			0.04	11.88		
Spergularia rubra			10	0.33		4.91	2.8
Sporobolus virginicus	60	90.98		8.31		15.65	2.16
Streptoglossa liatroides					4.38		0.15
Tecticornia indica				0.07			4.5
Trianthema sp.				2.51	16.88	3.9	0.64
Typha domingensis						55.45	0.64
Species Richness	5	5	7	24	13	7	20

**Note: N=number of spring vents within the dendrogram group.*

A comparison of the abundance and distribution of *Eriocaulon carsonii* subsp*. carsonii*, per impact zone, with previously reported values, to determine any impacts to GAB springs.

Within the region studied, populations of *E. carsonii* subsp. *carsonii* were found at 22 springs in the Hermit Hill, North East and Lake Eyre springs complexes in FY24. This is the same number as detected in FY23, but in contrast to the 18 sites with *E. carsonii* subsp. *carsonii* detected in FY16 (least sites) and 24 detection sites in FY22 (most sites). However, the springs where E.carsonii subsp. carsonii was detected over the years has changed (Table 13). *E. carsonii* subsp. *carsonii* was found at HHS182 for the first time in several years (at least 8 years), but it has been known to occur at the spring with records from 1983. In FY24 trial eDNA water samples were collected and filtered in situ, prior to being sent to Curtin University to test whether this methodology can be used to detect *E. carsonii* subsp*. carsonii*. eDNA monitoring will be further be refined in FY25.

E. carsonii subsp. *carsonii* occurred within the Hermit (n=17), Gosse (n=2), West Finniss (n=1), North West (n=1) and Sulphuric (n=1) spring groups (Table 13). *E. carsonii* subsp. *carsonii* was uncommon and limited in abundance where it did occur. It ranged in percentage abundance on any one spring vent on which it occurred from 2 – 50%. *E. carsonii* subsp. *carsonii* occurred on both spring vents and tails.

Using a Chi Square analysis for dependent samples, the average abundance of the 29 springs identified as suitable *E. carsonii* subsp. *carsonii* habitat from 2015-FY24 has shown that there has been no significant negative impact to the size of an important population of *E. carsonii* subsp. *carsonii* (X2 = 4.81, df = 8, p = 0.223; Figure 18). Rather, differences observed between 2015 and other years is likely to do with a difference in ability to find the oftentimes cryptic *E. carsonii* subsp. *carsonii*.

Table 13: Comparison of *E. carsonii* subsp. *carsonii* results in FY16-FY24

Spring code	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24
Spring Group: Hermit Hill									
HHS028	8.7	13.5	29.7	21.6	16.2	32.43	32.43	37.88	18.92
HHS033	1.6	2.7	5.4	5.4	10.8	13.51	10.81	13.51	8.11
HHS035	0	2.8	11.1	8.3	11.1	5.56	5.56	16.67	8.33
HHS072	1.4	0.0	0	0	0.0	0	5.41	Not found	Not found
HHS074	2.7	5.1	0	0	0.0	15.38	5.13	12.82	10.26
HHS075	1.4	0	0	0	0.0	0	2.7	Not found	Not found
HHS077	0	7.7	7.7	7.7	15.4	23.08	17.95	12.82	10.26
HHS078	5.5	20.5	11.8	2.9	35.3	35.29	17.65	23.53	32.35
HHS114	1.7	0.0	0.0	0.0	0.0	0.0	0.0	Not found	Not found
HHS116	1.4	8.3	8.3	8.3	8.3	19.44	11.11	5.56	13.89
HHS119	0	0	22.2	8.3	38.9	30.56	27.78	50	50
HHS121	0	2.9	17.1	31.4	11.4	5.71	8.57	17.14	11.43
HHS122	0.0	2.8	0	16.7	11.1	16.67	13.89	27.78	19.44
HHS123	6.3	30.5	8.3	25	19.4	27.78	13.89	41.67	13.89
HHS131	1.8	4.7	2.4	7.1	7.1	9.5	4.76	4.76	9.52
HHS144	0	0	0	0	0	0	0	Not found	Not found
HHS150A	2.6	5.4	8.1	10.8	5.4	5.41	8.11	18.92	5.41
HHS154	0	0	0	0	0	2.7	2.7	5.41	Not found
HHS155	3.9	15	17.5	20	20	25	15	20	25
HHS172								4.26	2.13
HHS173	0	0	0	0	0	0	10.81	Not found	Not found

Spring code	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24
HHS182	Not found	Not found	Not found	Not found	Not found	Not found	Not found	Not found	2.7
HHSfenl	13	10.5	17.5	7.1	14.3	18.57	22.86	35.71	1.43
Spring Group: North West									
HNWlawn	1.7	0.0	2.9	2	2	1	1	2	1
Spring Group: Old Finniss									
HOF058	0	0.0	0	0	0	0	0	Not found	Not found
Spring Group: Sulphuric									
HSS012	3.2	2.7	5.4	5.4	5.4	18.92	13.51	13.51	13.51
Spring Group: West Finniss									
HWF043	9.8	11.5	9.6	15.4	23.1	21.15	13.46	17.31	11.54
Spring Group: Gosse									
LGS002	12.3	18	8	14	12	6	20	34	16
LGS004	18.9	26.7	45	53	17	35	33	45	39

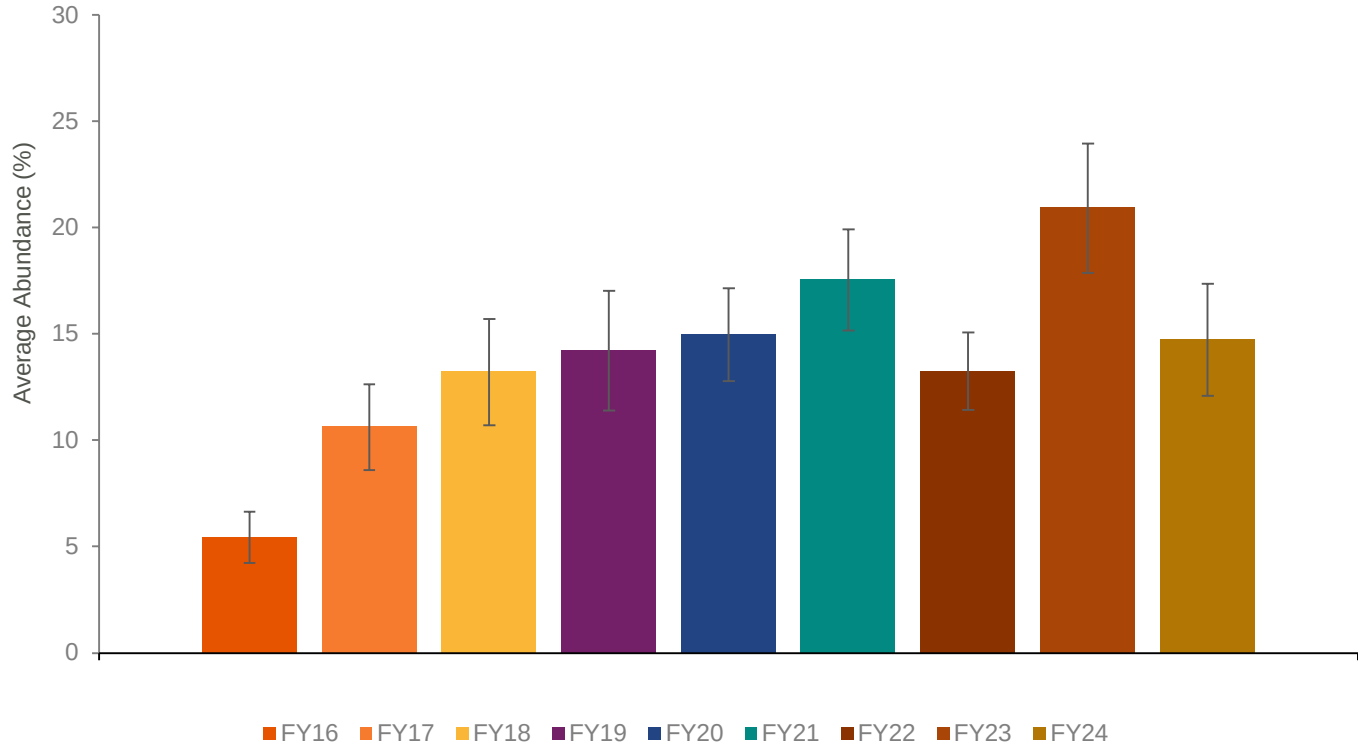


Figure 18: The abundance (mean ± SEM) of *Eriocaulon carsonii* subsp. *carsonii* from FY16-FY24 across the 29 springs identified as suitable *E. carsonii* subsp. *carsonii* habitat

Comparison of the abundance of Hydrobiid species against baseline data to quantify population change.

OD monitored 92 springs for invertebrates in FY24. Monitoring of 110 springs is attempted in the program. Sixteen springs were not able to be monitored for invertebrates as they lacked standing water, whilst two samples were not reported due to sampling error. A review of the GAB spring flow, flora and invertebrate monitoring programs in 2015 resulted in a more thorough evaluation of GAB spring flora and a reduction in the overall number of spring vents monitored for invertebrates. However, the overlap of the number of these springs monitored for flow, flora and invertebrates has increased. All data from the invertebrate monitoring program is submitted to the BDBSA under Survey 939, while the flora data is submitted under Survey 938. Table 14 indicates the taxa that are identified as part of the invertebrate program. Table 15 outlines the hydrogeological zones of springs.

Table 14: Eight key taxa included within the monitoring program

Taxa	Threatened Status	Level of Endemicity*
Trochidrobia sp. (snail)	-	$
Fonscochlea accepta (snail)	IUCN Vulnerable	Lake Eyre Supergroup (12 spring groups)
Fonscochlea aquatica (snail)	IUCN Endangered	-
Fonscochlea variabilis (snail)	-	Lake Eyre Supergroup (5 spring groups)
Fonscochlea zeidleri (snail)	IUCN Near Threatened	Lake Eyre Supergroup (7 spring groups)
Isopod		
Amphipod		
Ostracod		

**Note: Level of endemicity is from Rossini et al., 2018 and Beasley-Hall et al., 2023. $: Trochidrobia species T. punicea and T. smithii are difficult to distinguish morphologically but can be separated by examining the reproductive tracts of males and females. Occurrence of both species overlap the Coward complex, however, distributions may be used in the future to determine the separation. With the exception of the Coward complex, it is likely that all other springs with Trochidrobia present are T. punicea.*

Table 15: Spring groups within each hydrogeological zone and the predicted spring flow decline (BHP 2023b)

Spring Complex	Hydrogeological Zone	Spring Groups ^	Range of spring flow decline predicted
Coward	Coward	Blanche Cup	<1%
Hermit Hill	South West	Hermit Hill, Finniss Well, Old Finniss, Old Woman	<1-<3%
Hermit Hill	North East	Bopeechee, Dead Boy, Sulphuric, West Finniss	8-20%
Lake Eyre South	Western Lake Eyre South	Emerald, Gosse, McLachlan	3-17%
Wangianna	South East	Davenport and Welcome	3-16.5%
Hermit Hill and Lake Eyre South	Wellfield A	Beatrice, Fred	60-100%

^ Walkarinna and North-West spring groups are not assigned a hydrogeological zone within the GAB Monitoring Program.

1995 (baseline) comparison with 2023 (FY24)

Of the 92 monitored springs in 2023, 47 of the springs were also monitored in 1995. These 47 springs are presented by hydrogeological zone and the eight key taxa compared between 1995 and 2023 (Table 16). Most of the eight taxa are represented across all four hydrogeological zones, except for *Fonscochlea aquatica* which is only found in the Coward zone, and *F. accepta* which is not found at Coward but is represented in the remaining three hydrogeological zones. Noteworthy observations include the overall net reduction in occurrence of three of the Fonscochlea snails species, *F. zeidleri, F. accepta, F.variabilis* when the 47 springs are compared between 1995 and 2023 (Table 16). *F. accepta* is found across three hydrogeological zones North East, South East and South West. The percentage occupancy of *F. accepta* reduced the most, by 21.25% (10 springs) between 1995 and 2023 (Table 17). The greatest reduction in *F. accepta* occupancy between 1995-2023 was in the North East zone. Overall (hydrogeological zones combined) the remaining five taxa increased between 1995-2023.

2021 comparison with 2023

Of the 92 springs monitored in 2023, 76 of these were also monitored in April/May 2021 for invertebrates and have an assigned hydrogeological zone (Table 18). The FY2021 monitoring was conducted in April/May 2021 instead of the usual August 2020 due to operational reasons. Seven springs have not been assigned a hydrogeologic zone within the Great Artesian Basin Monitoring Program and therefore are not compared. The remaining nine springs sampled were not sampled in either 2021 or 2023 due to sampling error or requests not to sample, and therefore cannot be compared either, leaving 76 comparison springs.

The 1995-2023 trend is similarly noted when comparing the 76 springs monitored in 2021 and again in 2023, with *F. accepta* occupancy reduced by 11.84% (9 springs) (Table 18 and Table 19). The greatest reduction in occupancy of *F.accepta* between 2021-2023 was in the South West zone. The remaining six taxa either remained the same or increased in percentage occupancy between 2021 and 2023. This suggests that *F. zeidleri* and *F.variabilis* that decreased between 1995-2023 may be increasing in occupancy.

Fonscochlea accepta

From the trend of percentage occupancy for *F. accepta* across the eight monitoring periods (calendar year of sampling: 1995 [baseline], 2005, 2008, 2014, 2017, 2021, 2023) it is evident that the presence fluctuates (Figure 19). Table 20 shows the individual 26 springs that were monitored across all eight time periods and how the presence fluctuates between any given monitoring period. The key springs that have showed at least three periods (nine years) of absence are HBO011, HWF021, and WDS052, however, the overall percentage occurrence of *F.accepta* in 2023 is not the lowest that is has been over the past 8 periods (Table 20). Reviewing photopoints and GAB flora data captured since 2018, HBO011 and WDS052 experienced a level of grazing/pugging. All three springs continue to have standing water and HBO011 and WDS052 are part of the spring flow monitoring discussed below. Similarly, the raw abundance of *F.accepta* across the 48 springs where it was found to be present in 2023, the abundance varied from 1 individual to 50+ individuals recorded. While *F.accepta* is likely to be rare in the environment, the downward trend in occupancy across the monitoring period may suggest its sensitivity to change in environment factors. Microhabitats do exist within springs, with some species being aquatic obligates and others able to tolerate the fringe of the spring where the tail is shallower/prone to drying.

The monitoring program methodology has been consistent across the years, with duplicates taken at a number of sites to test the methodology. An analysis of the duplicate samples provides valuable information about the high level of this variation. The proportion of duplicate pairs that are different allows us to quantify the total rate of errors. A comparison of the duplicate pairs identified that 4 of the 8 pairs differed in one to three presence/absence value(s). This suggests that approximately half of the samples overall are not a perfect representation of the invertebrate species present in the spring, but that most of the errors impact just a single taxon.

OD has undertaken significant work over the previous three years to research and develop eDNA (environmental DNA) for use within the GAB springs. The intent is to create a tool that can be used by stakeholders to detect the suite of species to contribute to the understanding of the springs. Over the past 40 years a number of different springs have been monitored for invertebrates. The current suite of springs in the monitoring program has been implemented since 2015. The intent is to carry this monitoring suite forward to better determine trends in presence and absence of key taxa.

Table 16: Comparison of presence (P) and absence (A) of the 8 taxa monitored across 47 springs in 1995 compared with 2023

Hydrogeological Zone	Spring Group	Spring	Trochidrobia sp.		F. aquatica		F. zeidleri		F. accepta		F. variabilis		Isopod		Amphipod		Ostracod	
			1995	2023	1995	2023	1995	2023	1995	2023	1995	2023	1995	2023	1995	2023	1995	2023
Coward	Blanche Cup	*CBC001*	P	P	P	P	P	P	A	A	P	P	P	P	P	P	P	P
		CBC002	P	P	A	P	A	P	A	A	P	P	P	P	A	P	P	P
		CBC013	P	P	A	P	P	A	A	A	P	P	P	P	P	P	P	P
South East	Davenport	*WDS001*	A	P	A	A	A	A	A	P	A	A	A	P	A	P	A	P
		WDS042	P	P	A	A	A	A	P	P	A	A	P	P	P	P	P	P
		WDS052	P	P	A	A	A	P	P	A	P	A	P	P	P	P	P	P
	Welcome	*WWS001*	A	A	A	A	A	A	A	A	A	A	A	P	A	P	A	P
		WWS002	P	A	A	A	P	A	P	P	P	P	P	P	A	P	P	P
		WWS013	P	A	A	A	A	A	P	A	A	A	P	A	A	A	P	P
North East	Bopeechee	*HBO004*	P	P	A	A	A	A	P	P	P	A	P	P	P	P	P	P
		HBO007	P	A	A	A	A	A	P	P	A	A	P	P	P	P	P	P
		HBO011	P	P	A	A	A	A	P	A	A	A	A	P	A	P	P	P
	Dead Boy	*HDB004*	P	P	A	A	A	A	P	P	A	A	P	P	P	P	P	P
		HDB005	P	P	A	A	A	A	P	P	A	A	P	P	P	P	P	P
	Sulphuric	*HSS011*	A	P	A	A	A	A	P	P	A	A	P	P	A	P	P	P
		HSS012	A	P	A	A	A	A	P	A	A	A	P	P	P	P	P	P
		HSS024	P	P	A	A	A	A	P	P	A	A	P	P	P	P	P	P
	West Finniss	*HWF003*	P	P	A	A	A	A	P	P	A	A	P	P	A	P	P	P
		HWF018	A	P	A	A	P	A	P	P	A	A	A	P	A	P	P	P
		HWF021	A	P	A	A	A	A	P	A	A	A	P	P	P	P	P	P
		HWF028	A	P	A	A	A	A	P	A	A	A	P	P	P	P	P	P
		HWF039	A	P	A	A	A	A	P	A	A	A	P	P	P	P	P	P
		HWF048	A	P	A	A	A	A	P	P	A	P	P	P	P	P	P	P
South West	Hermit Hill	*HHS028*	P	P	A	A	A	P	P	P	A	A	P	P	P	P	P	P
		HHS033	A	P	A	A	A	A	P	A	A	A	P	P	A	P	P	P
		HHS035	P	A	A	A	P	A	P	P	A	A	P	P	P	P	P	P
		HHS039	A	P	A	A	P	P	P	P	A	A	P	P	P	P	P	P
		HHS042	A	A	A	A	P	P	P	A	A	A	A	A	A	P	P	P
		HHS072	P	A	A	A	P	A	P	A	A	A	P	P	P	P	P	P
		HHS074	P	P	A	A	P	P	P	P	A	A	P	P	A	P	P	P
		HHS075	P	P	A	A	P	P	P	A	A	A	P	P	P	P	P	P
		HHS078	P	P	A	A	P	A	P	P	A	A	P	P	P	P	P	P
		HHS097	A	A	A	A	P	P	A	P	A	A	A	P	A	P	A	P
		HHS113	A	P	A	A	P	P	A	A	A	A	A	P	A	P	P	P
		HHS114	A	P	A	A	A	P	A	P	A	A	P	P	A	P	P	P
		HHS116	A	P	A	A	P	P	P	P	A	A	P	P	P	P	P	P
		HHS119	P	P	A	A	A	P	P	P	A	A	P	P	P	P	P	P
			1995	2023	1995	2023	1995	2023	1995	2023	1995	2023	1995	2023	1995	2023	1995	2023

Hydrogeological Zone	Spring Group	Spring	Trochidrobia sp.		F. aquatica		F. zeidleri		F. accepta		F. variabilis		Isopod		Amphipod		Ostracod	
			1995	2023	1995	2023	1995	2023	1995	2023	1995	2023	1995	2023	1995	2023	1995	2023
		HHS122	A	P	A	A	A	A	P	A	A	A	P	P	P	P	P	P
		HHS123	P	P	A	A	A	A	P	A	A	A	P	P	P	P	P	P
		HHS131	A	P	A	A	A	A	P	P	A	A	P	P	A	P	A	P
		HHS135	A	A	A	A	P	A	A	A	A	A	P	P	A	P	P	P
		HHS137	A	P	A	A	P	A	A	P	A	A	P	P	A	P	P	P
		HHS186	A	P	A	A	A	P	A	A	A	A	A	P	A	P	P	P
	Old Finniss	*HOF004*	P	P	A	A	A	A	P	P	A	A	P	P	P	P	P	P
	Old Woman	*HOW009*	P	P	A	A	P	A	P	P	P	P	P	P	P	P	P	P
		HOW015	P	P	A	A	P	A	P	A	P	A	P	P	P	P	P	P
		HOW025	P	P	A	A	A	A	P	P	A	A	P	P	P	P	P	P
Net Change Occurrence			**12**		**2**		**-4**		**-10**		**-2**		**6**		**18**		**4**	

**Note: Green highlight indicates a taxa is present in 2023 when it was not found at the spring in 1995. Conversely orange highlight indicates a taxa is not present in 2023 when it was found in 1995. Hydrogeological zones are per the Great Artesian Basin Monitoring Program* (BHP, 2023)

Table 17: Percentage occurrence of 8 target taxa sampled across 47 springs across 4 hydrogeologic zones between 1995 and 2023

	Trochidrobia sp.		F. aquatica		F. zeidleri		F. accepta		F. variabilis		Isopod		Amphipod		Ostracod	
IUCN Category			IUCN E		IUCN NT		IUCN V									
Hydrogeological zone	1995	**2023**	1995	**2023**	1995	**2023**	1995	**2023**	1995	**2023**	1995	**2023**	1995	**2023**	1995	**2023**
Coward (n=3)	100	**100**	33	**100**	67	**67**	0	**0**	100	**100**	100	**100**	67	**100**	100	**100**
North East (n=14)	50	**93**	0	**0**	7	**0**	100	**65**	7	**7**	86	**100**	71	**100**	100	**100**
South East (n=6)	67	**50**	0	**0**	17	**17**	67	**50**	33	**17**	67	**83**	33	**83**	67	**100**
South West (n=24)	50	**79**	0	**0**	58	**46**	75	**58**	8	**4**	83	**96**	58	**100**	92	**100**
Total (n=47) (%)	55	**81**	2	**6**	38	**30**	77	**55**	17	**13**	83	**96**	60	**98**	92	**100**

Table 18: Presence (P) & absence (A) of the 8 taxa monitored across 76 springs in 2021 compared to 2023

Hydrogeological zone	Spring Group	Spring	Trochidrobia sp.		F. aquatica		F. zeidleri		F. accepta		F. variabilis		Isopod		Amphipod		Ostracod	
			2021	2023	2021	2023	2021	2023	2021	2023	2021	2023	2021	2023	2021	2023	2021	2023
Coward	Blanche Cup	*CBC001*	P	P	P	P	P	P	A	A	P	P	P	P	A	P	P	P
		CBC002	P	P	P	P	P	P	A	A	P	P	P	P	P	P	P	P
		CBC013	P	P	P	P	P	A	A	A	P	P	P	P	A	P	P	P
South East	Davenport	*WDS001*	P	P	A	A	A	A	P	P	A	A	P	P	A	P	P	P
		WDS042	P	P	A	A	A	A	P	P	A	A	A	P	P	P	P	P
		WDS052	P	P	A	A	A	P	A	A	A	A	P	P	P	P	P	P
	Welcome	*WWS001*	P	A	A	A	A	A	P	A	P	A	P	P	P	P	P	P
		WWS002	A	A	A	A	A	A	P	P	P	P	P	P	A	P	P	P
		WWS004	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P
		WWS013	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P
North East	Bopeechee	*HBO004*	P	P	A	A	A	A	A	P	A	A	P	P	P	P	P	P
		HBO007	A	A	A	A	A	A	A	P	A	A	P	P	A	P	P	P
		HBO011	P	P	A	A	A	A	A	A	A	A	P	P	P	P	P	P
	Dead Boy	*HDB004*	P	P	A	A	A	A	P	P	A	A	P	P	P	P	P	P
		HDB005	P	P	A	A	A	A	P	P	A	A	P	P	P	P	P	P
	Sulphuric	*HSS011*	P	P	A	A	A	A	P	P	A	A	P	P	P	P	P	P
		HSS012	P	P	A	A	A	A	P	A	A	A	P	P	P	P	P	P
		HSS024	P	P	A	A	A	A	P	P	A	A	P	P	P	P	P	P
	West Finniss	*HWF003*	P	P	A	A	A	A	P	P	A	A	P	P	P	P	P	P
		HWF018	P	P	A	A	P	A	P	P	A	A	P	P	P	P	P	P
		HWF020	P	P	A	A	P	A	P	P	A	A	P	P	P	P	P	P
		HWF021	P	P	A	A	A	A	A	A	A	A	P	P	P	P	P	P
		HWF028	P	P	A	A	A	A	P	A	A	A	P	P	P	P	P	P
		HWF039	P	P	A	A	A	A	P	A	A	A	P	P	P	P	P	P
		HWF048	P	P	A	A	A	A	P	P	A	P	P	P	P	P	P	P
South West	Hermit Hill	*HHS028*	P	P	A	A	A	P	P	P	A	A	P	P	P	P	P	P
		HHS033	P	P	A	A	P	A	P	A	A	A	P	P	P	P	P	P
		HHS035	A	A	A	A	P	A	A	P	A	A	P	P	P	P	A	P
		HHS039	P	P	A	A	A	P	A	P	A	A	P	P	P	P	P	P
		HHS042	A	A	A	A	A	P	A	A	A	A	P	A	P	P	P	P
		HHS072	P	A	A	A	A	A	A	A	A	A	P	P	P	P	P	P
		HHS074	P	P	A	A	A	P	P	P	A	A	P	P	P	P	P	P
		HHS075	A	P	A	A	P	P	P	A	A	A	P	P	P	P	P	P
		HHS077	P	P	A	A	P	P	P	P	A	A	P	P	P	P	P	P
		HHS078	P	P	A	A	A	A	A	P	A	A	P	P	P	P	P	P
		HHS108	A	P	A	A	P	P	P	P	A	A	P	P	P	P	P	P
		HHS113	A	P	A	A	P	P	P	A	A	A	P	P	P	P	P	P
		HHS114	P	P	A	A	A	P	P	P	A	A	P	P	P	P	P	P
		HHS116	P	P	A	A	P	P	P	P	A	A	P	P	P	P	P	P
		HHS119	P	P	A	A	P	P	P	P	A	A	P	P	P	P	P	P

Hydrogeological zone	Spring Group	Spring	Trochidrobia sp.		F. aquatica		F. zeidleri		F. accepta		F. variabilis		Isopod		Amphipod		Ostracod	
			2021	2023	2021	2023	2021	2023	2021	2023	2021	2023	2021	2023	2021	2023	2021	2023
South West		*HHS121*	P	P	A	A	A	P	P	P	A	A	P	P	P	P	P	P
		HHS122	P	P	A	A	A	A	P	A	A	A	P	P	P	P	P	P
		HHS123	P	P	A	A	A	A	P	A	A	A	P	P	P	P	P	P
		HHS131	P	P	A	A	A	A	P	P	A	A	P	P	P	P	P	P
		HHS135	P	A	A	A	A	A	P	A	A	A	P	P	P	P	P	P
		HHS137	A	P	A	A	A	A	P	P	A	A	P	P	P	P	P	P
		HHS142	P	P	A	A	P	P	A	A	A	A	A	P	P	P	P	P
		HHS144	A	P	A	A	P	A	A	A	A	A	P	A	A	P	P	P
		HHS149	A	A	A	A	P	P	A	A	A	A	P	P	P	P	P	P
		HHS150A	A	A	A	A	P	P	A	P	A	A	P	P	P	P	P	P
		HHS154	A	P	A	A	A	A	P	A	A	A	P	P	P	P	P	P
		HHS155	A	A	A	A	P	P	P	A	A	A	P	P	P	P	P	P
		HHS161	A	A	A	A	A	A	A	A	A	A	P	P	A	A	P	P
		HHS162	P	A	A	A	P	P	P	A	A	A	P	P	P	P	P	P
		HHS169	A	A	A	A	A	A	A	A	A	A	A	A	P	A	P	P
		HHS172	P	A	A	A	A	A	P	P	A	A	P	P	P	P	P	P
		HHS173	P	A	A	A	A	A	P	A	A	A	P	P	P	P	P	P
		HHS182	A	P	A	A	A	A	P	A	A	A	P	P	P	P	P	P
		HHS186	A	P	A	A	P	P	A	A	A	A	A	P	P	P	P	P
		HHS187	P	A	A	A	P	P	A	A	A	A	P	P	P	P	A	P
		HHSFENL	P	P	A	A	A	A	P	P	A	A	P	P	P	P	P	P
	Old Finniss	*HOF004*	P	P	A	A	A	A	P	P	A	A	P	P	P	P	P	P
		HOF058	P	P	A	A	A	P	P	P	A	A	P	P	P	P	P	P
		HOF081	A	A	A	A	A	A	A	A	A	A	A	P	A	A	P	P
		HOF096	A	P	A	A	P	P	P	P	A	A	P	P	P	P	P	P
	Old Woman	*HOW009*	P	P	A	A	A	A	A	P	P	P	P	P	P	P	P	P
		HOW015	P	P	A	A	A	A	P	A	A	A	P	P	P	P	P	P
		HOW025	P	P	A	A	A	A	P	P	A	A	P	P	P	P	P	P
Wellfield A	Beatrice	*HBS004*	P	A	A	A	P	A	A	A	A	A	A	A	A	A	P	P
	Fred	*LFE001*	P	P	A	A	P	P	A	A	A	A	A	A	A	A	P	P
		LFE006	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P
Western Lake Eyre South	Emerald	*LES001*	P	A	A	A	A	A	A	A	A	A	P	P	A	A	P	P
	Gosse	*LGS001*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P
		LGS002	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P
		LGS004	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P
	McLachlan	*LMS004*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P
*	North West	*HNWLAWN*	P	P	A	A	A	A	P	P	A	A	P	P	A	P	P	P
	Walkarinna	*LWS007*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	P
		LWS009	A	A	A	A	A	A	A	A	A	A	A	A	P	A	P	P
		LWS014	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P	A
		LWS015	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

Hydrogeological zone	Spring Group	Spring	Trochidrobia sp.		F. aquatica		F. zeidleri		F. accepta		F. variabilis		Isopod		Amphipod		Ostracod	
			2021	2023	2021	2023	2021	2023	2021	2023	2021	2023	2021	2023	2021	2023	2021	2023
Net Change Occurrence			**-**		**-**		**1**		**-9**		**-**		**2**		**5**			**3**

*Note. * indicates spring group has not been assigned a hydrogeological zone within the Great Artesian Basin Monitoring Program (BHP, 2022b).*

Table 19: Percentage occurrence of 8 target taxa sampled across 76 springs across hydrogeologic zones in 2021 and 2023

	Trochidrobia sp		F. aquatica		F. zeidleri		F. accepta		F. variabilis		Isopod		Amphipod		Ostracod	
IUCN Category			IUCN E		IUCN NT		IUCN V									
Hydrogeological zone	2021	**2023**	2021	**2023**	2021	**2023**	2021	**2023**	2021	**2023**	2021	**2023**	2021	**2023**	2021	**2023**
Coward (n=3)	100	**100**	100	**100**	100	**67**	0	**0**	100	**100**	100	**100**	33	**100**	100	**100**
North East (n=15)	93	**93**	0	**0**	13	**0**	73	**67**	0	**7**	100	**100**	93	**100**	100	**100**
South East (n=7)	57	**43**	0	**0**	0	**14**	57	**43**	29	**14**	57	**71**	43	**71**	83	**100**
South West (n=43)	60	**67**	0	**0**	40	**49**	65	**49**	2	**2**	91	**93**	93	**93**	95	**100**
Wellfield A (n=3)	67	**33**	0	**0**	67	**33**	0	**0**	0	**0**	0	**0**	0	**0**	100	**100**
Western Lake Eyre South (n=5)	20	**0**	0	**0**	0	**0**	0	**0**	0	**0**	20	**20**	0	**0**	100	**100**
Total (n=76) (%)	66	**66**	4	**4**	32	**33**	57	**45**	8	**8**	82	**84**	76	**83**	95	**100**

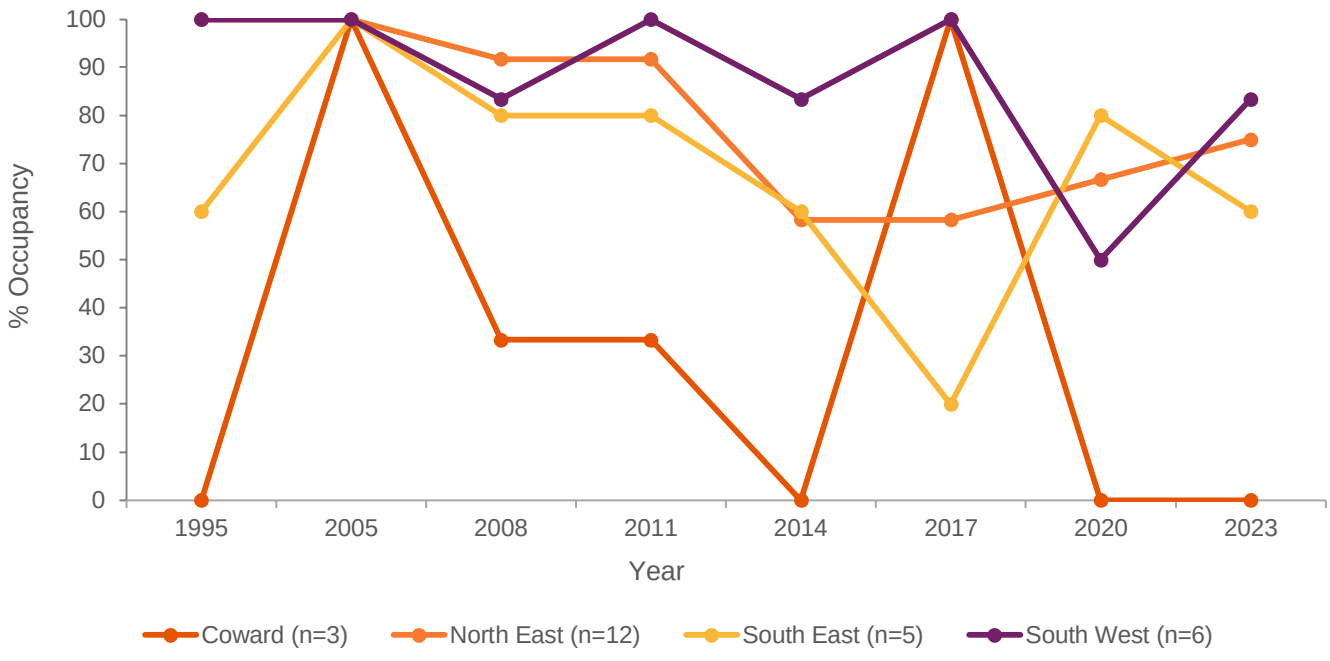


Figure 19: *F.accepta* percentage occupancy across the 26 springs monitored in 1995, 2005, 2008, 2014, 2017, 2021, 2023

Table 20: Presence (P) and absence (A) of *F.accepta* across the 26 springs monitored over 8 periods

Hydrogeological Zone	Spring Group	Spring	1995	2005	2008	2011	2014	2017	2021	2023
Coward	Blanche Cup	CBC001	A	P	P	A	A	P	A	A
		CBC002	A	P	A	P	A	P	A	A
		CBC013	A	P	A	A	A	P	A	A
North East	Bopeechee	HBO004	P	P	P	P	P	P	A	P
		HBO007	P	P	P	P	A	A	A	P
		HBO011	P	P	P	A	A	A	A	A
	Dead Boy	HDB004	P	P	P	P	P	P	P	P
		HDB005	P	P	P	P	P	P	P	P
	Sulphuric	HSS011	P	P	P	P	A	P	P	P
		HSS012	P	P	P	P	P	P	P	A
		HSS024	P	P	P	P	P	P	P	P
	West Finniss	HWF003	P	P	P	P	P	P	P	P
		HWF018	P	P	P	P	A	A	P	P
		HWF021	P	P	A	P	A	A	A	A
		HWF048	P	P	P	P	P	A	P	P
South East	Davenport	WDS001	A	P	P	P	P	A	P	P
		WDS042	P	P	P	P	P	P	P	P
		WDS052	P	P	A	A	P	A	A	A
	Welcome	WWS001	A	P	P	P	A	A	P	A
		WWS002	P	P	P	P	A	A	P	P
South West	Hermit Hill	HHS028	P	P	A	P	P	P	P	P
		HHS033	P	P	P	P	P	P	P	A
		HHS035	P	P	P	P	P	P	A	P
		HHS039	P	P	P	P	P	P	A	P
	Old Woman	HOW009	P	P	P	P	P	P	A	P
		HOW025	P	P	P	P	A	P	P	P
Total (n=26) (%) Occupancy			81	100	81	85	58	65	58	65

Triennial qualitative comparison of GAB springs monitoring data incorporating GAB spring flow and GAB springs endemic invertebrate data.

Of the 108 springs monitored for flora (with flora present i.e. WWS013 has no vegetation present so was excluded), 91 of the springs were also assessed for their invertebrate community. A Bray-Curtis dissimilarity matrix which clustered springs together based on their vegetation was used to compare the vegetation diversity alongside the invertebrate communities. Refer to the annual GAB Flora report for a full description on the flora dendrogram descriptions. Of the seven dendrogram groups, two of them did not contain any springs monitored for invertebrates. These dendrogram groups were made up of the 'dry' springs with absent standing water but contained the springs with the highest flora diversity. The remaining five dendrogram groups had between 0 to 8 invertebrate taxa represented.

There does not appear to be a relationship between invertebrate taxa richness and average vegetation richness in each vegetation dendrogram group (Table 21). Vegetation dendrogram group 7 had the lowest average vegetation richness and was distinguished from other dendrogram groups by the dominance of *Cyperus laevigatus,* which had an average abundance of 92.21% across the 22 springs in the group. Group 7 had all 8 invertebrate taxa present, however the average invertebrate richness was in the mid of the five groups.

Of the 91 springs monitored for both flora and invertebrates, a subset of 32 springs were also monitored for spring flow. Three of the vegetation dendrogram groups had spring flow. Vegetation dendrogram group 7 had the greatest average spring flow, but also had the highest variability (Figure 20). Higher spring flow does not appear to be an indicator for high vegetation richness, or invertebrate richness.

When average flora and invertebrate richness, and average spring flow are assessed by hydrogeological zone, Coward had the highest values for all three metrics (Table 22). However, similar trends are not seen across the other hydrogeologic zones.

Table 21: Comparison of percentage occupancy of invertebrate taxa within each vegetation dendrogram group

	Vegetation Dendrogram Group				
n=number of springs	**1 (n=1)**	**3 (n=1)**	**4 (n=61)**	**6 (n=6)**	**7 (n=22)**
Trochidrobia sp.	100	0	66	33	50
F. aquatica	0	0	0	0	14
F. zeidleri	0	0	39	17	9
F. accepta	100	0	46	17	41
F. variabilis	0	0	3	0	18
Isopod	100	0	87	17	68
Amphipod	100	0	89	17	59
Ostracod	100	0	100	100	95
Average Invertebrate Richness	5	0	4	2	4
Average Vegetation Richness	5	7	5	5	3

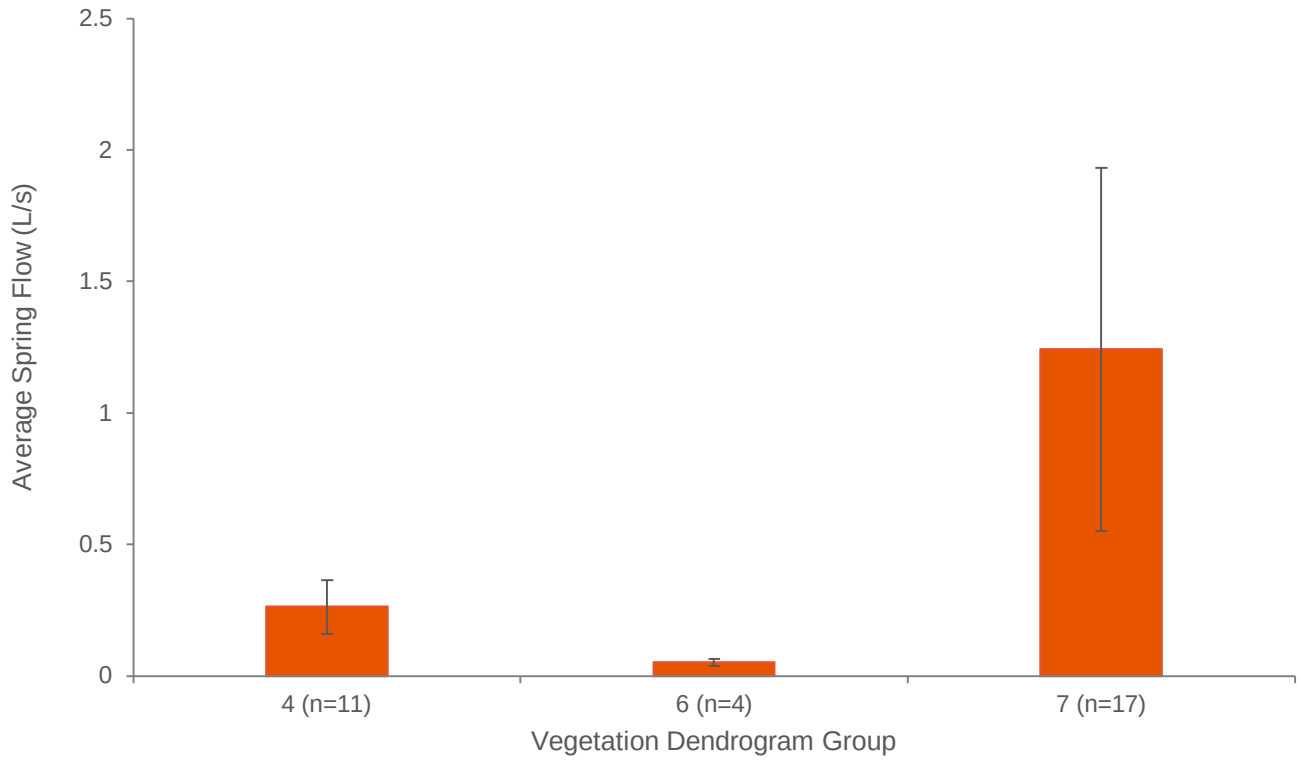


Figure 20: Average spring flow across the vegetation dendrogram groups (± SEM)

Table 22: Average spring flow, invertebrate, and flora richness across the hydrogeologic zones

	Avg Spring Flow (L/s)	Avg Invert Richness	Avg Flora Richness
Coward (n=3)	4.71963	6.6667	5.33333
North East (n=10)	0.16839	4.8	3.7
South East (n=6)	0.43191	4	2.33333
South West (n=6)	0.18503	4.3333	5.16667
Wellfield A (n=3)	0.06423	1.6667	4.66667
Western Lake Eyre South (n=4)	1.12202	1.25	4.5

F. accepta's occupancy has reduced across the monitored springs and continues to decline when comparing data between 2021 and 2023. More work needs to be completed to determine if this decline is broader and what the cause of the decline may be. The remaining seven invertebrate taxa are on an increasing trend of occupancy across monitored springs when comparing the 2021 and 2023 data. The improved alignment with monitoring programs will mean these trends can be further investigated across a wider range of springs.

No clear relationship between vegetation dendrogram group, flora richness, and invertebrate richness can be determined. The hydrogeological zone with the highest spring flow (Coward) did show similarly high average invertebrate and flora richness, but similar trends were not observed across hydrogeological zones with lower average spring flow.

1.2.5 Deliverables (GA 3.5)

Collated domestic and industrial water use efficiency data, to assess performance against improvement targets.

In FY24 the GAB Industrial Water Efficiency of the operation was 1.0 kL/t compared to the target of 1.16 kL/t and actual of 0.98 kL/t for FY23.

It is worth noting that the water efficiencies achieved in FY23 and FY24 are the best recorded over the history of Olympic Dam's operations. This is largely due to the high milled tonnes, however previous years with similar production did not achieve the same efficiency. The efforts of ODC to control water use have therefore contributed to the 0.98 and 1.0 kL/t figures. This has been achieved by incorporating monitoring of water use into daily production review meetings, to improve understanding of the drivers of water consumption, and to respond quickly to variations.

Historical GAB industrial water efficiency is provided in Figure 21. Domestic water use during FY24 averaged 2.35 ML/d compared to 2.09 ML/d in FY23, below the target of 3.2 ML/d. Historical domestic water use is given in Figure 22.

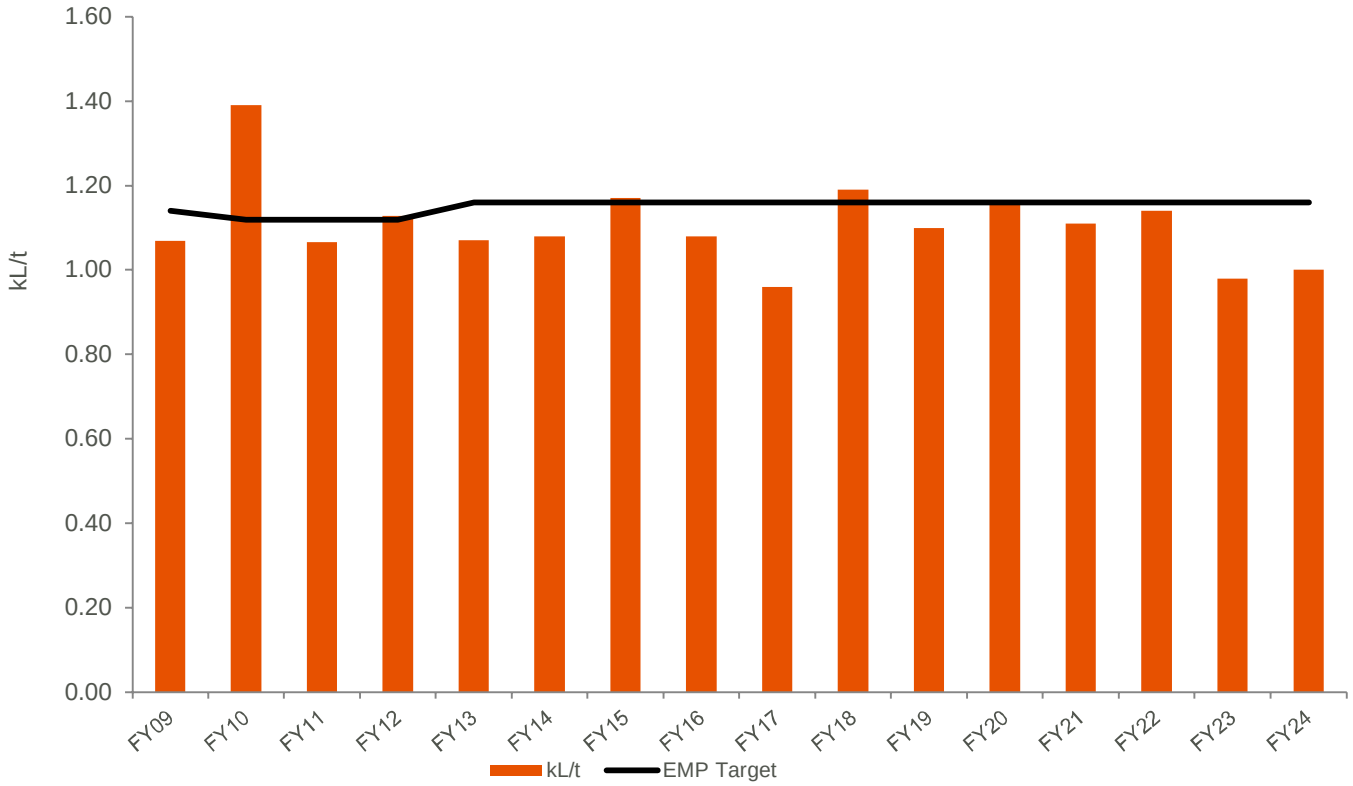


Figure 21: Historical industrial GAB water efficiency

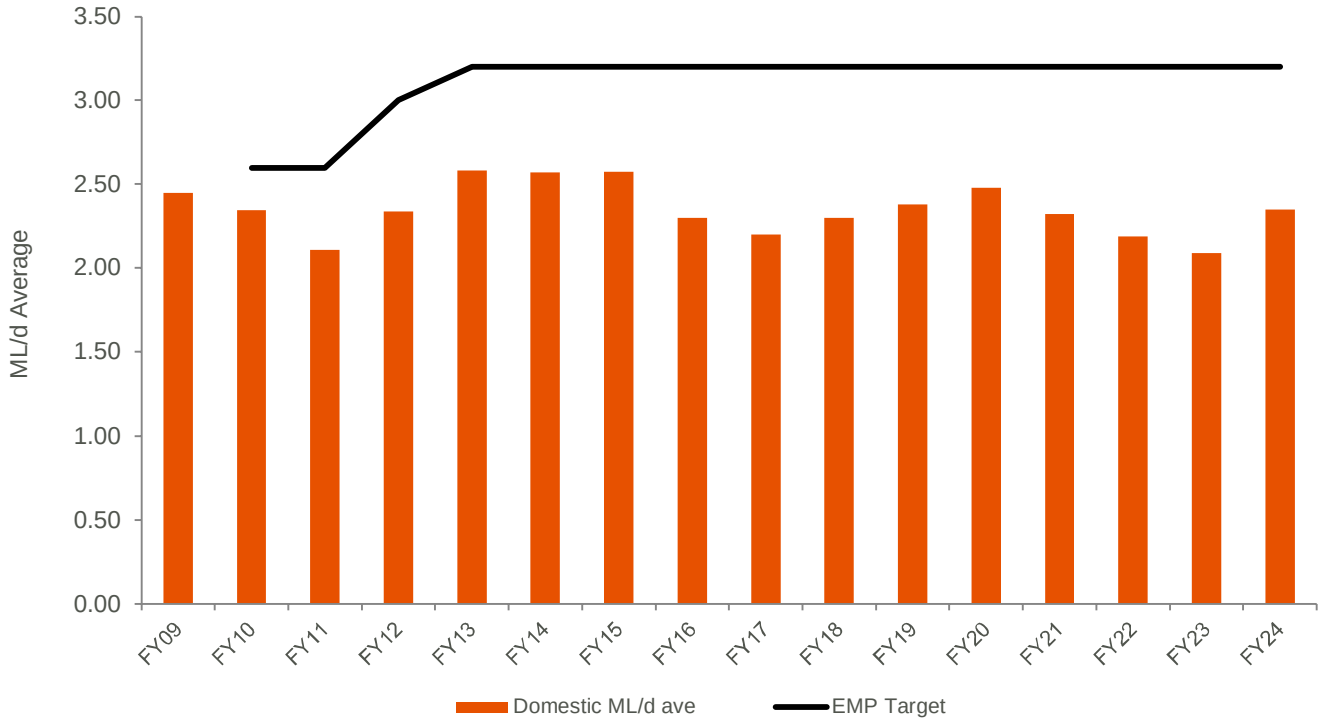


Figure 22: Historical domestic water use (note there was no target in FY09)

Ten-year water use schedule to be submitted to the Indenture Minister by 1 January annually.

The current 10-year water use schedule, as submitted to the Minister for Energy and Mining in December 2023, is presented in Appendix 6 of the FY24 Annual Wellfields Report (BHP Olympic Dam 2023c). An updated schedule will be provided by the 1st of January 2025.

Since the 5 ML/d limitation was installed (November 2020) for Wellfield A, the annual abstraction has averaged 3.7 to 4.4 ML/d. This highlights that, under normal production conditions, the 5 ML/d limit for Wellfield A will not be reached over a year, due to both planned and unplanned downtime.

Further development of existing wellfield infrastructure may be required to supply additional capacity to the operation as part of the 10-year water forecast. The 10-year forecast includes current business as usual (BaU) operations.

To realise the forecasted future abstraction rates additional production wells and associated pipeline infrastructure may be required. This additional water take is currently expected to come from Wellfield B however ODC is actively considering other potential water sources inclusive of local water sources and the Northern Water Supply project[1].

1.2.6 Deliverables (GW 3.1)

A review of abstraction rates and trends, and an assessment with respect to groundwater levels.

Saline water was abstracted from the Arcoona Quartzite throughout FY24 from the Saline Wellfield located south of the Mine offices (Figure 23). Additional saline water was sourced from the Andamooka Limestone aquifer within the vicinity of the TRS facility to manage underground seepage rates.

Some of this saline water was used in construction projects throughout the operations. A portion of the water from the saline borefield was treated with a reverse osmosis hire plant such that the permeate was at process water quality and added to process water storages to reduce the volume of GAB water required. Water from bores within the vicinity of the TRS facility was lower salinity and could be added directly to process water storages (i.e. not added to the saline/mine water system), also reducing GAB requirements. The remainder was discharged to the mine water disposal pond for evaporation. An average of 3 ML/d was abstracted over the period, compared to 4.2 ML/d during the previous financial year.

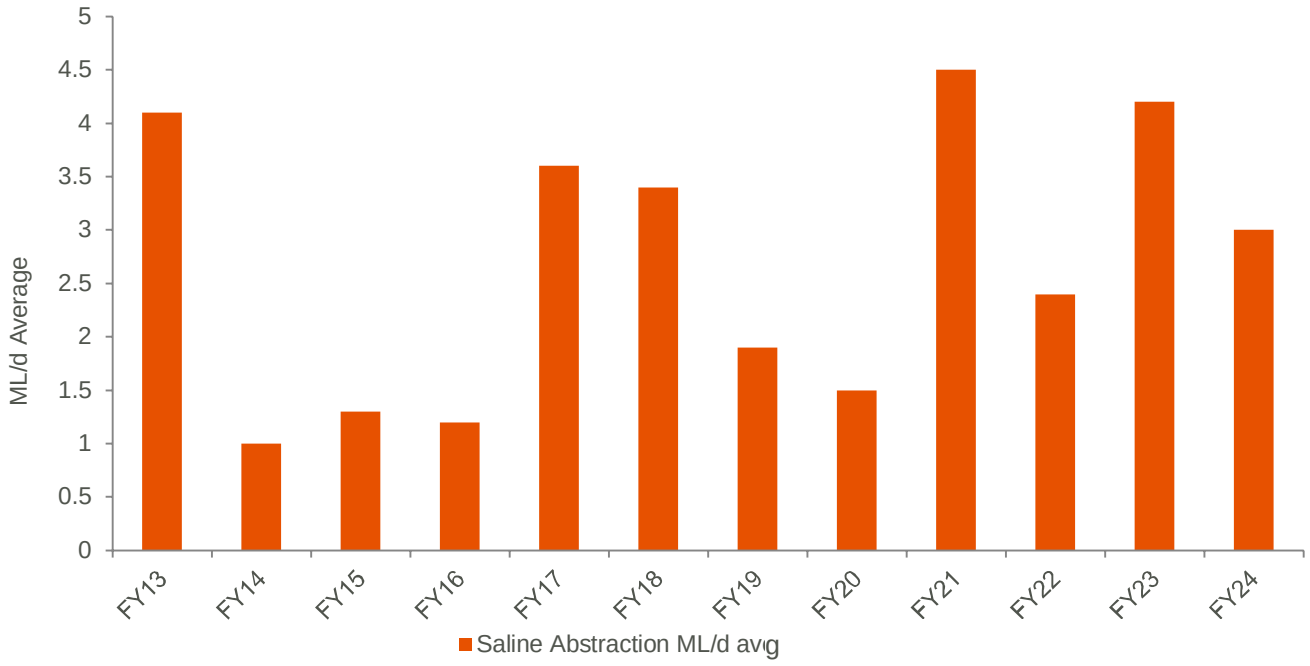


Figure 23: Historical saline abstraction rates (ML/d)

A definition and map of the underground mine water balance.

The mine water balance is a summary of the volume of water going into and out of the underground mine. It includes saline water abstracted from local bores that is added to surface storages and used around site. The balance (Figure 24) is generated from a combination of measured, derived, and estimated data.

An estimate of the volume of groundwater discharge to underground.

Groundwater inflow to the mine occurs at several intersections with the underground operations. Total natural inflow is estimated to be approximately 5.0 ML/d, the majority entering via upcast raise bores. Additional natural inflow comes into the mine via other entry points, including downcast raise bores, exploration drill holes and shafts. Much of the total inflow to the mine is transported to the surface as ore content or exhausted to the atmosphere as aerosols or moisture-laden air via upcast raise bores, estimated at around 3.0 ML/d.

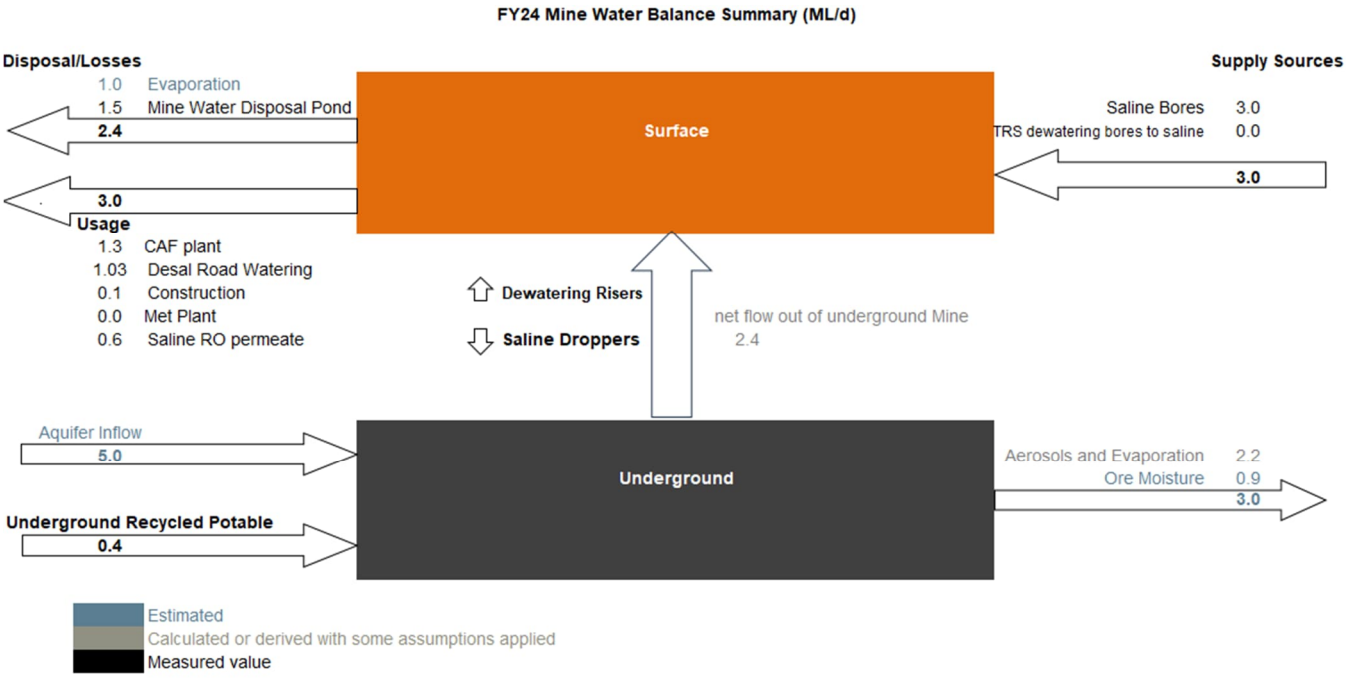


Figure 24: FY24 Saline (Mine) water balance summary (ML/d)

**Note: Totals may differ from individual values due to rounding.*

1.2.7 Deliverables (GW 3.2)

A review of the trends in local and regional groundwater levels and a comparison with historical groundwater levels.

The Olympic Dam groundwater monitoring network is shown in Figure 25. The groundwater cross section (Figure 26) and hydrograph (Figure 27 and Figure 29) show limited changes in groundwater levels beneath the TSF between June 2023 and June 2024. All groundwater levels remain below the leading indicator of 70 mAHD and compliance criteria of 80 mAHD.

The maximum groundwater level recorded below the TSFs for the current reporting period was 69.5 mAHD at LT67A (Figure 29) adjacent to TSF5. The rising trend at LT67/LT67A was being addressed with the installation of a dewatering system under TSF5 however several of the dewatering wells have since failed. A project to provide an improved solution has been developed and groundwater levels are not expected to exceed the compliance criteria of 20 m below the ground surface (80 mAHD).

Groundwater level contours in the Andamooka Limestone aquifer beneath the perimeter of the TSFs (Figure 28) have remained relatively consistent. There is an overall continued rise in groundwater levels beneath TSF5 (Figure 29), which can be attributed to the ongoing use of this facility; however, all groundwater levels outside of the TSF5 perimeter are below the compliance limit of 80 mAHD. Both wells LT65A and LT67A are rising slowly; this slow rise, and drop from FY22, is likely due to the vuggy nature of the limestone aquifer beneath the TSF. As noted

above, a project to manage the groundwater level rise has been developed and the water level in this area will continue to be monitored and managed to maintain compliance with agreed compliance levels.

Groundwater levels for bores in the vicinity of the underground mine (Figure 30) continue to show overall depressurisation of the geological units, consistent with ongoing mine depressurisation activities. Limestone aquifer bores in the vicinity of Roxby Downs (Figure 31) demonstrate generally stable groundwater levels during FY24. LM43 and LM46 observed groundwater levels remain relatively steady due to continued minimal discharge of water to the mine water disposal pond.

Historical level monitoring indicates steady groundwater levels over time with no overarching trends that would indicate material change in the availability at existing bores in the Stuart Shelf area operated by third-party users (Section 1.2.2).

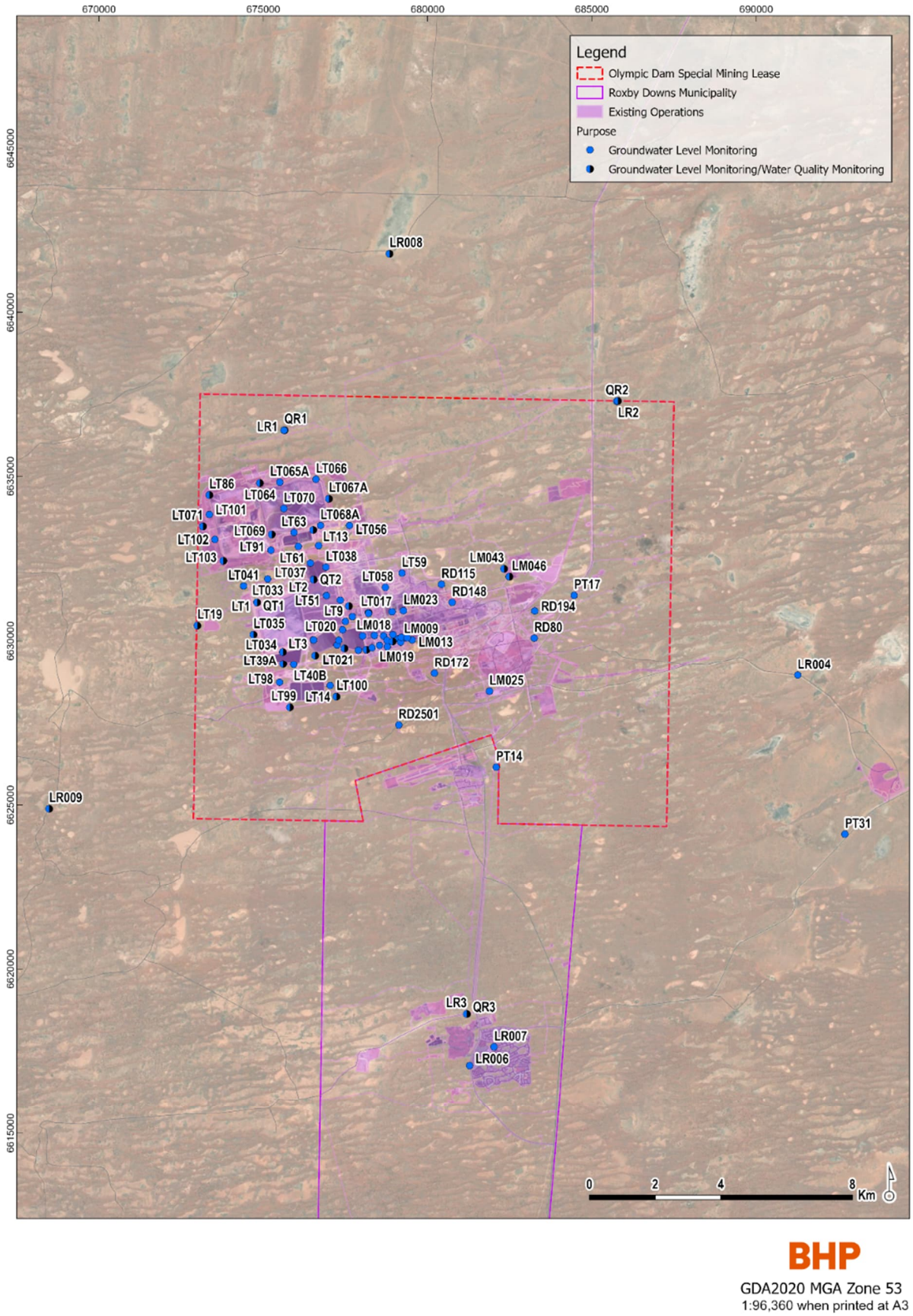


Figure 25: Location of groundwater monitoring sites within the Special Mining Lease

**Note: Includes regional monitoring sites and monitoring sites on the SML.*

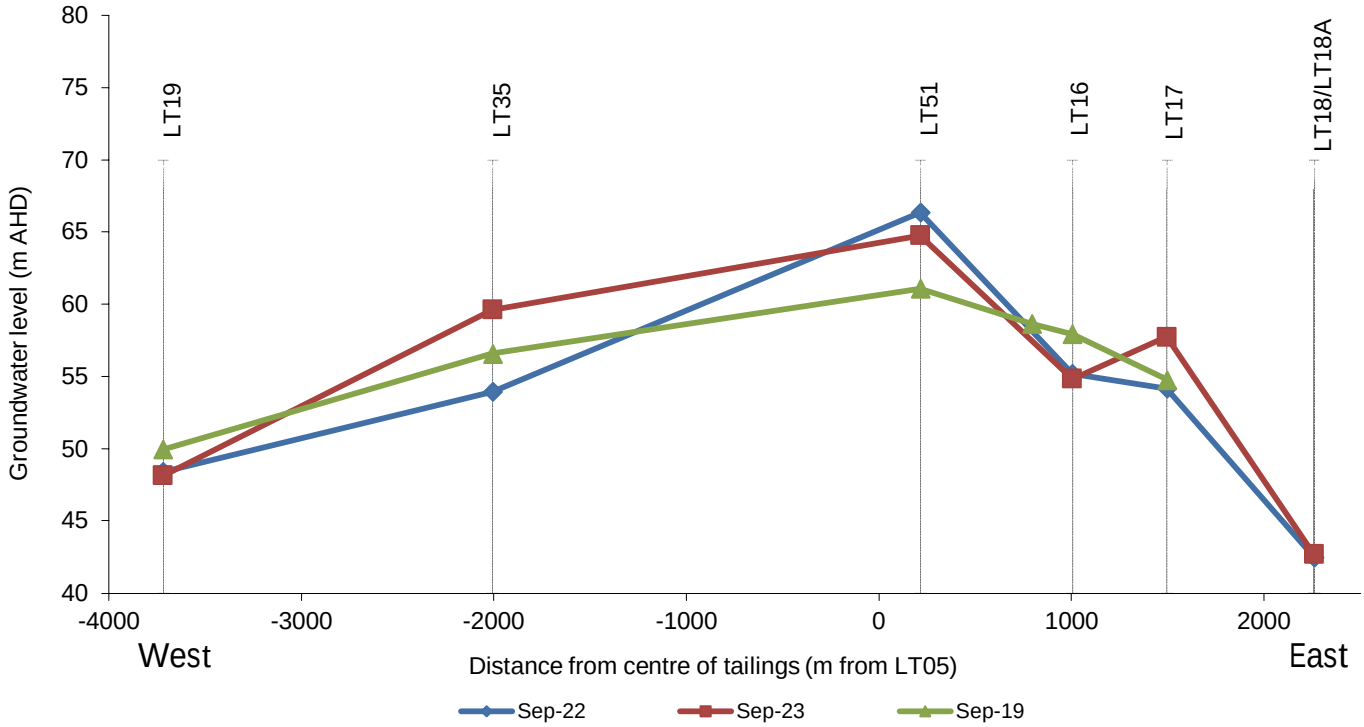


Figure 26: Change in groundwater elevation along an east-west cross-section from LT19 to LT18A, through the centre of the TSF

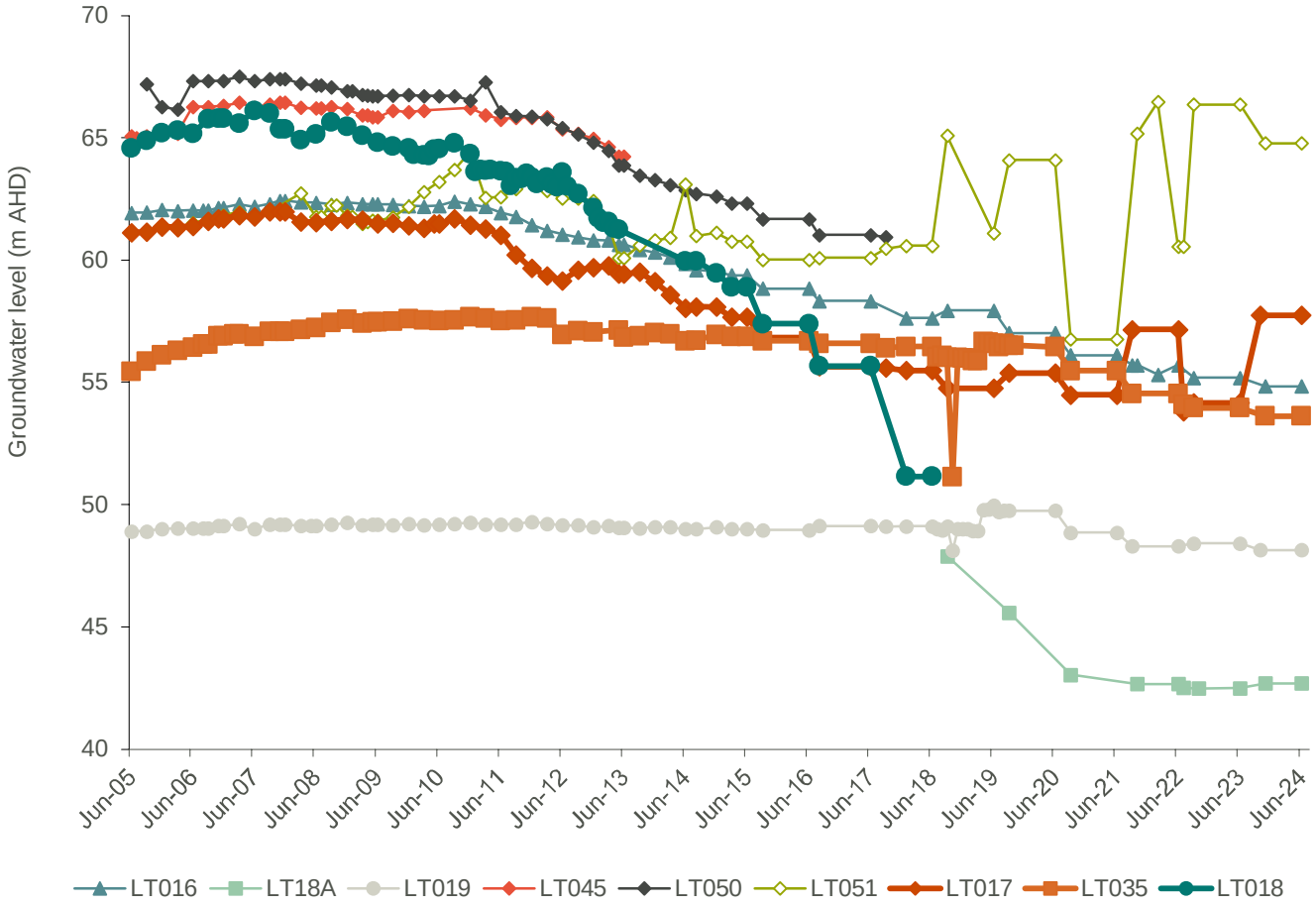
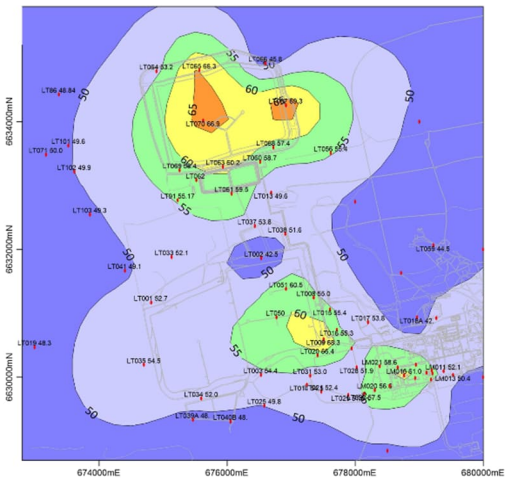
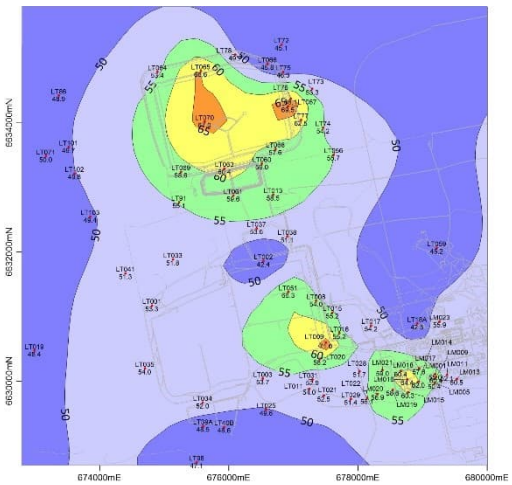


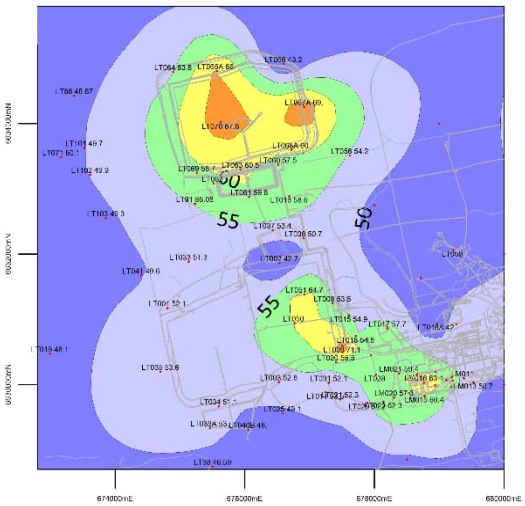
Figure 27: Groundwater levels for Andamooka Limestone bores in the vicinity of the TSF



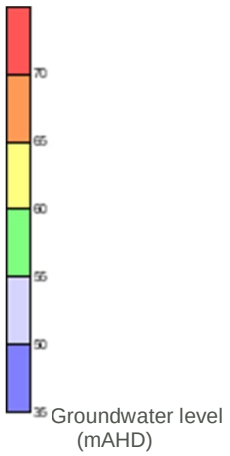
Sept 2021



Sept 2022



Sept 2023



Datum: GDA94

Projection: MGA94

Zone: 53

Figure 28: TRS area groundwater levels (mAHD) Andamooka Limestone Aquifer (compliance criteria 80 mAHD)

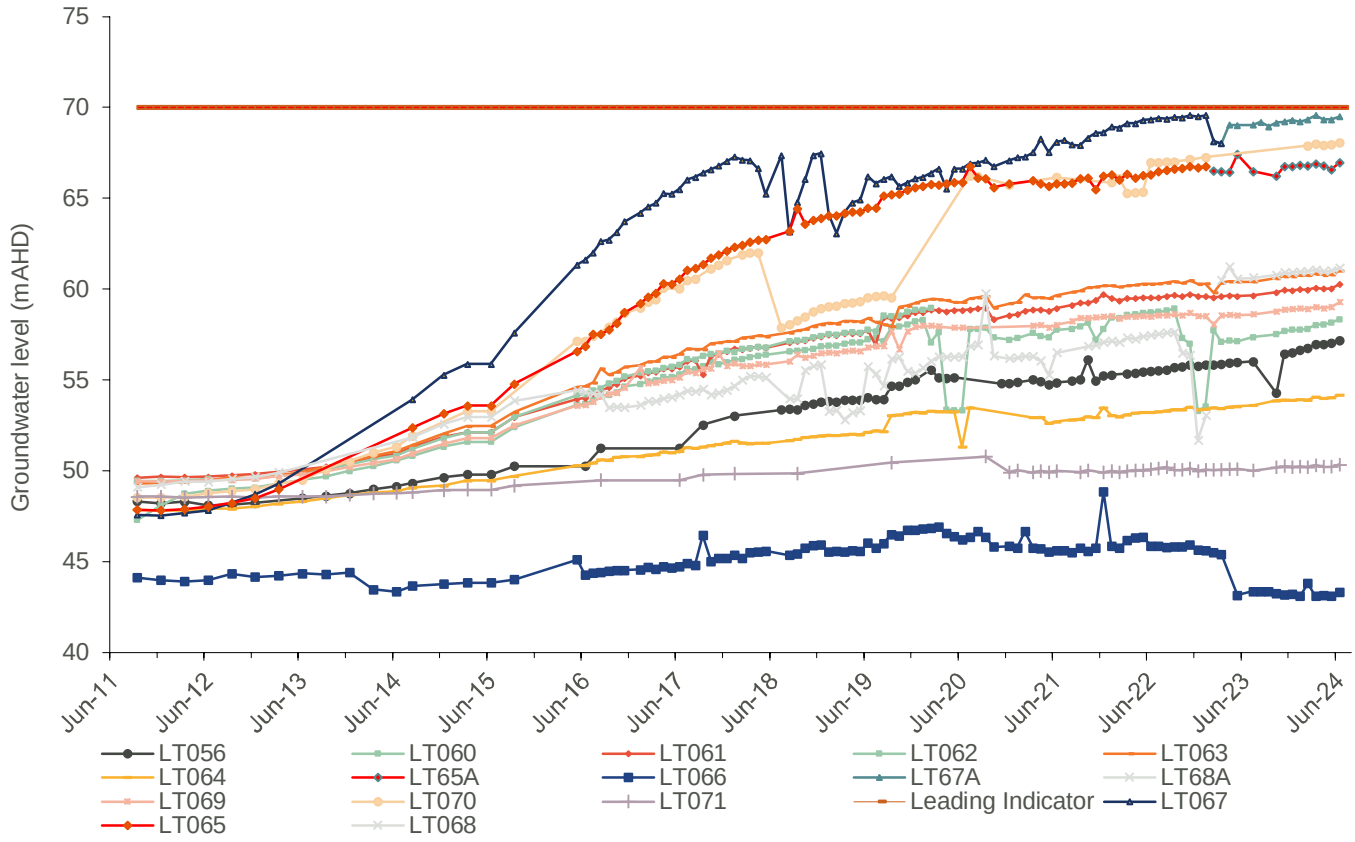


Figure 29: Groundwater levels for bores in the vicinity of TSF 5

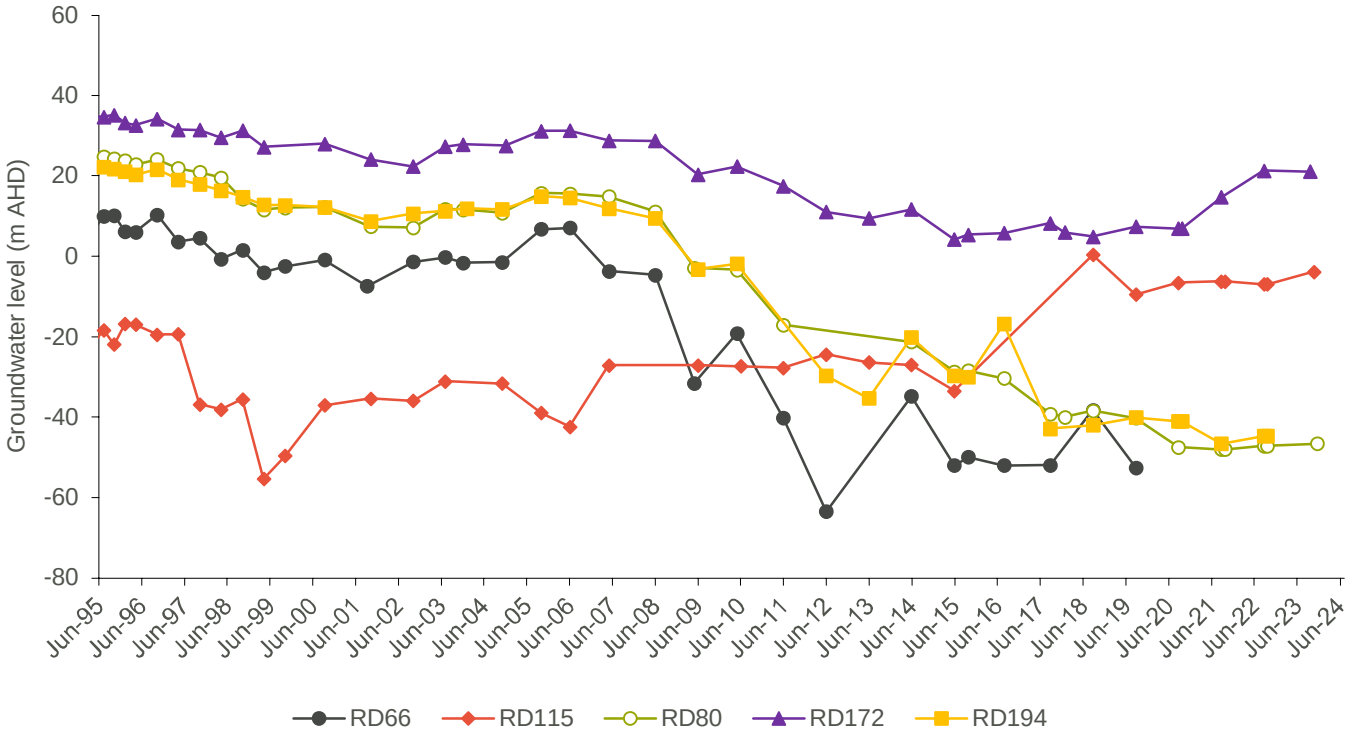


Figure 30: Groundwater levels for exploration drill holes in the vicinity of the underground mine

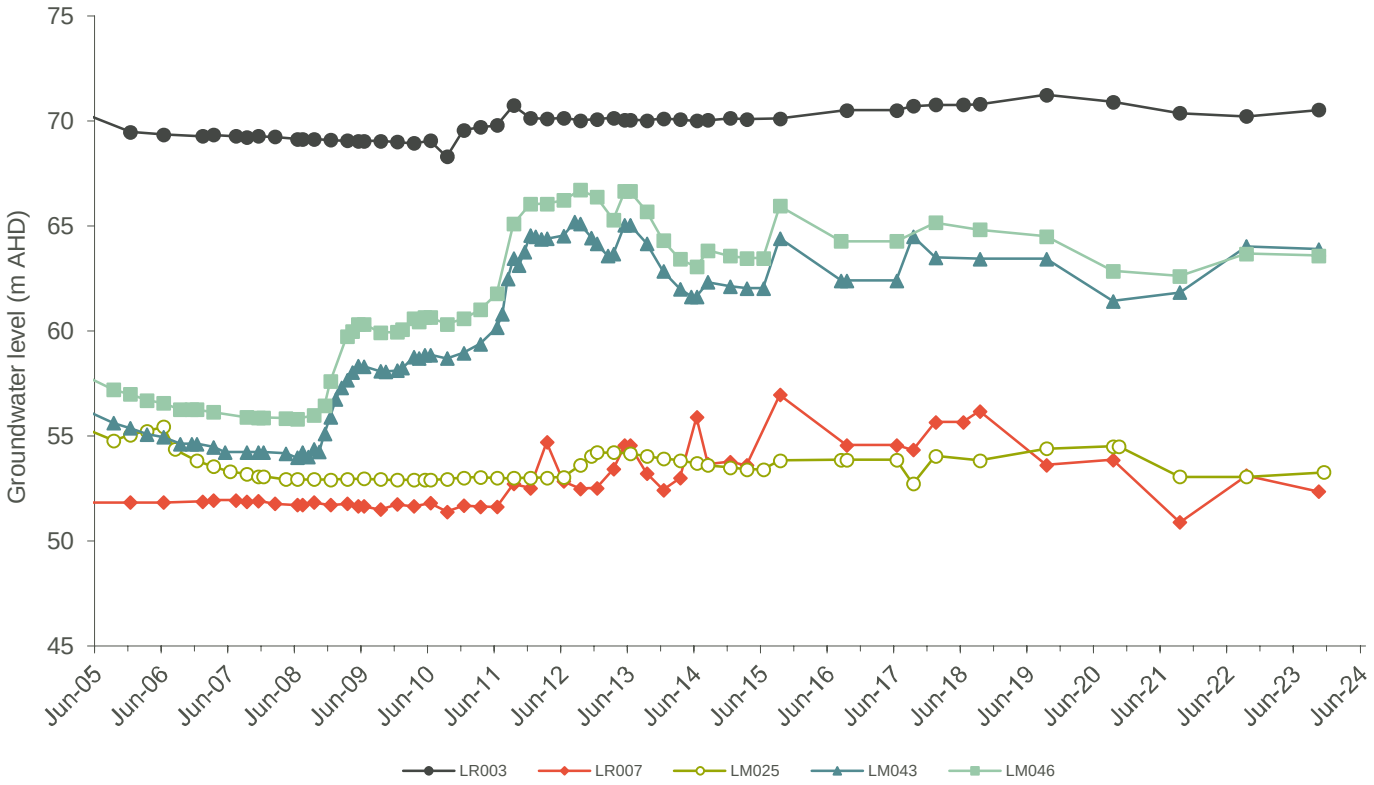


Figure 31: Groundwater levels for Andamooka Limestone bores in the vicinity of Roxby Downs (LR) and the Mine Water Pond (LM)

Data showing the tracking of trends towards leading indicators for groundwater impacts, and an alert to management when levels approach the leading indicators.

Data for groundwater level was collected, with a discussion of results in Section 1.2.7 showing that leading indicator trigger levels were not reached.

1.2.8 Deliverables (GW 3.3)

A review of trends in groundwater quality and a comparison to ANZG criteria.

Groundwater in the vicinity of the Olympic Dam operation occurs at depth and is highly saline making it unsuitable for human or livestock consumption and largely inaccessible. The local groundwater does not meet any of the beneficial use categories listed under ANZG guidelines. Groundwater salinity has generally remained stable and within the range that could be reasonably expected for natural variation within the aquifer.

Total dissolved Solids (TDS) from monitoring bores around the base of the TRS facility ranged from 11,600 mg/L at LT22 to 73,500 mg/L at LM46. The TDS from regional monitoring bores ranged from 9320 mg/L at LR3 to 25,900 and 30,200 mg/L at LR8 and LR9 respectively. LR3 is located next to the Roxby Downs potable water dam, which was decommissioned in 2023. This dam has previously influenced TDS locally due to historical leakage from the dam of high-quality water. LR9, to the southwest of the SML, is hydraulically up gradient of the mine and representative of aquifer background. LR8, to the north of the SML, is hydraulically down gradient of the mine.

Groundwater pH from monitoring wells around the base of the TRS facility ranged from 7.03 at LT25 to 7.96 at LT98. The pH of regional monitoring bores ranged from 7.31 at LR9 (up-gradient background of the SML) 7.29 in LR8 (down gradient of the SML) and 7.25 in LR3.

Concentrations of copper in all groundwater monitoring bores sampled during the FY24 monitoring program were detected and reported below ANZG (2018) guidelines for livestock consumption of 0.4 mg/L (Figure 32).

Elevated concentrations of elemental uranium continue to be detected in the groundwater in the vicinity of EP2 (LT25) and was detected in 3 bores at the base of the tailings storage facilities (LT1, LT17, and LT64) (Figure 33). Bore LT67 which had previously exceeded the ANZG livestock guidelines in FY20, 21,22 and 23, was decommissioned as part of TSF5 buttress project in 2023 and replaced by LT67A which was below the ANZG livestock guidelines 0.027 mg/L). LT15 has historically exceeded the ANZG Livestock guidelines; In FY24, LT15 was unable to be monitored due to the active TSF5 buttress works during the monitoring period.

An elemental uranium concentration that exceeds the ANZG livestock guidelines has been detected at bores LT1 (0.364 mg/L), LT17 (0.470), LT25 (0.449 mg/L), LT64 (0.560 mg/L). The monitoring points LT1, LT17, LT25, LT64 are located at the base of the tailings facility and are highly susceptible to changes in tailings pond use rates. Other monitoring bores in the area do not display elevated uranium concentrations and are lower than the adopted ANZG (2018) guidelines for livestock consumption of 0.2 mg/L.

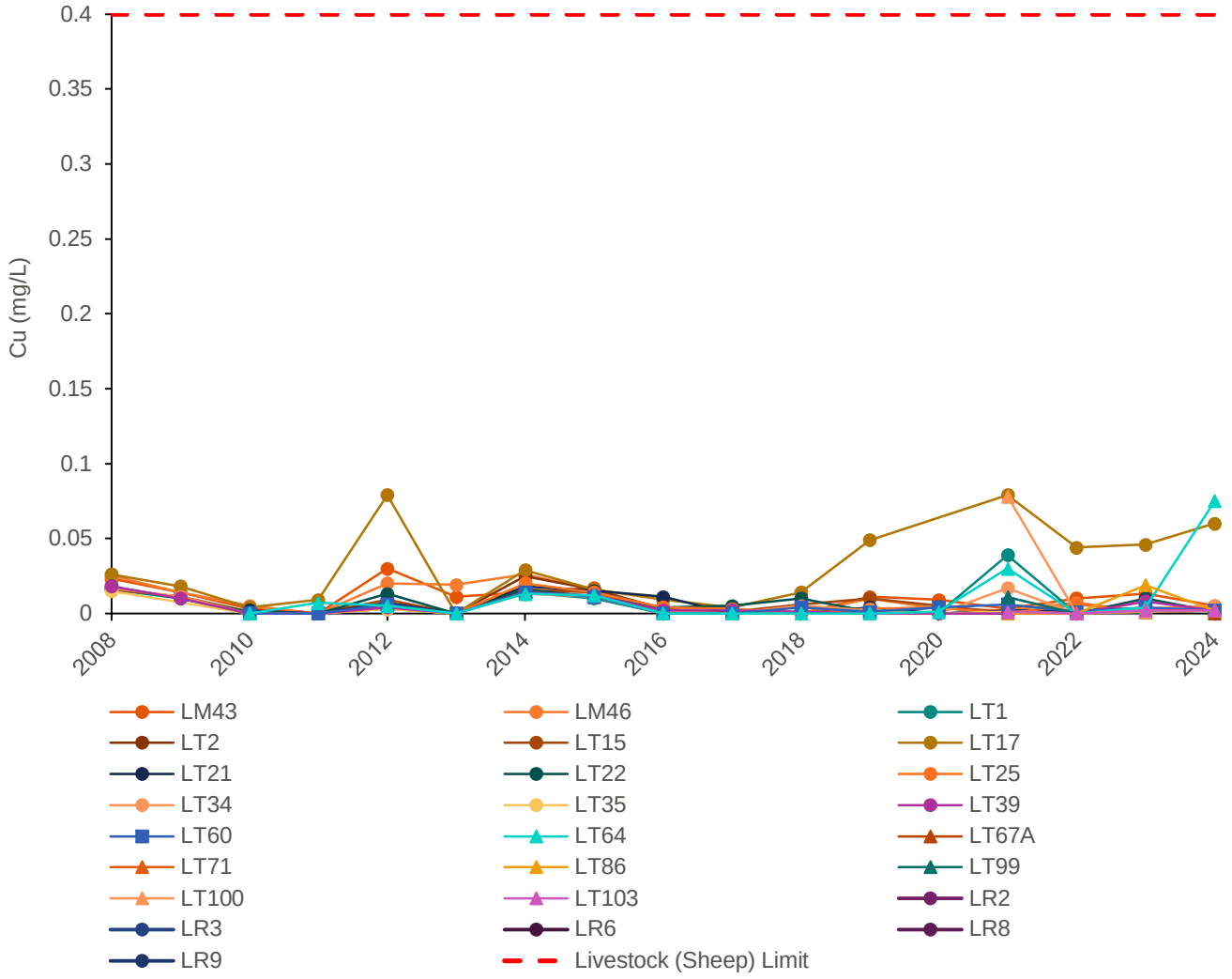


Figure 32: Copper concentration of OD on-site and regional groundwater monitoring bores

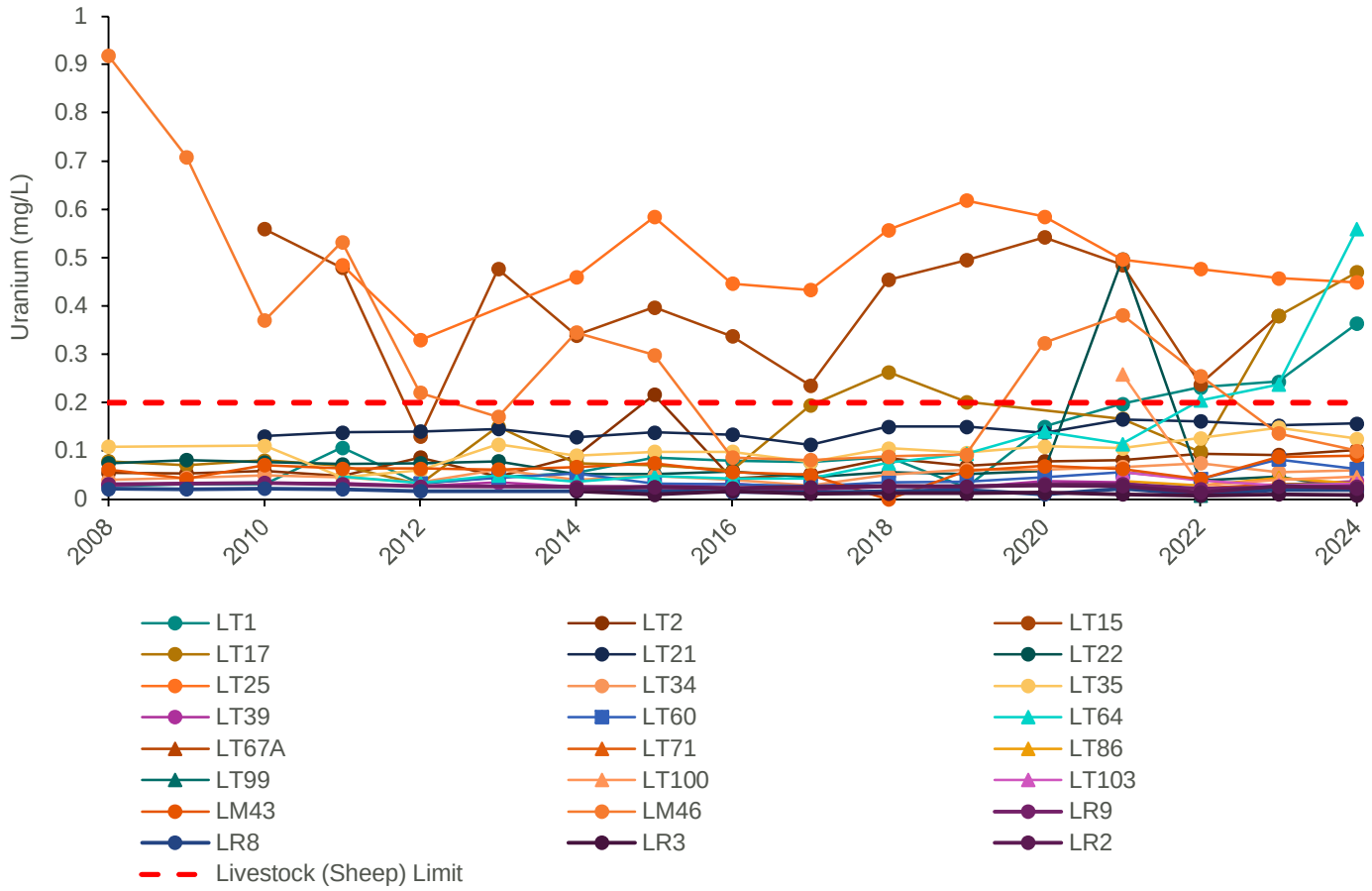


Figure 33: Uranium concentration of OD on-site and regional groundwater monitoring bores

1.2.9 Deliverables (WA 3.3)

Records of ground water levels in the vicinity of the MWDP.

To determine any potential environmental impacts of the Mine Water Disposal Pond (MWDP), water levels were monitored via local groundwater bores. Relatively stable groundwater levels at LM43 and LM46 were observed, albeit a slight uptick, along with an increase in water discharge rates into the pond during FY24 (Figure 31).

Records of quantities of water disposed of into the MWDP.

Quantities of water disposed of into the MWDP were measured and recorded each day and reconciled monthly as part of the Saline Water balance (Figure 24). An average of 1.5 ML per day was disposed into the MWDP during FY24.

During FY24, the MWDP continued to be used as used as a supply source for construction water for the TSF 5 Buttress project and the commencement of the EP 7 project, which has resulted in a recovery and reuse of 58 ML of saline water discharged to this location. The EP 7 construction will continue across FY25 allowing ongoing re-use for construction support.

1.2.10 Deliverables (WA 3.4)

Records of pond levels and pond wall condition.

Sewage waste generated by Olympic Village (ODV) is gravity fed to three on-site chambers and pumped to the ODV treatment facility west of the camp. The treatment facility consists of primary and secondary storage ponds and a permanent evaporation pan. The secondary ponds are mechanically aerated. Testing and monitoring of water quality continued throughout FY24 under 1SAP programmed maintenance, with results remaining within guideline thresholds. The ODV treatment facility is inspected daily for security, inflow, wall integrity and available freeboard in storage ponds. Freeboard is reported daily and recorded. Inflow was recorded daily and averaged at ~299 kL/day for FY24.

Connection of the transfer pipeline between ODV WWTP and Roxby Downs WWTP (as per DoH approval WWI-10723) to allow partially treated effluent to be utilised by the Council Recycled Water System was approved by SA Health for ongoing use. A total of 21.17 ML was transferred to the RD WWTP across this financial year. This is a significant reduction from FY23 due to a combination of reduced demand for effluent by the Roxby Downs WWTP along with a reduction in production due to lower numbers of occupants at ODV. In addition to this the ODV evaporation ponds were more extensively utilised in FY24 compared to FY23.

Sewage waste generated by the Mine and Process plant is treated onsite. The onsite facility consists of a lined primary lagoon and two lined evaporation ponds. Inflow for FY24 averaged at ~245 kL/day however freeboard levels were impacted by FY23 rain events as the evaporation across the summer did not exceed the balance of inflows. Mechanical evaporation has continued across FY24, and a study commenced in March 2023 to understand current state and potential options to address capacity issues in the future. This work will continue across FY24 to support the operation of the onsite treatment facility. To ensure freeboards of the onsite evaporation lagoons did not breach their limit, a total of 15.33 ML of treated effluent was transferred to the caustic pan over the space of the FY24. Transfers ceased in March 2024 as per the agreement with the EPA.

1.2.11 Deliverables (GW 3.4)

Data demonstrating that radionuclide concentrations are below upper limits.

Surface ponds which hold groundwater used for road watering were monitored and analysed during FY24 for specific radionuclides. Results from samples analysed in October 2023 were below the upper limit for radionuclide ^{238}U and ^{226}Ra of 50 Bq/L and 5 Bq/L respectively (Table 23, Figure 34, Figure 35).

A review of results and provision for increased monitoring frequency where concentrations are trending towards upper limits.

No samples collected during FY24 showed levels above upper limits.

Table 23: Radionuclide analysis for dust suppression water FY24

		Analyte (Bq/L)				
		^{238}U	^{230}Th	^{226}Ra	^{210}Pb	^{210}Po
Sample site	**Date**					
A Block	October 2023	7.6	0.016	0.17	0.052	0.037
D Block	October 2023	17.4	0.28	0.20	0.30	0.15
F Block	October 2023	16.2	0.014	0.21	0.02	0.0
Desal Dam	October 2023	0.014	0.006	0.76	0.08	0.04
SMA Saline Dam	October 2023	15.3	0.03	0.72	0.036	0.04
Mine Water Disposal Dam	October 2023	0.011	0.000	0.79	-0.002	0.01
Olympic Falls Dam	October 2023	0.04	-0.001	0.39	-0.030	0.01
TSF De-Watering Dam	October 2023	0.38	0.002	0.36	0.033	0.00
Upper Limits		**50**		**5**		

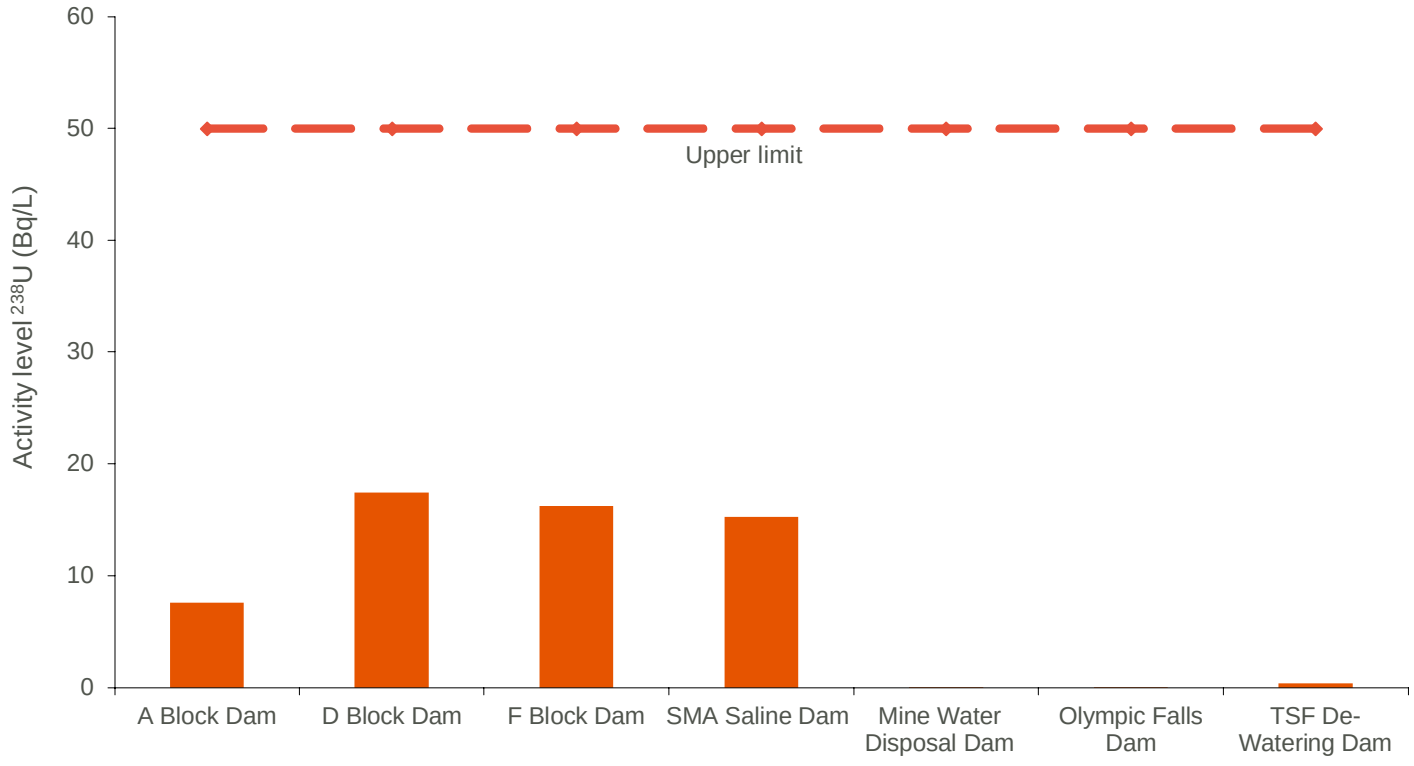


Figure 34: Mine water sample ^{238}U levels and upper limit FY24

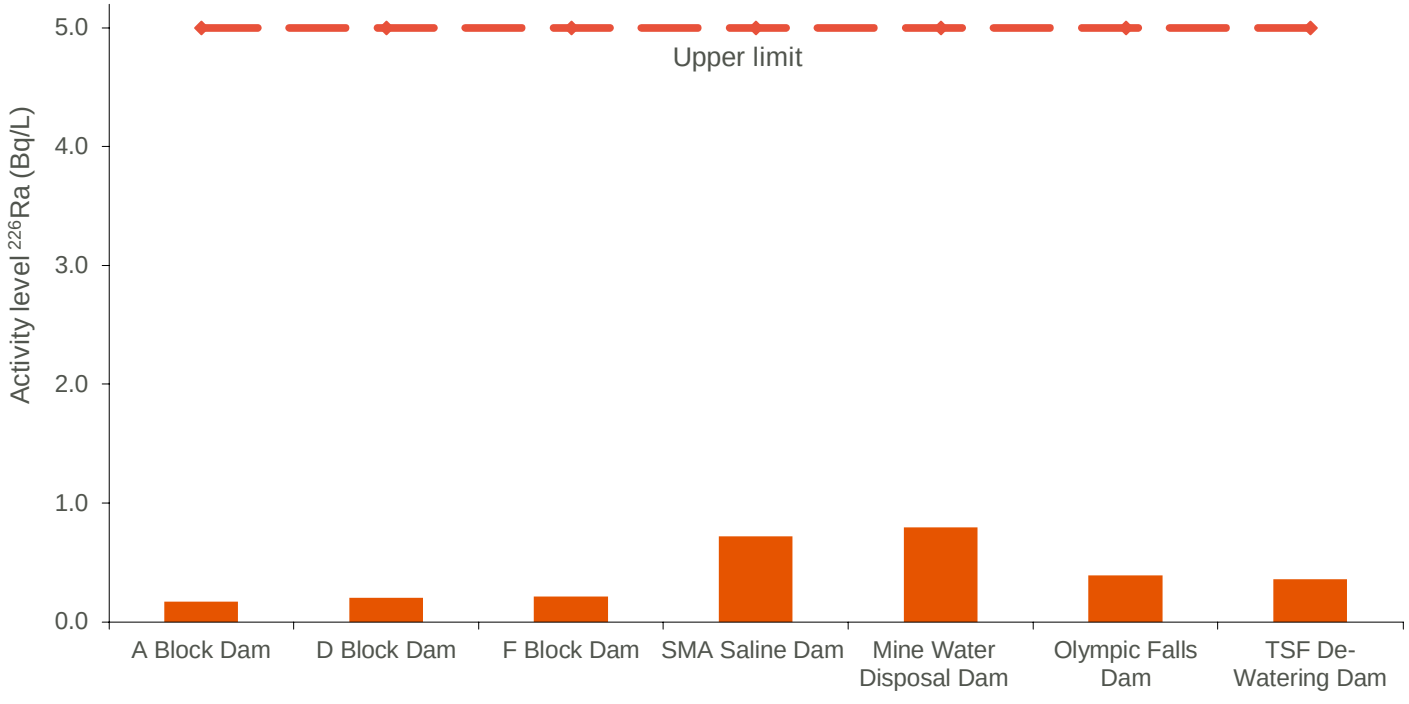


Figure 35: Mine water sample ^{226}Ra levels and upper limit FY24

1.2.12 Targets FY24

Maintain an annual industrial water efficiency of 1.16kL/t at the budgeted production rate.

In FY24 the GAB Industrial Water Efficiency of the operation was 1.0 kL/t compared to the target of 1.16 kL/t and actual of 0.98 kL/t for FY23.

Maintain a domestic water use target of 3.2 ML/day average.

Domestic water use during FY24 averaged 2.35 ML/d, below the target of 3.2 ML/d.

1.2.13 Actions FY24

Continue implementation of water use conservation and recycling initiatives.

During FY24, the focus continued to be on maintaining the efficiency, conservation and recycling of high-quality GAB water. Improvements and upgrades were made to flowmeters to increase knowledge and understanding of water demands across the production areas. The routines of the Water Management Group were set at a minimum of weekly and increases as storage levels reduce to ensure production impacts were minimised through water efficiency monitoring across site.

Continue substitution of saline water for high quality water where possible.

Saline water continues to be used in lieu of high-quality water where feasible, including use in processing, Cement Aggregate Fill (CAF), road watering, construction and underground drilling activities. A limited volume of saline water containing lower concentrations of chlorides (compared to SML saline wellfields) has been sourced from the groundwater mound beneath the TRS and is being utilised to augment the process water stream. Total saline volume use is restricted as the metallurgical process is highly susceptible to increased chloride concentrations which degrades infrastructure and affects plant performance. On average 0.37 ML/d is being added to the process water stream with chloride concentration being managed to protect infrastructure and production.

1.2.14 Continuous Improvement Opportunities FY24

Within the GAB, pastoral abstraction has influence on aquifer pressure and reported drawdown. The elimination of pastoral flow at Jackboot Bore has resulted in drastically reduced drawdown, previously incorrectly attributed to Wellfield B operations. Some of the declining trends observed in current reported drawdown are likely to be influenced by antecedent pastoral flow, ageing infrastructure failure, and temperature effects.

Opportunity: Eliminate or minimise the influence of pastoral flow on reported drawdown.

A broader plan for this has been initiated for FY25 as described in the Annual Wellfield Report (BHP 2024d).

During the FY24 period, the following issues were addressed:

A pressure reduction trend in Georgia 2 was identified. Following investigation, a plan for upgrading and replacing pastoral surface infrastructure was implemented. Completion of the surface infrastructure upgrade is planned for FY25 and pressure readings will continue be monitored.

Anomalous pressure readings were identified at D3. Investigation determined surface infrastructure failure was the likely cause and rectified in consultation with the pastoralist. Pressure readings have since improved.

Investigation of the ageing Peachawarrina bore discovered to have incurred downhole infrastructure failure. This bore is planned for decommissioning and replacement in FY25.

2. STORAGE, TRANSPORT AND HANDLING OF HAZARDOUS MATERIALS

2.1 Chemical/Hydrocarbon Spills

2.1.1 Environmental Outcome

No significant site contamination of soils, surface water or groundwater, as a result of the transport, storage or handling of chemical or hydrocarbon substances associated with ODC's operational activities.

No significant contamination of soils, surface water or groundwater leading to actual or potential environmental harm due to the transport, storage or use of chemical or hydrocarbon substances associated with ODC operational activities occurred during FY24.

2.1.2 Compliance Criteria

No site contamination leading to material environmental harm (as defined in the Environmental Management Manual) arising from a loss of containment of a chemical substance or hydrocarbon material within the SML and/or Wellfields Designated Areas.

Note: Measurement and monitoring is carried out in response to a specific event, and in accordance with the National Environment Protection (Assessment of Site Contamination) Measure 1999 or SA Environment Protection (Water Quality) Policy 2015. Remediation and monitoring programs are in place for historical contaminated sites.

During FY24, 58 chemical/hydrocarbon spills were reported within the Event Management Solution as having occurred within the (SML, the Wellfield designated areas and in the accommodation villages. All spills were contained and cleaned up as soon as practicable. As a result, no chemical/hydrocarbon spills within the SML and Wellfield designated areas, or in the accommodation villages led to actual environmental harm occurring as part of ODC activities.

Chemical and hydrocarbon substance spills which occurred within the operational areas of the SML were appropriately contained and cleaned up as soon as practicable with each event captured in the EMS. Of the chemical and hydrocarbon spills recorded within the operational area in FY24, two triggered additional reporting under the SA *Environment Protection Act 1993 (EP Act 1993)* for actual or potential environmental material harm:

- A spill in March 2024 involved the loss of diesel to ground due to a truck rollover on the SML. The majority of the fuel contained within the vehicle was recovered, preventing a large spill and the diesel lost to ground was on previously disturbed ground. The contaminated soil was removed from the site and disposed of off-site at a licenced facility.
- A spill in September 2023 was caused by a bund overflow at Pump Station 6B on the M6 water pipeline. Approximately 150 litres (L) of oil spilled to the ground from a bund affecting an estimated 5 square metres (m^2) of soil. The affected soil was excavated and disposed of at a licenced facility. No ongoing impacts occurred as a result of this spill.

Three legacy hydrocarbon spill sites exist (the 3 ML tank on the SML and PS1 and PS6A in the Wellfields area), which are being actively monitored and managed. These are described further below.

The hydrocarbon plume at the 3ML tank has been the subject of a Remediation Management Plan and subsequent Groundwater Management Plan (GMP), which requires three-yearly monitoring between 2016 and 2025 to confirm plume stability. A monitoring event was conducted in October 2022 and no contingency or trigger values were exceeded, with the conclusion that no further action above the GMP is required at this time. Total Recoverable Hydrocarbons (TRH) decreased or remained the same in two monitoring points in the main portion of the plume

and increased within an order of magnitude at the front of the plume. These results are inconclusive to establish the stability of the plume and another monitoring event is planned for 2025 under the current GMP.

PS1 remediation has successfully treated a groundwater volume in excess of 4 ML since commencing operation in late 2014. The PS1 Remediation Management Plan was updated in FY21 after a review of previous remediation effort, and an options assessment concluded that the current active remediation option has reached end of life. A change from active to passive remediation was implemented and the GMP for PS1 updated with relevant triggers and targets to support the remediation technique change. Monitoring was carried out by JBS&G in June 2024. During the FY24 monitoring event light non-aqueous phase liquids (LNAPL) were detected at two monitoring wells, which is a reduction from FY23. Additional wells were monitored consistent with the GMP. Some conflicting data was recorded with the different methodologies that may indicate the plume is moving towards the passive barrier, however the plume is considered to be stable and low risk.

PS6A remediation has treated groundwater in excess of 12 ML since commencing operation in mid-2014 and recovered approximately 51,300 L of LNAPL. The PS6A system was inactive during FY20/21 and the rebound response monitored. An assessment of remediation effectiveness was prepared in FY21, which updated the estimate of plume volume and recommended an expansion of the existing active remediation system. The upgraded infrastructure was installed in September 2020 and approximately doubles the extractive capacity. Since the restart of the treatment plant in 2020, the estimated volume of product (LNAPL) removed is 13,310 L.

Groundwater quality was assessed at eight locations across the site in June 2024 to provide data at the boundaries of and outside the known historical hydrocarbon plume. The measured LNAPL thickness in the June 2024 monitoring event were all lower than the previous monitoring event (June 2023). The thickness over time since the remediation re-commenced have shown generally decreasing trends over time. Therefore, it is concluded that no site contamination leading to new material environmental harm (as defined in the EM Manual) has arisen from chemical/hydrocarbon spills within the SML and Wellfields designated areas.

2.1.3 Leading Indicators

None applicable.

2.1.4 Targets FY24

Finalise updated spills register to align with the Global Event Management System roll out.

The spills register was finalised and aligned with the (BHP Global) Event management System in FY20 and continues to operate to plan.

Corrective actions for all reportable spills of chemicals and hydrocarbons are implemented in a timely manner and do not result in material environmental harm (as defined in the EMM).

Note: Spills are reportable if they result in potential or actual material environmental harm in accordance with the EP Act 1993.

Two hydrocarbon spills occurred during FY24 that triggered external reporting requirements as outlined under the *EP Act 1993*. Of these spills, one diesel spill occurred within the operational SML area with the second spill occurring at Pump Station 6B on the M6 water pipeline.See Section 2.2.2.

2.1.5 Actions FY24

Maintain a register of recordable chemical and hydrocarbon spills and corrective actions.

Note: In FY22 OD aligned with BHP Minerals Australia to define an internally recordable spill of chemicals and/or hydrocarbons is defined as any amount (previously 10 L threshold) outside of a bund, in a single event.

During FY24 a register of recordable chemical and hydrocarbon spills and corrective actions was maintained through the Event Managament System. In FY24 there were a total of 58 spill events, two of which were externally reported. The 56 internally recordable events comprised of 33 chemical spills and 23 hydrocarbon spills. The majority of these spills (55 of 58) occurred above ground on the SML and were a result of loss of containment from plant and equipment. The remaining three spills (of 58) were reported off-site; two at water pump stations and one on a public road near the industrial area south of the SML. Internally reportable chemical and hydrocarbon spills increased slightly in FY24 in comparison to FY23, but remain below the FY20 peak, as shown in Figure 36.

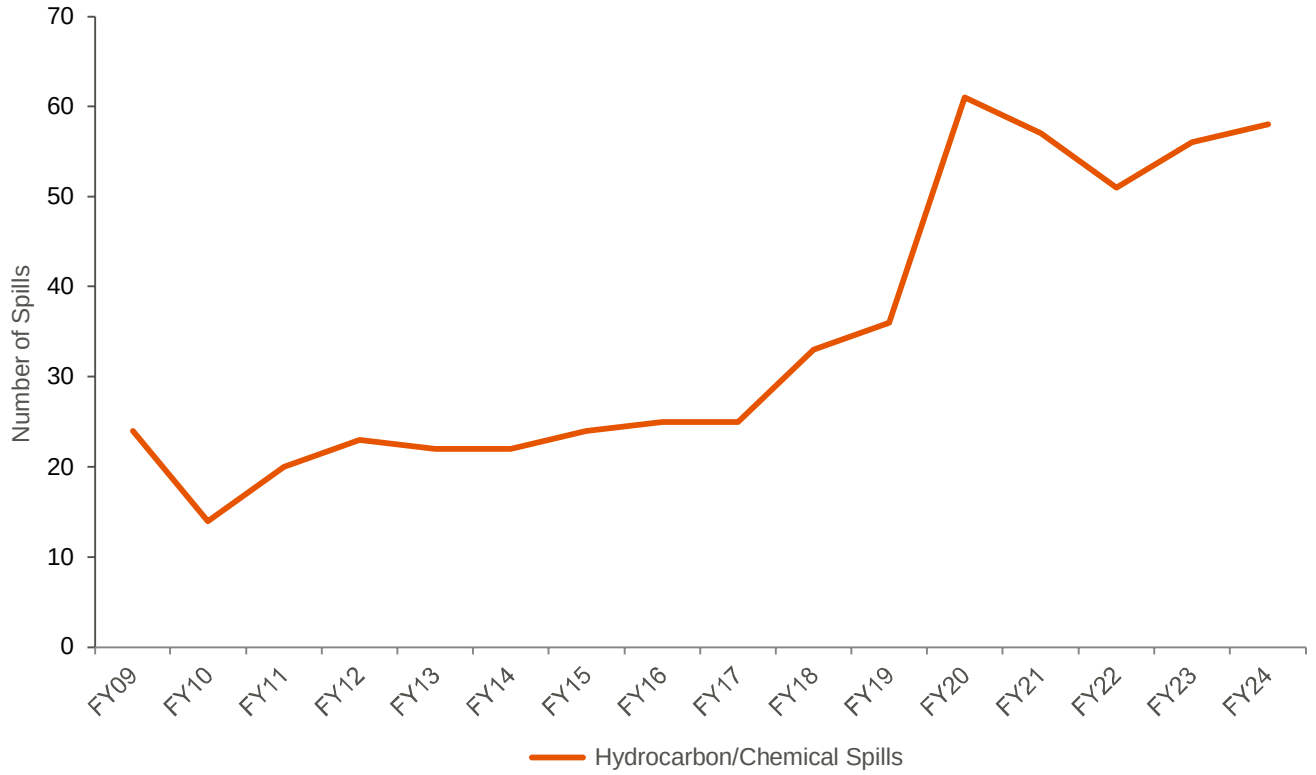


Figure 36: Historical hydrocarbon/chemical spills to FY24

Continue to implement environment improvement plans for areas of concern, as identified through the annual Aspects and Impacts risk register review.

OD is continuing to implement inspections and maintenance on bunded areas to ensure a consistent spill management methodology is maintained.

Implement the PFAS Environment Improvement Program as required by EPA Exemption 51301.

OD has executed projects to ensure complete phase out of all prohibited firefighting foam (PFFF) in accordance with Clause 13A of the *Environment Protection (Water Quality) Policy 2015* through the following activities:

1. Twelve small deluge systems have been replaced and the decontamination of two large deluge systems has been completed in accordance with Environment Protection Authoirty (EPA) approved phase out plans;
2. PFFF and contaminated infrastructure has been decontaminated and removed; and
3. Verification reporting was completed by an external expert consultant to confirm the removal and decontamination activities were completed in accordance with the approved Environment Improvement Program (EIP). The report has been reviewed by the EPA and the EPA has been confirmed that BHP OD has complied with the Condition 5.1 - Develop Environment Improvement Program.

With the completion of the Per- and Polyfluoroalkyl Substances (PFAS) EIP, BHP will investigate the requirement for further site investigations.

Implement the Foam Management Plan as required by EPA Exemption 51301 to ensure all PFAS firefighting foam is appropriately managed during the phase out program.

All PFFF has been removed from the OD site. The requirement for an ongoing foam management plan will be assessed during the Detailed Site Investigation (DSI) process.

2.1.6 Continuous Improvement Opportunities FY24

An audit of all existing bunds was undertaken in FY13 to determine compliance against the EPA Liquid Storage (Bunding and Spill Management) Guideline (EPA 2016). Based on the audit a risk-based approach

and review is being applied to bund management. Process controls are implemented when bund capacity is inadequate or there is a risk that bunds will be insufficient to contain a spill if it is found that a spill is likely to occur.

Opportunity: Ensure bunds are continuously maintained and process controls are implemented such as safe fill levels and Citect alarms when a risk has been identified. The controls must be captured in the site Aspect and Impact register against the functional location of the bund.

None applicable in FY24.

2.2 Radioactive Process Material Spills

2.2.1 Environmental Outcome

No adverse impacts to public health as a result of radioactive process material spills from ODC's activities.

Olympic Dam Corporation has consistently operated in a manner that limits radiation dose to members of the public, from operational activities and radioactive emissions, to less than a small fraction of the International Commission on Radiological Protection (ICRP) 1 mSv/y limit.

During FY24, two reportable radioactive process material spills occurred as a result of ODC's activities; one within the tailings disposals operational area outside of the designated bund and one off-site near the ODV sewerage lagoons. There were no adverse impacts to public health as a result of radioactive process material spills from ODC's activities.

No significant adverse impacts to populations of listed species or ecological communities as a result of radioactive process material spills from ODC's activities.

No significant impacts to populations of listed species or ecological communities were recorded as a result of operational activities, including the effects from any radioactive process material spills. Impacts to listed species and ecological communities are avoided by ensuring that there is no uncontrolled loss of radioactive material to the natural environment. As there was no loss of radioactive material to the undisturbed (natural) environment in FY24, no impact to populations of listed species or ecological communities occurred.

2.2.2 Compliance Criteria

A dose limit for radiation doses to members of the public of 1 mSv/y above natural background (ER 3.2).

The total estimated dose (FY24) to members of the public at Roxby Downs Air Quality Monitoring System (AQMS) and Olympic Village AQMS contributed by OD operations was 0.0230 mSv and 0.027 mSv respectively. For more detail refer to Section 3.3.

No significant radioactive contamination arising from uncontrolled list of radioactive material to the natural environment (ER 3.4).

Note: Significant is defined as requiring assessment and remedial action in accordance with the National Environment Protection (Assessment of Site Contamination) Measure 1999 or Environment Protection (Water Quality) Policy 2015 and the Mining Code. Measurement and monitoring is carried out in response to a specific event.

In FY24 there were 66 radioactive process material spills, two of which were reportable (one within the SML and one associated with nearby off-site infrastructure). The majority of these spills were in the concentrator and hydromet areas and were a result of leaking or failed pipes or instrument reading failure. Of the spills in FY24 none required assessment and remedial action in accordance with the NEPM (Assessment of Site Contamination) 1999, Environment Protection (Water Quality) Policy 2015 or the Mining Code.

As stated in Section 2.2.1 above, there was no uncontrolled loss of radioactive material to the natural environment in FY24.

2.2.3 Leading Indicators

None applicable.

2.2.4 Targets FY24

No spill of radioactive process material into an undisturbed environment. Corrective actions resulting from a reportable spill of radioactive process material are executed in a timely manner to ensure no adverse impacts to human health.

There was no uncontrolled loss of radioactive process material to the undisturbed (natural) environment in FY24. One reportable radioactive process material spill occurred in FY24 within the SML, which did not impact on

undisturbed areas or result in adverse impacts to human health. In September 2023, human error during trouble shooting resulted in pumps failing in the tailings disposal unit. Tailings flowed into a bund, which overflowed into the disposals area compound. The spill was contained with sand bunds and was collected for disposal into the TRS.

One reportable radioactive process material spill occurred in FY24 outside of the SML. Waste material that contained some OD process material was found at the edge of an access road next to the ODV sewerage ponds. The contaminated soil was excavated for disposal into the TRS. To ensure no contamination remained, the impacted area was assessed by the BHP Radiation Team following the completion of remedial works, and soil samples were collected and sent for independent analysis. Analysis results did not detect any contamination remaining within the impacted area following the completion of remedial works.

2.2.5 Actions FY24

Maintain a register of recordable spills of radioactive process material resulting from operations at Olympic Dam.

Note: Reportable and recordable spills of radioactive process material as defined by the Criteria and Procedures for Recording and Reporting Incidents as SA Uranium Mines (DEM), known as 'Bachmann Criteria'

A register of recordable spills was maintained during FY24. Throughout the reporting period, there were 66 recordable radioactive process material spills (of which two were reportable). The spills occurred at the SX, hydromet, concentrator, feed prep/smelter and TRS (Figure 37), with the dominant causes being leaking/failed pipes or instrument failures. The increase in recorded events is in part due to spills from the mills which can contain water and ore in variable proportions, with these conservatively recorded as process material spills. Discussions with mills/hydromet teams indicated that improvements to monitoring equipment will be made during maintenance shutdowns. It is expected that this will reduce the number of spills of water potentially contaminated with ore from the mills area.

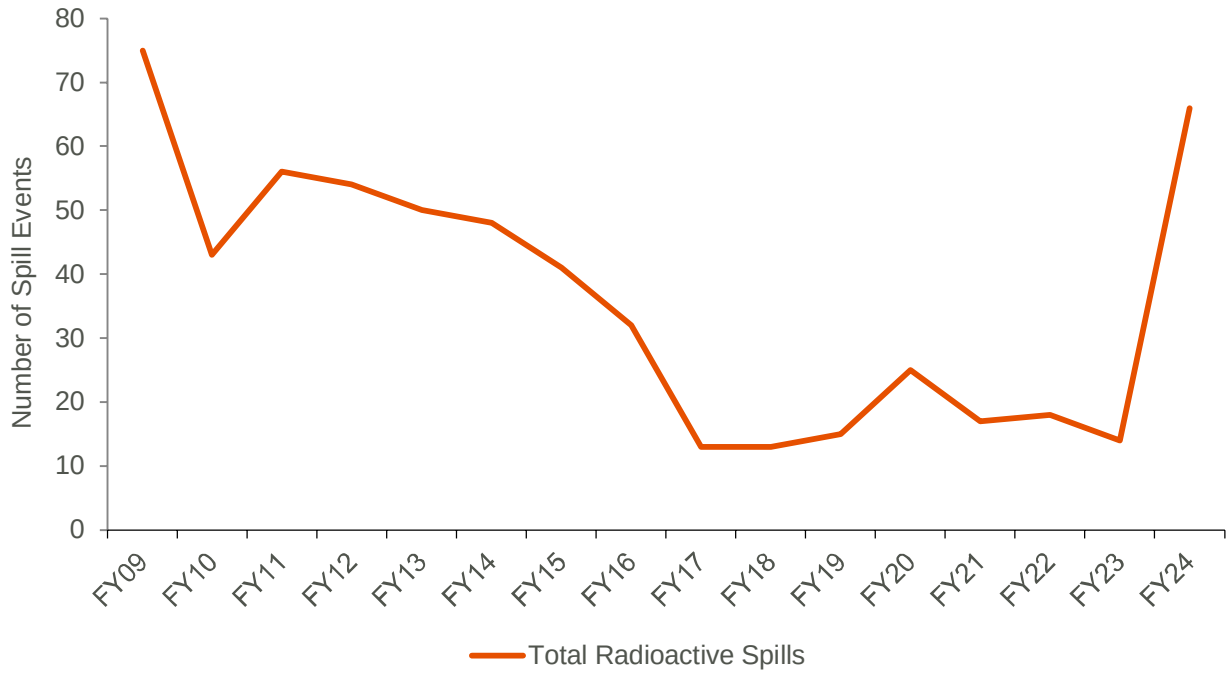


Figure 37: Historical radioactive process material spills to FY24

Continue to implement environment improvement plans for areas of concern as identified in the annual Aspects and Impacts risk register review.

All areas continued with planned maintenance tasks for tanks, pipes and bunds. These plans are captured and monitored through BHP's internal 1SAP.

2.2.6 Continuous Improvement Opportunities FY24

The majority of spill events occur in areas within secondary and tertiary containment systems and have minimal potential to cause significant environmental impact. The data from these incidents are reviewed to identify root causes and reduce the potential for further spill events.

Opportunity: Review data to identify actions to be included in the area Environment Improvement Plans.

The loss of containment of tails slurry that was reported externally in September 2024 and the subsequent investigation has led to improvements in how production technicians sign off on adjustments to plant. These improvements will be rolled out in the affected area as processes are updated.

An audit of all existing bunds has been undertaken to determine compliance against the EPA Liquid Storage (Bunding and Spill Management) Guideline (EPA 2016). Based on the audit, a risk based approach and review is being applied to bund management. Process controls are implemented when bund capacity is inadequate or there is a risk that bunds will be insufficient to contain a spill if it is found that a spill is likely to occur.

Opportunity: Ensure bunds are continuously maintained and process controls are implemented such as safe fill levels and Citect alarms when a risk has been identified.

None applicable in FY24.

3. OPERATION OF INDUSTRIAL SYSTEMS

3.1 Particulate Emissions

3.1.1 Environmental Outcome

No adverse impacts to public health as a result of particulate emissions from ODC's activities.

In FY24, three ground level PM_{10} dust concentrations at Olympic Village exceeded the PM_{10} 24-hour average of 50 micrograms per cubic metres (µg/m^3). These events were likely to be caused by a combination of regional dust generation and local dust generation from nearby disturbed land (i.e. the airport and surrounds). As such the environmental outcome for particulate emissions for FY24 has been classified as 'significant progress towards achieving the environmental outcome'.

3.1.2 Compliance Criteria

Ground level PM_{10} dust concentrations at Roxby Downs and Olympic Village derived from construction and/or operational sources at Olympic Dam must not exceed the PM_{10} 24-hour average of 50 µg/m^3 (AE 3.7).

In FY24, three ground level PM_{10} dust concentrations at Olympic Village exceeded the PM_{10} 24-hour average of 50 µg/m^3. These events were investigated and corrective actions pursued. One exceedance event on the 12th of August 2023 was deemed to be invalidated due to outages at the Olympic Village AQMS at the time.

3.1.3 Leading Indicators

None applicable.

3.1.4 Deliverables (AE 3.1)

Records of particulate emissions from Smelter 2 to assess compliance with the emission limits of EPA Licence 1301 and to compare against Schedule 4 of the Environment Protection (Air Quality) Policy 2016 (EP (Air Quality Policy)) as shown in Table 3-1.

Smelter stack emissions and analysis for particulate concentrations are undertaken periodically to assess the performance of gas cleaning systems. Particulate emissions from the Concentrate Dryer Stack and Main Smelter Stack (MSS) were tested during FY24 (Table 24).

Emissions tested by isokinetic testing from the MSS and Concentrate Dryer Stack met requirements of the Environment Protection (Air Quality) Policy 2016 and EPA Licence 1301 (Condition U-1068) (100 milligrams per normal cubic metre (mg/Nm^3)) during the reporting period (Table 24). All stack bypass events were recorded and reported in the quarterly smelter emissions report as per EPA Licence 1301 (Condition U-1066).

Analysis of particulates from the MSS and Concentrate Dryer Stack was completed in July 2023 and January 2024. All FY24 results for the MSS confirmed particulate emissions were below the 100 mg/Nm^3 limit. Results for the Concentrate Dryer Stack were below the reporting limit in July 2023 but exceeded the 250 mg/Nm^3 limit in January 2024. The exceedance was reported to the EPA on the 15th of January 2024 and a subsequent investigation took place. The investigation determined that the root cause was the mis-calibration of in-stack particulate probes in October 2023 where the probes were calibrated in response to incorrect readings. During calibration, an incorrect correction factor was applied. This mis-calibration resulted in the failure to detect high particulate levels within the stack. There has been no indication that there were any negative impacts on the environment or sensitive receptors as a result of this event. Follow up testing of the Concentrate Dryer Stack in late January 2024 confirmed results had returned to below the 250 mg/Nm^3 limit. Follow up testing of the MSS was not required as no further exceedances were recorded during FY24.

Table 24: Particulate concentrations at the main smelter stack and concentrate dryer stack (mg/Nm³)

	Main Smelter Stack (mg/Nm³)	Concentrate Dryer Stack (mg/Nm³)
January 2024 (after event)	N/A	62
January 2024	5	1459
July 2023	18	29

3.1.5 Deliverables (AE 3.2)

Records of particulate emissions from Calciners A and B to assess against the relevant particulate pollutant level specified in Table 3-1.

Particulate emission testing is managed through scheduled maintenance (in BHP's internal 1SAP), with Calciner A and B tested on a quarterly basis by isokinetic sampling. The isokinetic stack-sampling filters are used to capture particulates and are analysed for ^{238}U activity. Results from the uranium analysis, together with data obtained from the process control system, are used to estimate total uranium discharged from the stacks and are subsequently reported in the Licence to Mine (LM1) Radiation Annual Report.

Scheduled sampling of the Calciner gas cleaning systems occurred in July 2023, October 2023, January 2024, April 2024 and May 2024 (Table 25). Point source emission results are assessed against Table 3-1 of the EPMP Monitoring Program – Airborne Emissions. An exceedance of the compliance limit at Calciner B was reported to the EPA on the 16th of April 2024. The event investigation is currently in progress with summary findings to be provided to the EPA in FY25. There has no indication of any negative impacts on the environment or sensitive receptors as a result of the exceedance.

Table 25: Measured particulate concentrations in calciner emissions (mg/Nm³)

	Calciner A (mg/Nm³)	Calciner B (mg/Nm³)
July 2023	92	98
October 2023	90	68
January 2024	49	65
April 2024	88	252
May 2024	nd	104

Data not determined (nd) for Calciner A during May 2024. Follow up sampling at Calciner B only due to exceedance recorded in April 2024.

3.1.6 Deliverables (AE 3.3)

Records of particulate and hydrogen sulphide emissions from the Slimes Treatment Plant to assess against the pollutant levels specified in Table 3-1.

Particulate and hydrogen sulphide emissions from the Slimes Treatment Plant are measured on a biannual basis by isokinetic sampling. Any measurement above 100 mg/Nm^3 for particulates from the Saunders Furnace roaster scrubber or above 5 mg/Nm^3 of Hydrogen Sulphide from the NOx Scrubber are to be reported to EPA and investigated. These values were not exceeded during FY24 (Table 26).

Table 26: Saunders Furnace particulates and Hydrogen Sulphide concentrations (mg/Nm³)

	Saunders Furnace Particulates (mg/Nm³)	NOx Scrubber Hydrogen Sulphide (mg/Nm³)
October 2023	30	<0.05
April 2024	17	<0.08

3.1.7 Deliverables (AE 3.5)

Records of real-time monitoring of particulates to ensure that concentrations at Roxby Downs remain within the compliance criteria and to inform the management of dust-producing activities at the operation.

The real-time AQMS records operational ground level PM_{10} dust concentrations at Roxby Downs and Olympic Village at 10-minute intervals. The real time operational PM_{10} dust concentration results for Roxby Downs and Olympic Village are shown in Figure 38, Figure 39, Figure 40.

The Northern Background Station control site is located to the north of the surface processing operations within the ARR. The AQMS is depicted in Figure 41.

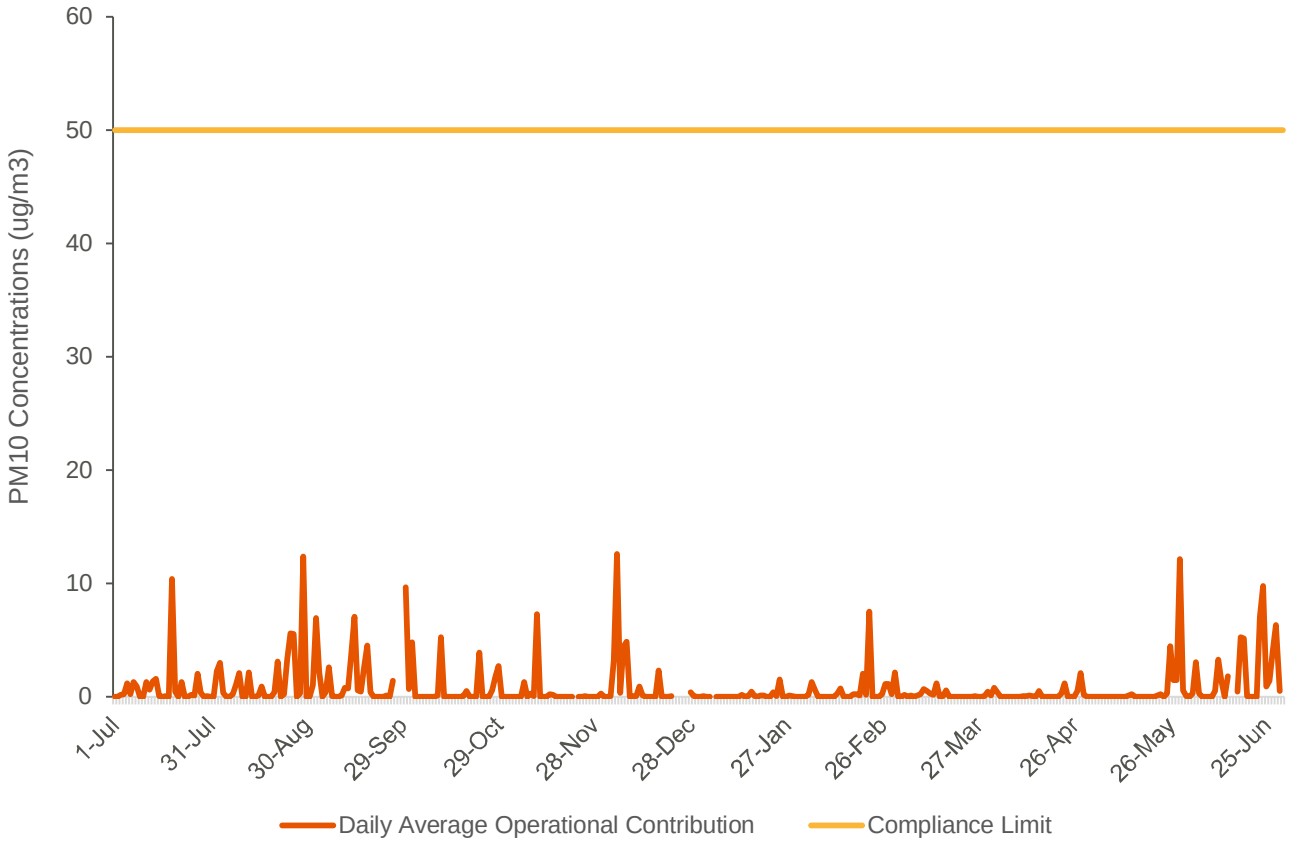


Figure 38: Real time PM10 24-hour 'operational contribution' dust concentrations at Roxby Downs (FY24)

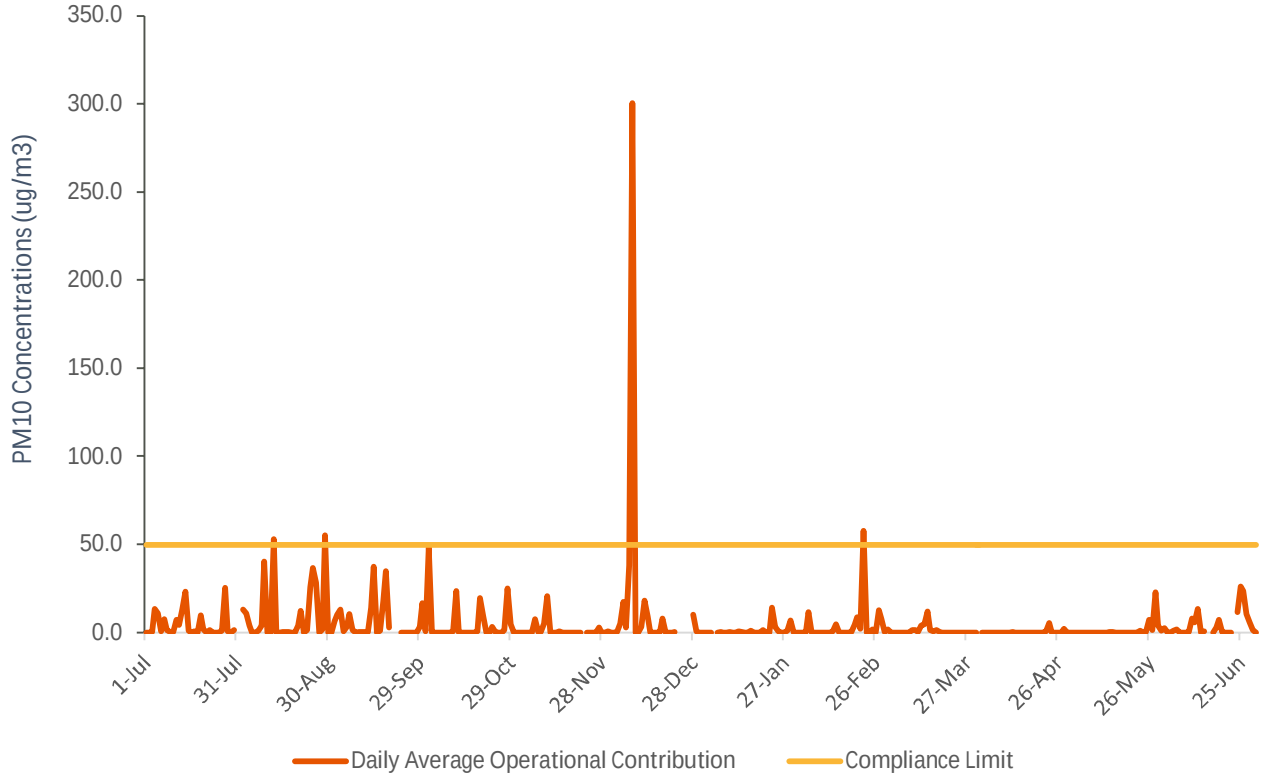


Figure 39: Real time PM10 24-hour 'operational contribution' dust concentrations at Olympic Village (FY24)

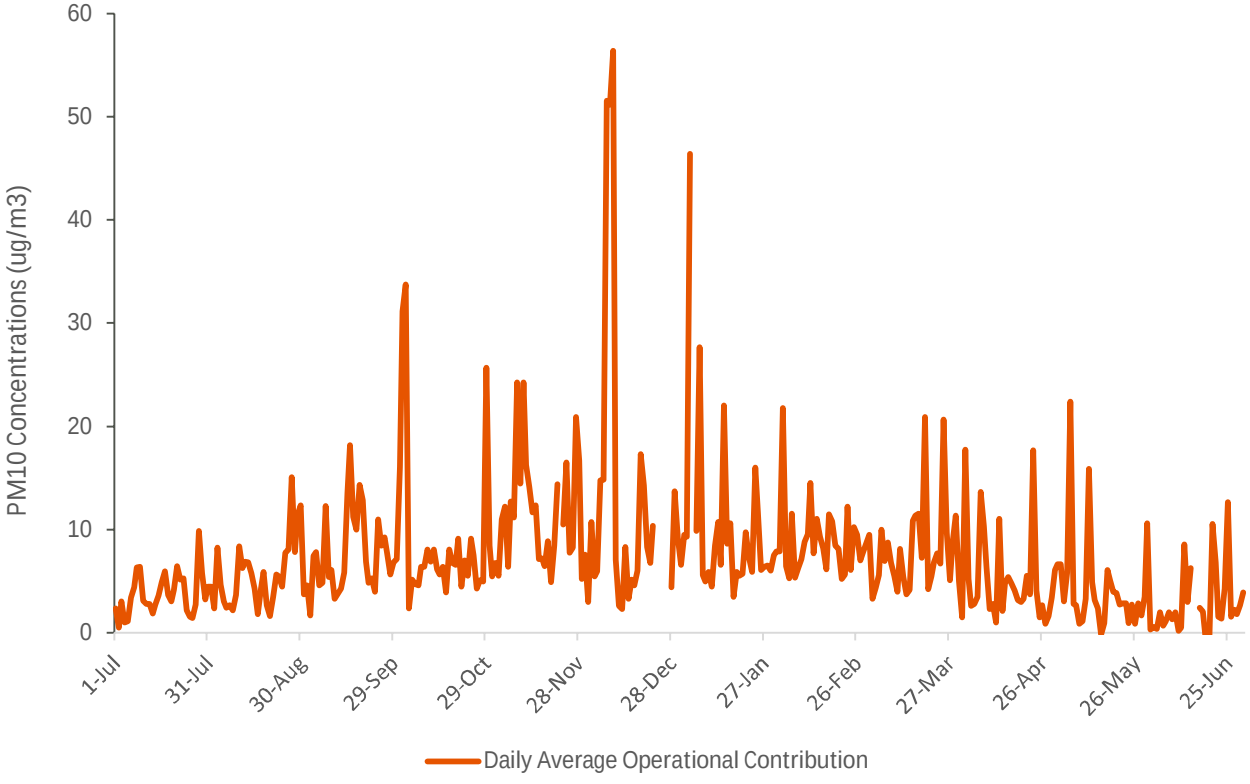


Figure 40: Real time total dust concentrations at Northern Background Station (FY24)

Figure 41: The AQMS' three monitoring sites

In FY24, there were three reported exceedances of the PM_{10} 24-hour average dust concentrations at Olympic Village (Table 27). The exceedance events that occurred in August 2023, December 2023 and February 2024 at the Olympic Village AQMS were deemed likely to be caused by a combination of regional dust generation and local dust generation from nearby disturbed land (i.e. the airport and surrounds). One exceedance event recorded on the 12th of August 2023 at the Olympic Village AQMS was deemed invalidated due to power outages recorded during the period, with less than 75% of data captured for the 12th of August. No exceedance events were recorded at the Roxby Downs receptor.

Table 27: FY24 reportable PM_{10} 24-Hour average exceedances

Date	PM_{10} Limit (µg/m^3)	Olympic Village AQMSPM_{10} 24-hr Average Contribution (µg/m^3)
22/02/2024	50	65
08/12/2023	50	304
29/08/2023	50	56

The real time AQMS' record PM_{10} data at 10-minute intervals, with all information stored and managed on the Airodis air management database. A daily report is distributed to internal stakeholders, which shows both background and operationally contributed PM_{10} dust concentrations for the previous 24-hours. Weather warnings, issued by the Bureau of Meteorology (BOM) are distributed to all OD staff in response to extreme weather events to assist operational areas in managing dust producing activities. Dust suppression is undertaken as per the site Dust and Emission Management Plan which describes fugitive source emission controls and measurement. An automatic alert system has been implemented to automatically alert high dust generating activity area owners to cease operations or increase dust controls, when weather conditions are unfavourable.

3.1.8 Deliverables (FL 3.1)

A report on the annual changes in perennial communities within and surrounding the Special Mining Lease (SML).

In FY24, 62 permanent sites categorised as either Treatment or Control were monitored for perennial vegetation and the trends analysed (Table 28 and Figure 42).

Acacia ligulata had the greatest relative abundance overall from 2011 to 2023, followed by *Dodonea viscosa* subsp. *angustissima*. Similar to previous years, *A. ligulata* relative abundance continued to significantly decrease at both Treatment and Control sites, while *D. viscosa* subsp. *angustissima* continued to significantly increase at both Treatment and Control sites. *Acacia ramulosa* and *Eremophila glabra* relative abundance significantly decreased at Treatment sites. *Alectryon oliefolius* relative abundance significantly increased at Treatment sites, along with *Eremophila longifolia*, *Pimelea microcephala*, and *Lycium australe* (although *P. microcephala* and *L. australe* are not found at any Control sites). An individual Sandalwood (*Sandalwood spicatum*) has been monitored since 2016, and it is considered that the significant increase in its relative abundance was due to the decrease in other species at the site.

Acacia aneura and *Senna artemisioides* subsp. *petiolaris* significantly increased at Control sites. *Callitris glaucophylla* significantly decreased at Control sites. The individual *Hakea leucoptera* that was observed in previous monitoring sessions was recorded as dead in 2022 and was still dead with no recruitment in FY24. *Acacia ramulosa* and *E. glabra* showed relative decline at Treatment sites that isn't reflected at Control sites. Deceased individuals of *A. ramulosa* have been noted as both old growth dieback and where juveniles recruited in previous years they could not be found in subsequent years. Excluding relationships found in *A. ramulosa*, similar changes at both Treatment and Control sites indicates that changes in species composition are not due to impacts from the mine.

Table 28: Linear regression analysis results for all species in Treatment and Control sites from FY12 - FY24

Species	Treatment		Control	
Acacia aneura	$F_{1,11}$ = 0.16, p = 0.699	R^2 = 0.014	$F_{1,11}$ = 14.6, p = 0.003	R^2 = 0.571
Acacia ligulata	$F_{1,11}$ = 99.3, p = 0.000001	R^2 = 0.900	$F_{1,11}$ = 27.0, p = 0.0003	R^2 = 0.711
Acacia oswaldii	$F_{1,10}$ = 0.22, p = 0.652	R^2 = 0.077	-	-
Acacia ramulosa	$F_{1,11}$ = 12.3 p = 0.005	R^2 = 0.528	$F_{1,11}$ = 0.08, p = 0.930	R^2 = 0.001
Alectryon oleifolius	$F_{1,11}$ = 7.69, p = 0.018	R^2 = 0.411	$F_{1,11}$ = 10.7, p = 0.007	R^2 = 0.493
Callitris glaucophylla	$F_{1,11}$ = 2.91, p = 0.116	R^2 = 0.210	$F_{1,11}$ = 6.34, p = 0.029	R^2 = 0.366
Dodonaea viscosa* subsp. *angustissima	$F_{1,11}$ = 61.1, p = 0.000008	R^2 = 0.847	$F_{1,11}$ = 20.3, p < 0.009	R^2 = 0.648
Eremophila glabra	$F_{1,5}$ = 7.20, p = 0.044	R^2 = 0.590	$F_{1,5}$ = 1.27, p = 0.311	R^2 = 0.203
Eremophila longifolia	$F_{1,10}$ = 18.1 p = 0.002	R^2 = 0.644	-	-
Gunniopsis quadrifida	$F_{1,11}$ = 0.56, p = 0.470	R^2 = 0.048	-	-
Lycium australe	$F_{1,11}$ = 7.86, p = 0.017	R^2 = 0.417	-	-
Pimelea microcephala	$F_{1,9}$ = 5.35, p = 0.046	R^2 = 0.372	-	-
Pittosporum angustifolia	$F_{1,11}$ = 1.78, p = 0.210	R^2 = 0.139	-	-
Santalum lanceolatum	$F_{1,11}$ = 0.18, p = 0.684	R^2 = 0.0157	-	-
Santalum spicatum	$F_{1,4}$ = 44.6, p = 0.003	R^2 = 0.917	-	-
Senna artemisioides* subsp. *petiolaris	$F_{1,11}$ = 0.80, p = 0.390	R^2 = 0.068	$F_{1,11}$ = 7.0, p = 0.023	R^2 = 0.389

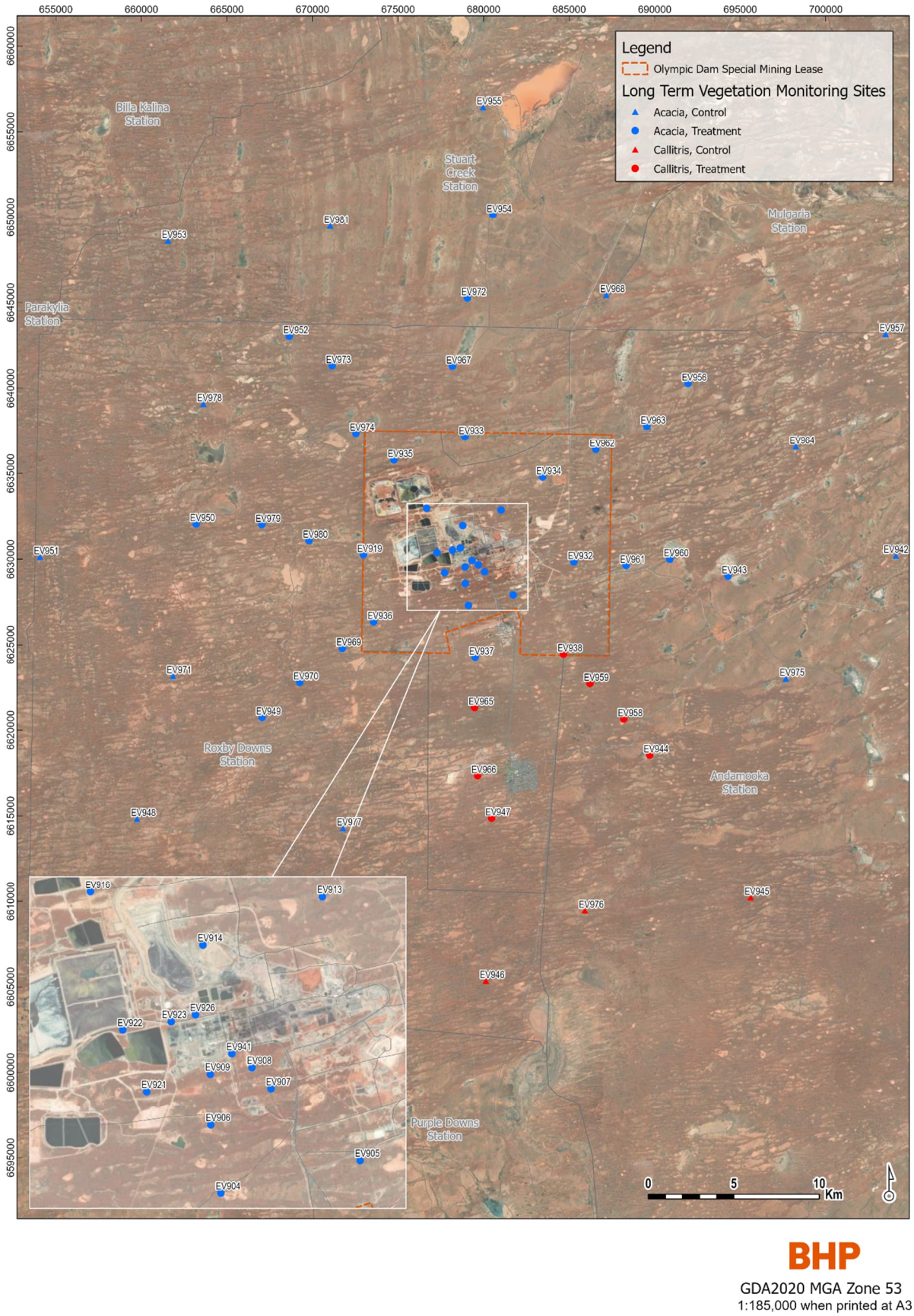


Figure 42: Location of radial sample sites monitored in FY24

Provide a comparative assessment on perennial species existing at different distances from the Main Smelter Stack (MSS).

Simpson's index values averaged over a maximum of 18 years showed that plant diversity could not be linked to proximity of the mine. Therefore, it is likely that the operation is not having an ongoing impact on species diversity in the surrounding region. A regression analysis determined that plant species diversity averaged over 2006 to 2023 did not significantly change with distance from the operation (up to 27 km from the main smelter stack; $F_{1,60}$ = 0.31, p = 0.58; R^2 = 0.0052; Figure 43).

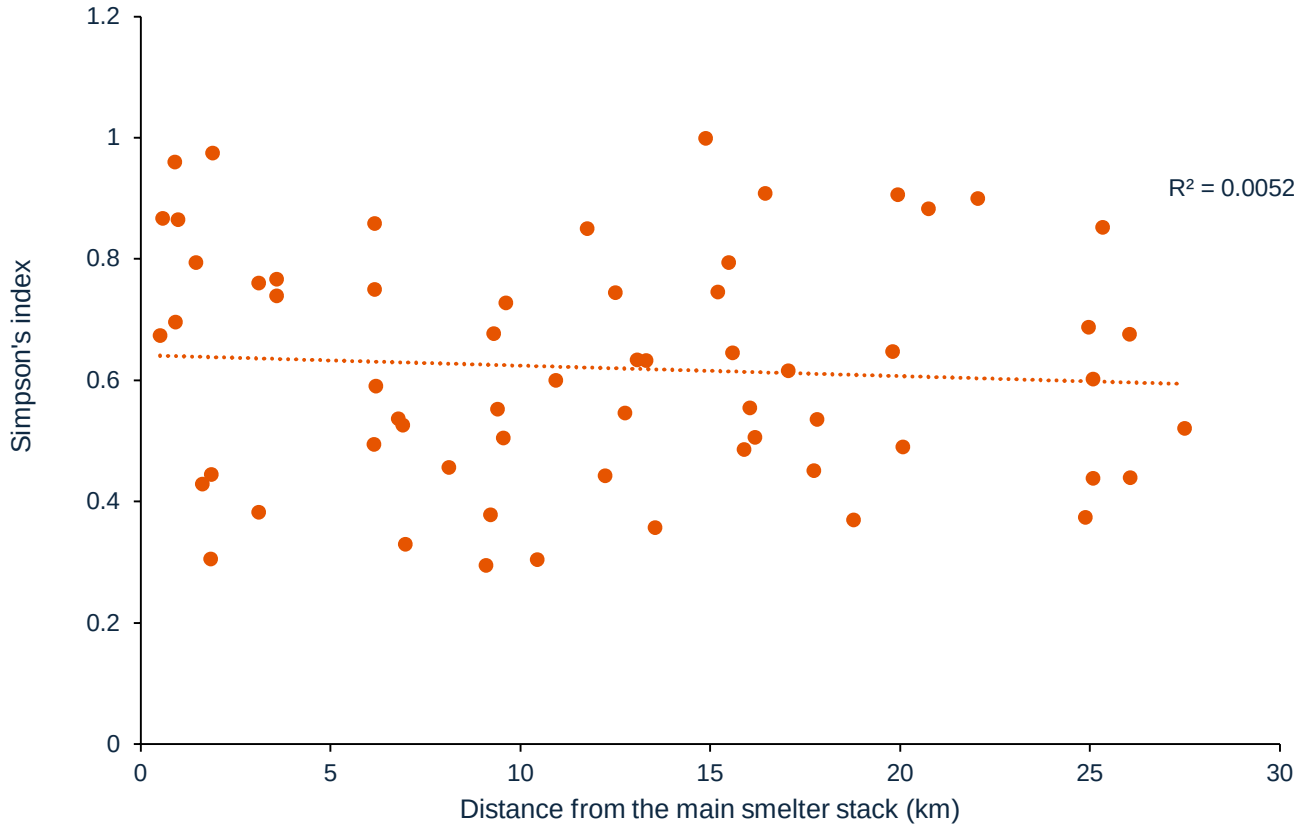


Figure 43: Simpson's index averaged over 2006 to 2023 for each site and plotted against the distance of the site from the main smelter stack

3.1.9 Targets FY24

None applicable.

3.1.10 Actions FY24

Update the dust monitoring system with new equipment.

Ongoing maintenance and upgrade works to the OD AQMS were undertaken throughout FY24. The majority of works completed were to replace equipment reaching end-of-life. BHP continued engagement with a third-party contractor to carry out monthly service and repair works as required to ensure effective operation of the AQMS. Works will continue as required throughout FY25 to ensure effective operation of the AQMS.

3.1.11 Continuous Improvement Opportunities FY24

Continue a watching brief on particulate monitoring technology and fugitive dust suppression technology.

None applicable.

3.2 Sulphur Dioxide Emissions

3.2.1 Environmental Outcome

No adverse impacts to public health as a result of sulphur dioxide (SO_2) emissions from ODC's operations.

The GLC levels for ambient air quality are based on the protection of human health (SA Environment Protection (Air Quality) Policy 2016). The Roxby Downs Township and Olympic Village ambient sulphur dioxide (SO_2) analyser results for the reporting period showed no exceedance of the SA Environment Protection (Air Quality) Policy 2016 for ambient air quality SO_2 at either Olympic Village or the Roxby Downs Township.

An annual review of monitoring data collected at sensitive receptors (ambient ground level concentrations) has shown there were no adverse impacts to public health as a result of SO_2 emissions from ODC's activities during FY24.

3.2.2 Compliance Criteria

Annual average SO_2 concentration of less than 0.02 ppm at sensitive receivers, Olympic Village and Roxby Downs (AE 3.1, AE 3.4).

The measured annual average SO_2 concentrations for FY24 were 0.0008 parts per million (ppm) and 0.0006 ppm at Roxby Downs and Olympic Village respectively, which is less than the 0.02 ppm SA Environment Protection (Air Quality) Policy 2016 GLC limit.

24 hour average SO_2 concentration of less than 0.08 ppm at sensitive receivers, Olympic Village and Roxby Downs (AE 3.1, AE 3.4).

The measured maximum 24-hour average SO_2 concentrations for FY24 were 0.0027 ppm and 0.0013 ppm for Roxby Downs and Olympic Village respectively. This is below the 0.02 ppm Environment Protection (Air Quality) Policy 2016 GLC limit.

One hour average SO_2 concentration of less than 0.2 ppm at sensitive receivers, Olympic Village and Roxby Downs (AE 3.1, AE 3.4).

The measured maximum hourly average SO_2 concentration for FY24 were 0.0031 ppm and 0.015 ppm for Roxby Downs and Olympic Village respectively, which is less than the 0.1 ppm SA Environment Protection (Air Quality) Policy 2016 GLC limit.

3.2.3 Leading Indicators

None applicable.

3.2.4 Deliverables (AE 3.1)

Calibration records for SO_2 analysers on the MSS and APTS.

The Acid Plant Tails Stack (APTS) and MSS SO_2 analysers were maintained in accordance with site procedures and manufacturer recommendations throughout the reporting period. Calibration Maintenance Plans (CMPs) are scheduled through BHP's internal 1SAP and are automatically generated. These CMPs are part of OD's pollution control register and are monitored for completion. Currently, the in-stack real time SO_2 and particulate analysers on the MSS and the APTS are calibrated on a weekly and quarterly basis. All CMPs were completed for FY24, and the calibration records are kept electronically.

Records of particulate and SO_2 emissions from Smelter 2 to assess compliance with the emission limits of EPA Licence 1301 and to compare against Schedule 4 of the Environment Protection (Air Quality) Policy 2016 (EP (Air Quality) Policy), as shown in Table 3-1.

Isokinetic sampling of the Main Smelter Stack and Acid Plant Tails Stack was undertaken in July 2023 for sulphur trioxide and sulphur dioxide and sulphur dioxide in January 2024. The results indicate continued compliance with the requirements of EPA Licence 1301 and the Environment Protection (Air Quality) Policy 2016 (Table 29 and Table 30).

Table 29: Smelter 2 MSS emission sampling results FY24

	Sulphur Trioxide and Acid Mist* (mg/Nm^3)	Sulphur Dioxide** (mg/Nm^3)	Total Acid Gas (mg/Nm^3)
Reporting Level	**100**	**2400**	**3000**
January 2024	nd	<15	<15
July 2023	1	80	81

** Expressed as sulphur trioxide equivalent. ** EPA Licence 1301 requirement level without sulphur trioxide. "nd" = Not determined, which means no testing for this parameter was undertaken during the period.*

Table 30: Smelter 2 APTS emission sampling results FY24

	Sulphur Trioxide and Acid Mist* (mg/Nm^3)	Sulphur Dioxide** (mg/Nm^3)	Total Acid Gas (mg/Nm^3)
Reporting Level	**100**	**2400**	**3000**
January 2024	2	360	362
July 2023	1	747	748

** Expressed as sulphur trioxide equivalent. ** EPA Licence 1301 requirement level without sulphur trioxide.*

Records to assess compliance with the monitoring and reporting requirements of EPA Licence 1301 and the EP (Air Quality) Policy (see Table 4-1).

Olympic Dam Corporation compiles a report for the EPA every quarter outlining the operation of the Acid Plant Bypass Stack, the Flash Furnace Bypass Stack, the Electric Furnace Bypass Stack, and both of the Anode Furnace Bypass Stacks. With each operation, the date and time is recorded, along with the duration, reason for the event, and the actions to remedy the situation. Daily reports are sent to the Environment team outlining each event and Metallurgists provide the information on causes and actions. The quarterly report to the EPA also includes a summary of events resulting from the start-up or abnormal/emergency operation of the Acid Plant, which results in the total acid gas content of the APTS exceeding 3000 mg/m^3. Event details include the date and time, duration, cause and action(s) taken to remedy the situation. Similarly, events where the emission level exceeds 3000 mg/m^3 of residual gases from the MSS are also recorded in the quarterly report.

The monitored ground level concentration of SO_2 concentration is continuously recorded at Olympic Village and Roxby Downs AQMS and is maintained in the Airodis database. The GLC of SO_2 is reviewed each day via a daily report, along with the daily stack events. This process is managed via procedures and work management held within the 1SAP system.

Continuous monitoring occurs of SO_2 emissions from the APTS and MSS ack using an in-stack instrument. In stack analysers are calibrated and maintained to manufacturer standard, and this process is controlled by the 1SAP system. The total acid gas emissions from the APTS and the total sulphur trioxide emissions from the MSS are tested annually, managed by the 1SAP system.

Data to confirm that approximately 99 per cent of all SO_2 generated during the smelting process is captured.

The percentage of SO_2 recovery for FY24 was 99.44%. This recovery result has increased from FY23 (99.31%), FY22 (99.22%), FY21 (99.11%) and FY20 (98.97%). The capture rate is compliant with the required approximate of 99% SO_2 capture deliverable.

3.2.5 Deliverables (AE 3.4)

Records of ground level SO_2 concentrations at the Olympic Village and Roxby Downs monitoring stations to assess compliance with the GLC requirements for SO_2 contained in Schedule 2 of the EP (Air Quality) Policy (see Table 3-2).

Ambient SO_2 1-hour, 24-hour, and 1-year average (mean) concentrations for FY24 at Olympic Dam Village and Roxby Downs were measured by real time continuous ambient SO_2 monitors in accordance with the EPA Licence 1301 Condition (Ambient Sulphur Dioxide Assessment: U-1072).

The measured maximum average 1-hour, 24-hour, and 1-year concentrations for Roxby Downs and Olympic Village results along with the applicable EPA (Air Quality) Policy 2016 GLC values, are presented in Table 31. The results of the measured concentration for the FY24 reporting period show that no exceedance of the GLC for ambient air quality limits of SO_2 occurred at Olympic Village or Roxby Downs Township (Figure 44, Figure 45, Figure 46, Figure 47, Figure 48, Figure 49) sensitive receiver monitoring locations.

Table 31: Average ambient SO_2 concentrations at Roxby Downs and Olympic Village for FY24

	Annual average concentration (ppm)	Maximum 24-hour average concentration (ppm)	Maximum Hourly average concentration (ppm)
EPA (Air Quality) Policy 2016	0.02	0.08	0.2
Roxby Downs	0.0008	0.0027	0.0031
Olympic Village	0.0006	0.0013	0.0014

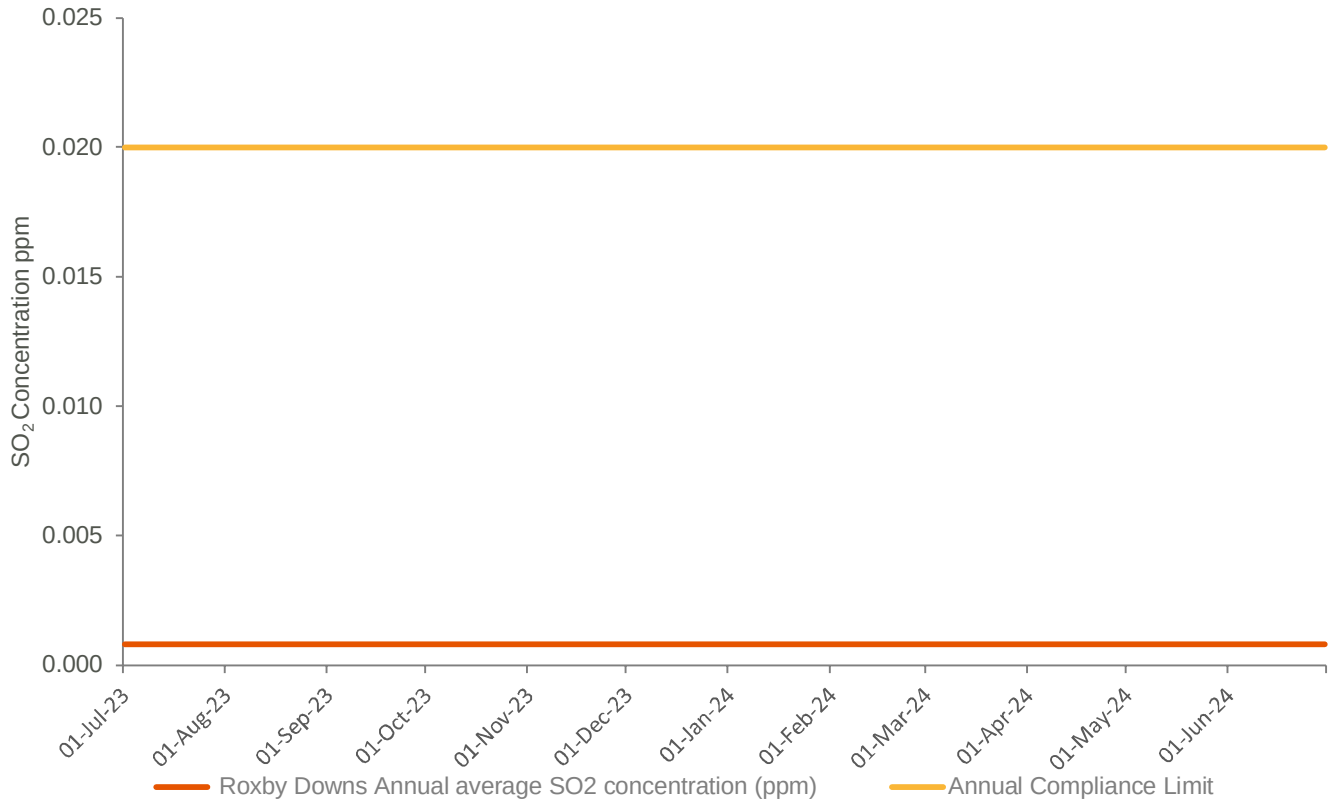


Figure 44: Measured annual average SO_2 concentration at sensitive receptor, Roxby Downs

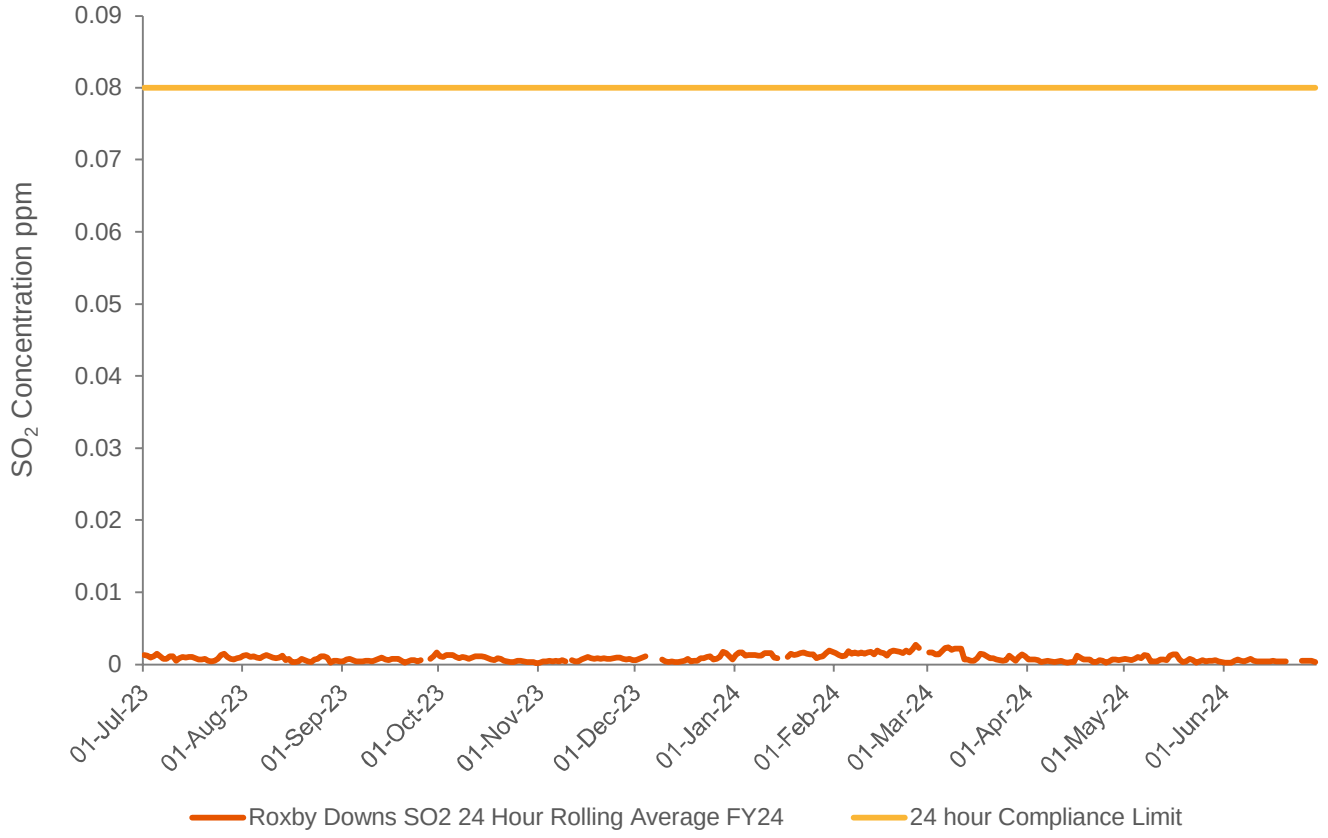


Figure 45: Measured 24-hr average SO_2 concentration at sensitive receptor, Roxby Downs

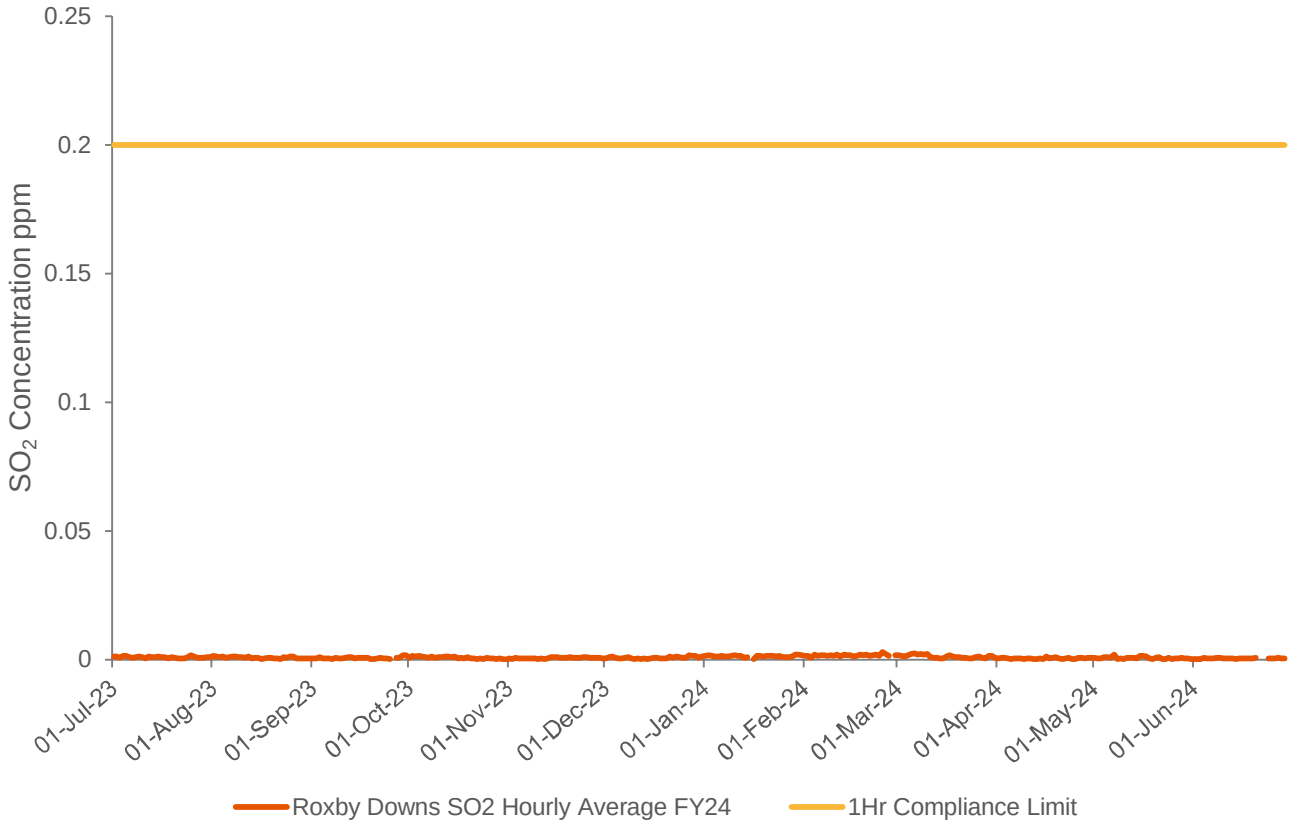


Figure 46: Measured average hourly SO_2 concentration at sensitive receptor, Roxby Downs

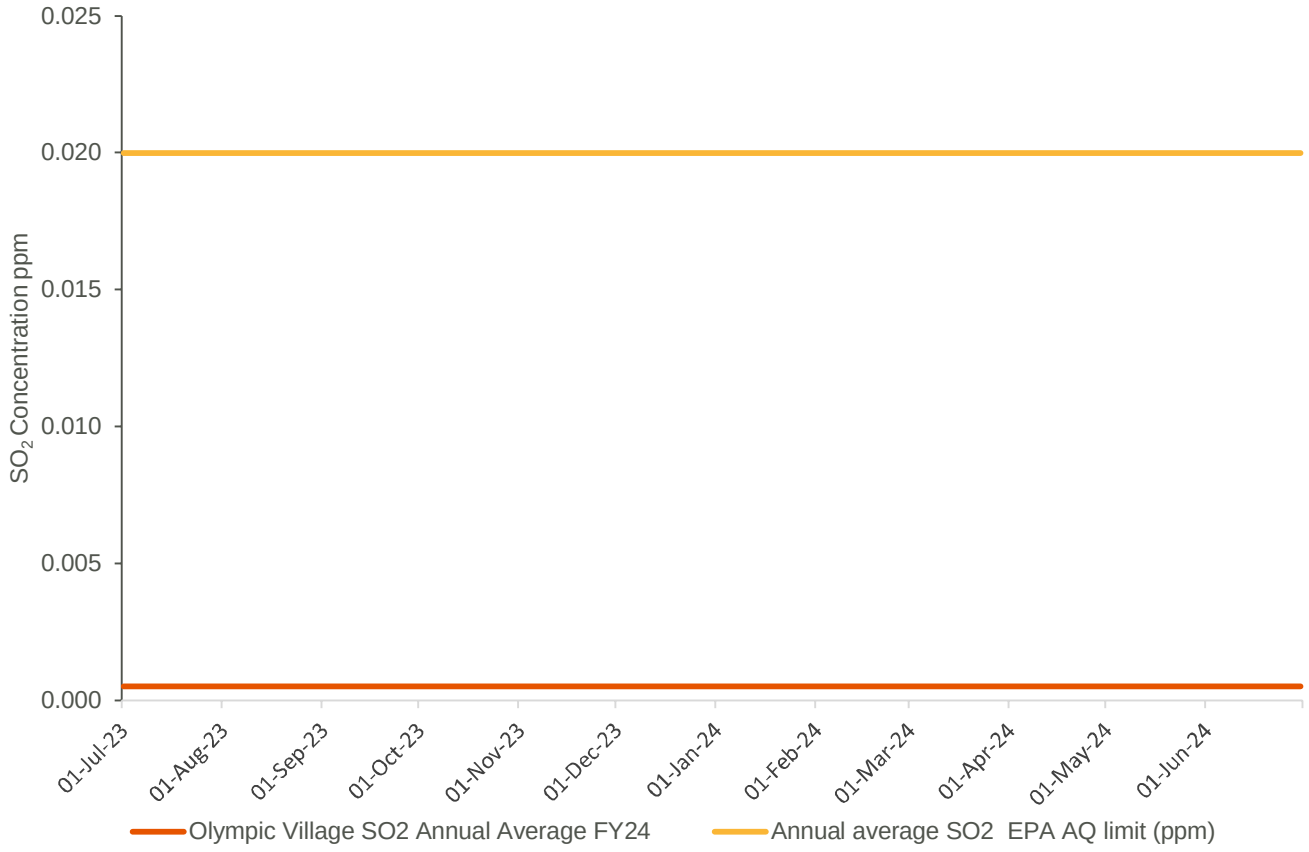


Figure 47: Measured annual average SO_2 concentration at sensitive receptor, Olympic Village

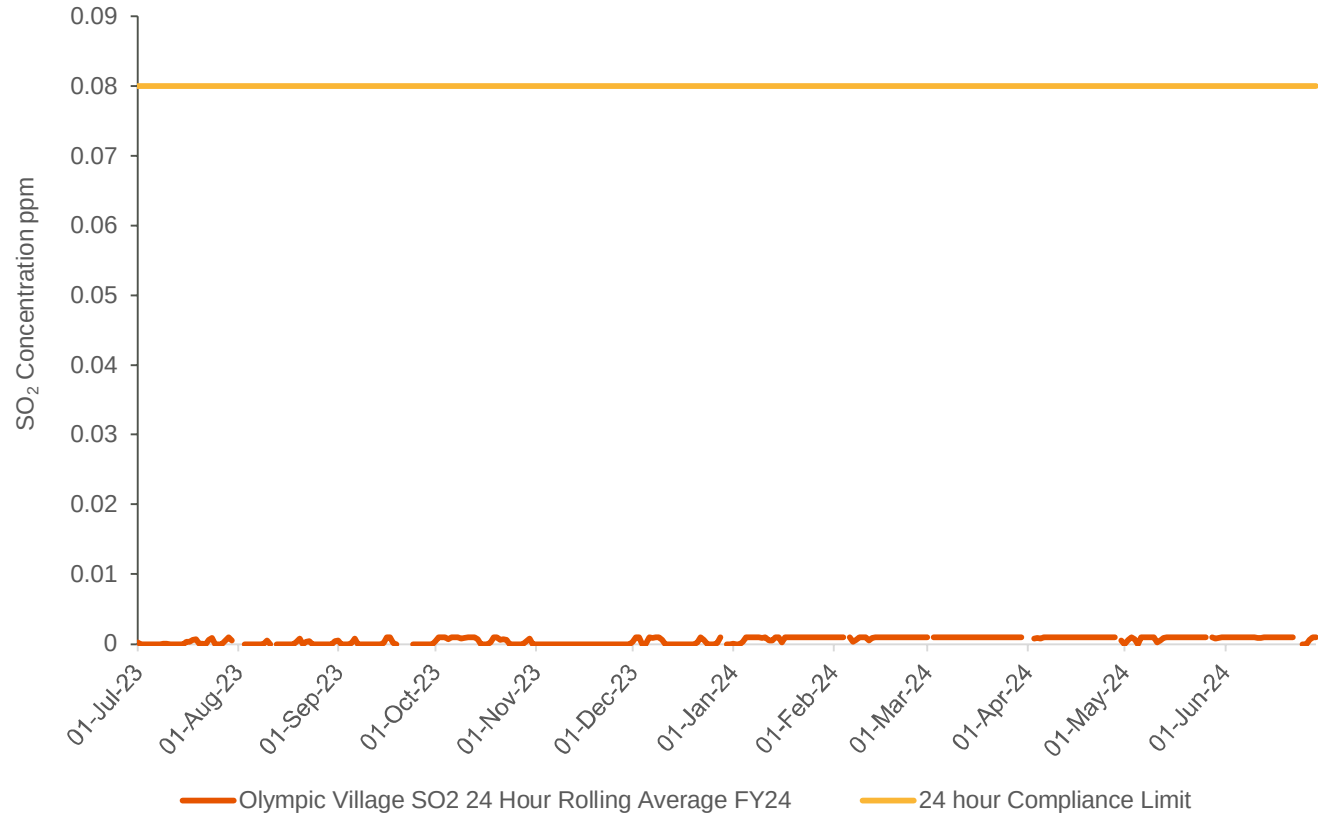


Figure 48: Measured 24-hr average SO_2 concentration at sensitive receptor, Olympic Village

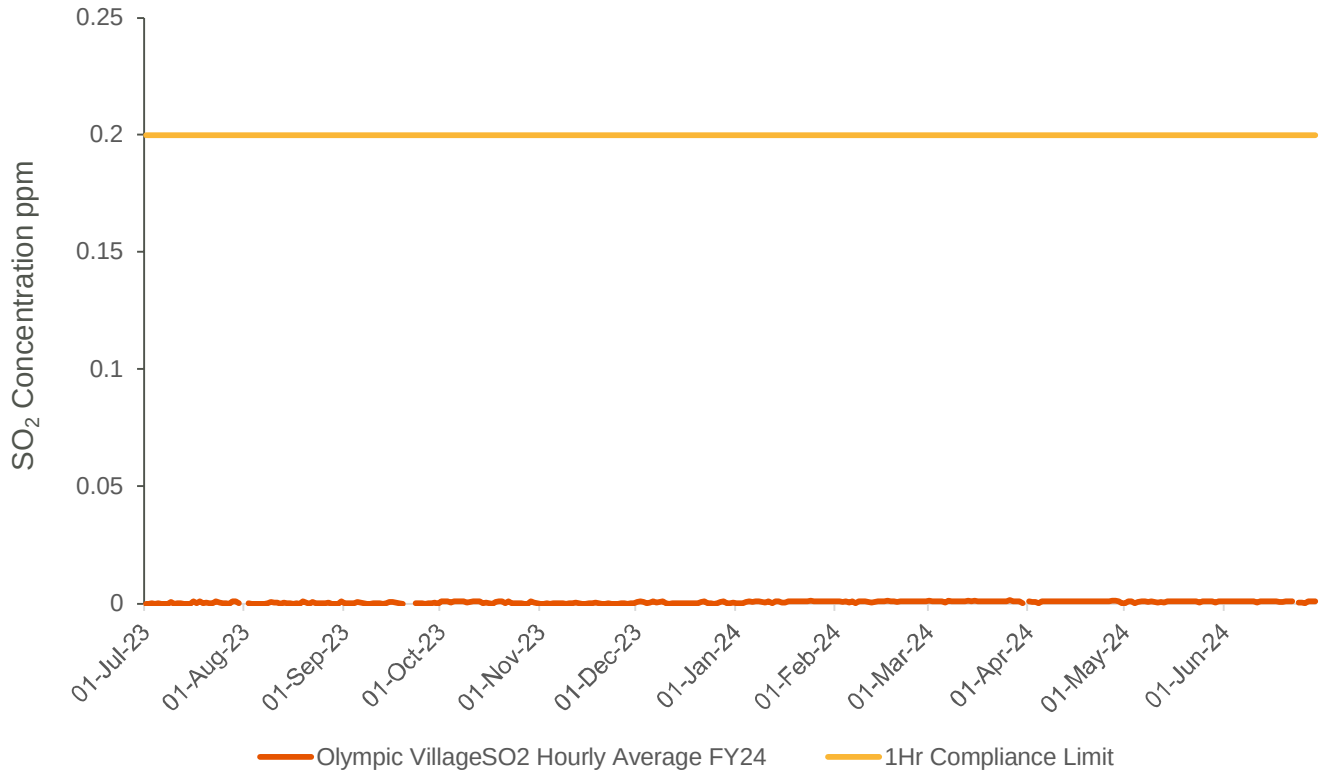


Figure 49: Measured average hourly average SO_2 concentration at sensitive receptor, Olympic Village

3.2.6 Targets FY24

Capture approximately 99 percent of all SO_2 generated during the smelting process.

This target has been achieved for FY24, refer to Sections 3.2.4 and 3.2.5 above.

3.2.7 Actions FY24

None applicable.

3.2.8 Continuous Improvement Opportunities FY24

Continue a watching brief on sulphur dioxide emission reduction technology.

None applicable.

3.3 Radioactive Emissions

3.3.1 Environmental Outcome

No adverse impacts to public health as a result of radioactive emissions from ODC's activities.

Olympic Dam Corporation has consistently operated in a manner that limits radiation dose to members of the public, from operational activities, to less than a small fraction of the 1 mSv/yr public dose limit prescribed by the ICRP. As a result, there are no adverse radiation exposure impacts to the public from activities undertaken at ODC.

No significant adverse impacts to populations of listed species or ecological communities as a result of radioactive emissions from ODC's activities.

There were no significant adverse impacts to populations of listed species or ecological communities as a result of ODC's activities. Monitoring of radiation doses to the public and the deposition of ^{238}U at non-human biota (NHB) assessment sites is used as an indicator of the potential exposure of listed species to radioactive emissions. Deposition of ^{238}U at non-human biota assessment sites was at a level which poses no significant adverse impacts to non-human biota.

3.3.2 Compliance Criteria

Radiation doses to members of the public less than 1 mSv/y above natural background (Aus 5d, 6, 13; State 34) (ER 3.2).

The total estimated dose in FY24 to members of the public at the Roxby Downs Monitoring Site and the Olympic Village Monitoring Site contributed by ODC operations was 0.030 mSv and 0.027 mSv respectively.

Deposition of project originated ^{238}U less than 25 Bq/m^2/y at the non-human biota assessment sites (ER 3.3).

The average deposition of ^{238}U, calculated as an average of results at the four monitoring sites was determined to be 1.58 Bq/m^2/y, well below the 25 Bq/m^2/y compliance criteria.

3.3.3 Leading Indicators

Indications that a dose constraint of 0.3 mSv/y to members of the public above natural background will be exceeded (Aus 5f, 6, 14; State 34) (ER 2.2.).

Indications that a reference level of 10 µGy/h for impacts on non-human biota above natural background will be exceeded (Aus 5f, 6, 14; State 34) (ER 2.3).

Note: The reference level for non-human biota is set as an interim criteria until such time as an agreed national approach is determined.

No leading indicators were triggered. Doses to members of the public are below OD's internal dose constraint of 0.3 mSv/yr. Similarly, the reference level of 10 micrograys per hour (uGy/h) for impacts on non-human biota has not been triggered.

3.3.4 Deliverables (ER 3.2)

Data leading to calculated estimates of annual radiation doses to members of the public in the critical groups identified in section 2.3 of this MP (Environmental Radiation).

The annual dose attributable to radon decay products (RDP) and radionuclides in dust is calculated and added to calculate the total annual effective dose for members of the public. The underlying calculation for each radionuclide is:

- Dose = Net Concentration × Dose Conversion Factor × Hours Per year

Where the concentration is in nano joules per cubic meter (nJ/m^3) (for RDPs) or Micro becquerel per cubic meter (µBq/m^3) (for radionuclides in dust) and there are 8784 hours in a leap year. The dose conversion factor is different for each radionuclide.

Radon Decay Products

Monthly RDP averages and the five-year rolling average for the Roxby Downs and Olympic Village Monitoring Sites during FY24 are depicted in Figure 50. The estimated dose (FY24) from RDP to members of the public at Roxby Downs and Olympic Village contributed by ODC operations was 0.028 mSv and 0.025 mSv respectively. The dose results demonstrate that the dose to members of the public (as measured at both monitoring stations) due to RDP resulting from ODC operations is a small fraction of the applicable dose limit.

The FY24 data aligns with previous years and suggests that there is little operation related RDP concentration at these monitoring sites. The main source of RDP exposure at both stations is from natural radiation background, which shows significant seasonal variations throughout the year (Figure 50).

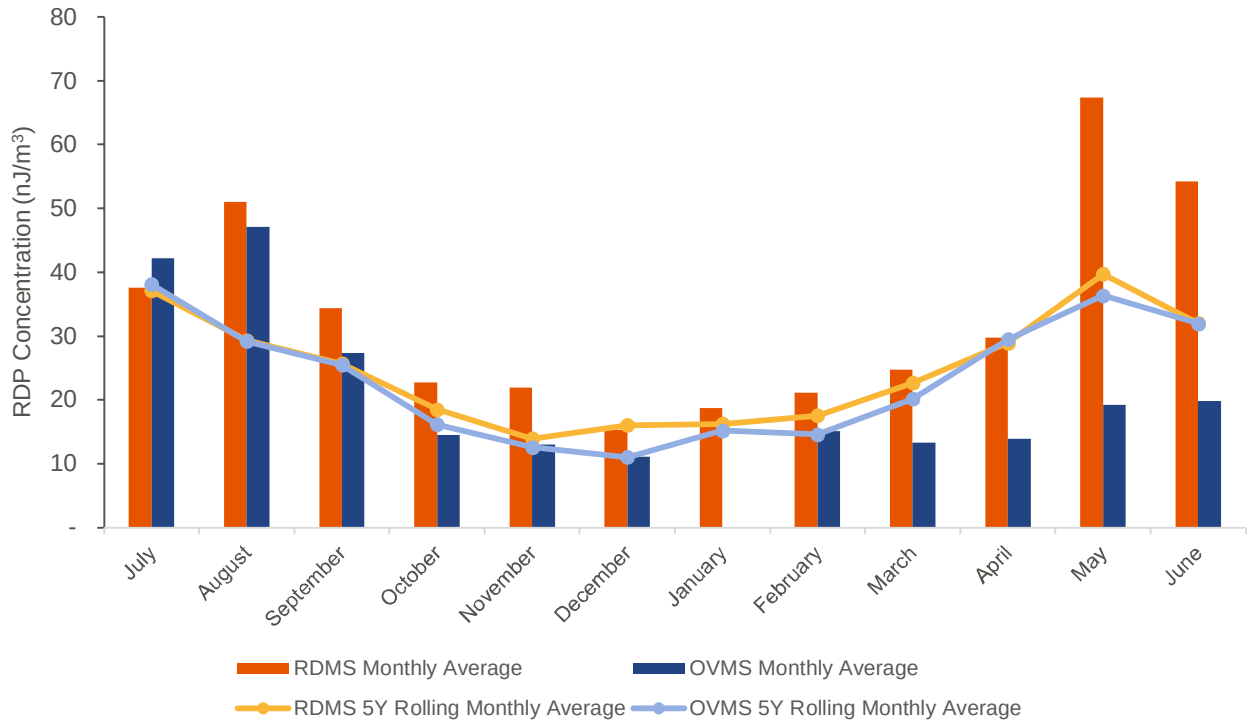


Figure 50: FY24 RDP monthly trends

Radionuclides in Dust Dose Assessment

Monthly concentrations of the long-lived radionuclides, ^{238}U, ^{230}Th, ^{226}Ra, ^{210}Pb and ^{210}Po for the 4-year period FY21-FY24 are shown in Figure 51, Figure 52, Figure 53, Figure 54, and Figure 55 (includes environmental background taken at the Roxby Downs Homestead in 2006 and 2007).

The estimated FY24 radiation doses to members of the public at the Roxby Downs Monitoring Site (RDMS) and the Olympic Village Monitoring Site (OVMS) due to long lived radionuclides in dust was 0.0026 mSv and 0.0021 mSv (adjusted for background) respectively. These correspond to 0.26% and 0.21% of the public dose limit of 1 mSv respectively. It is to be noted that the dust sampling and the radionuclide analysis processes have inherent uncertainties which contribute to the fluctuations seen in the radionuclide trends.

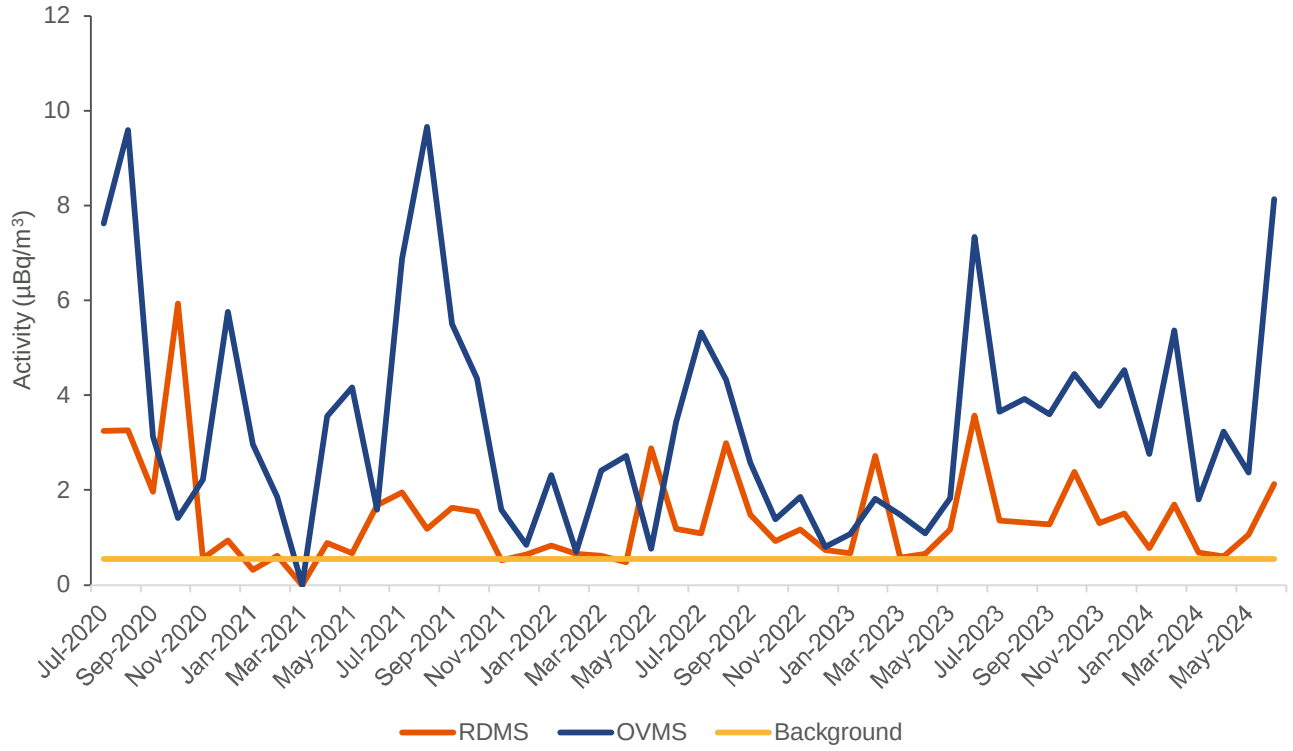


Figure 51: ^{238}U concentration for the 4-year period FY21 - FY24 (PM_{10})

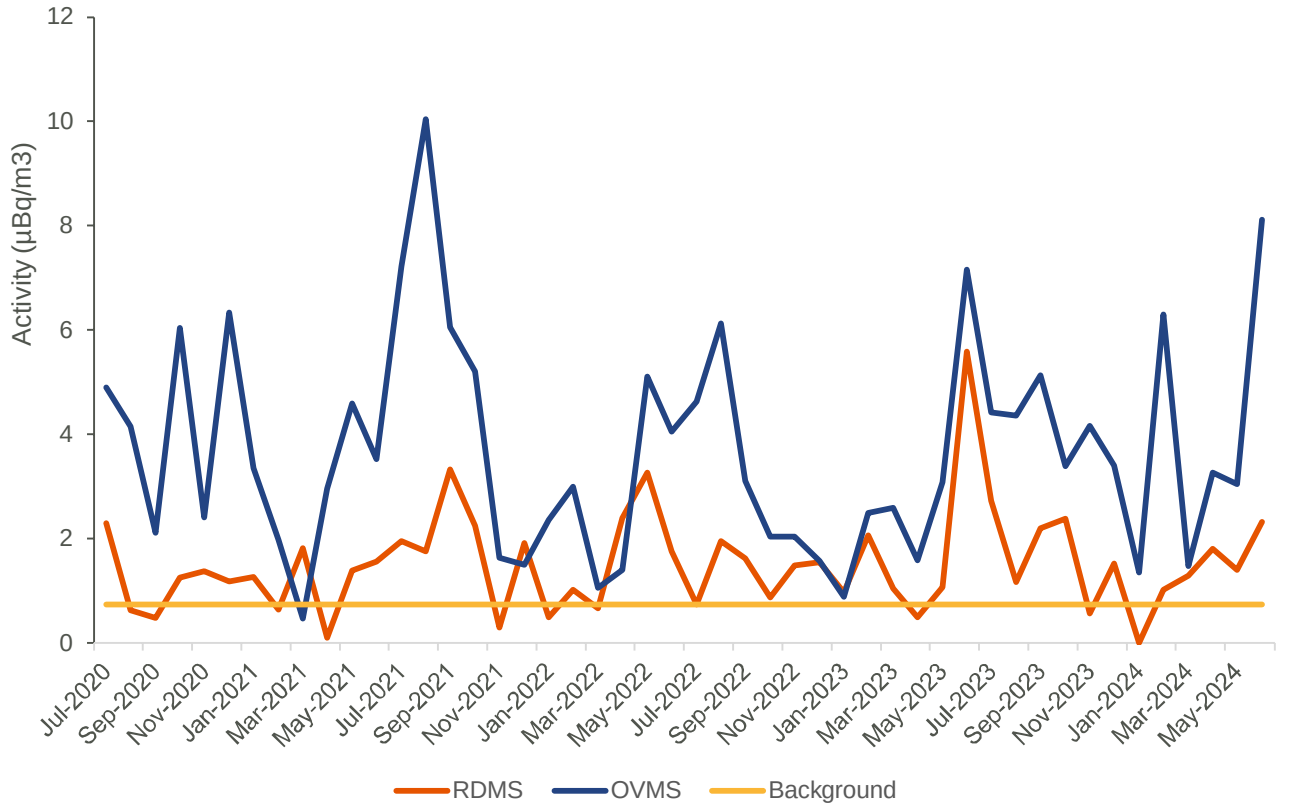


Figure 52: ^{230}Th concentration for the 4-year period FY21 - FY24 (PM_{10})

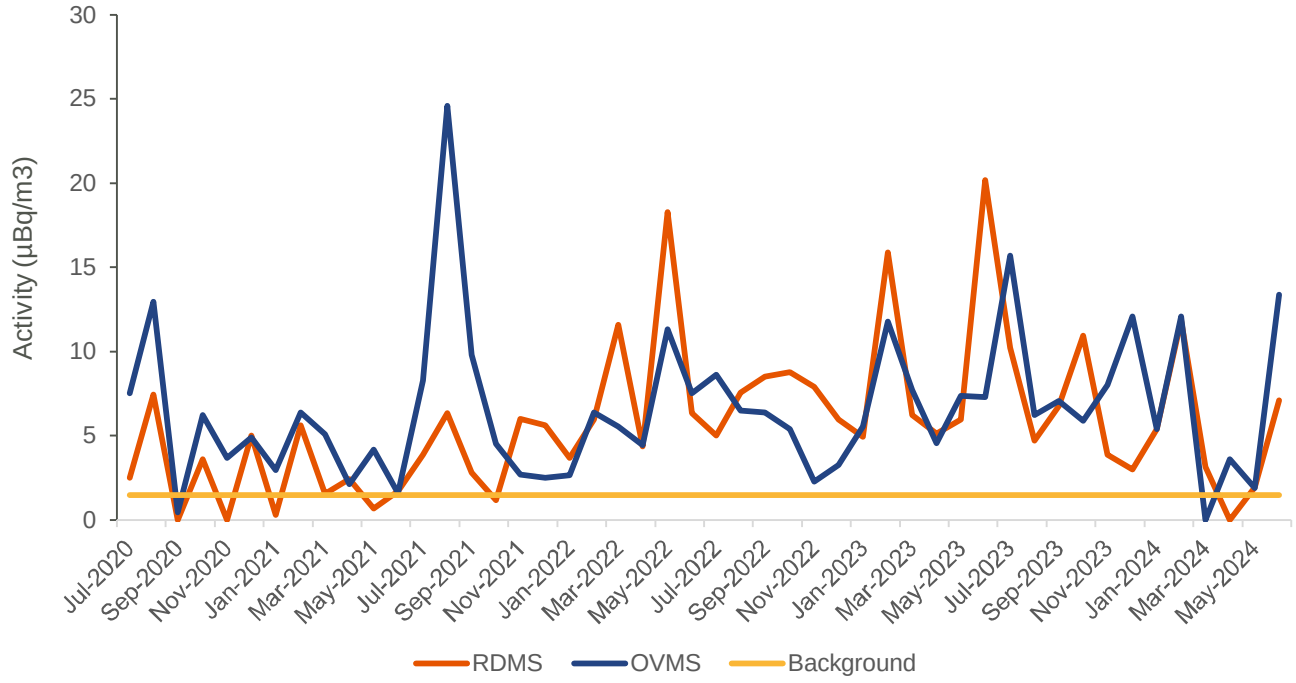


Figure 53: ^{226}Ra concentration for the 4-year period FY21 - FY24 (PM_{10})

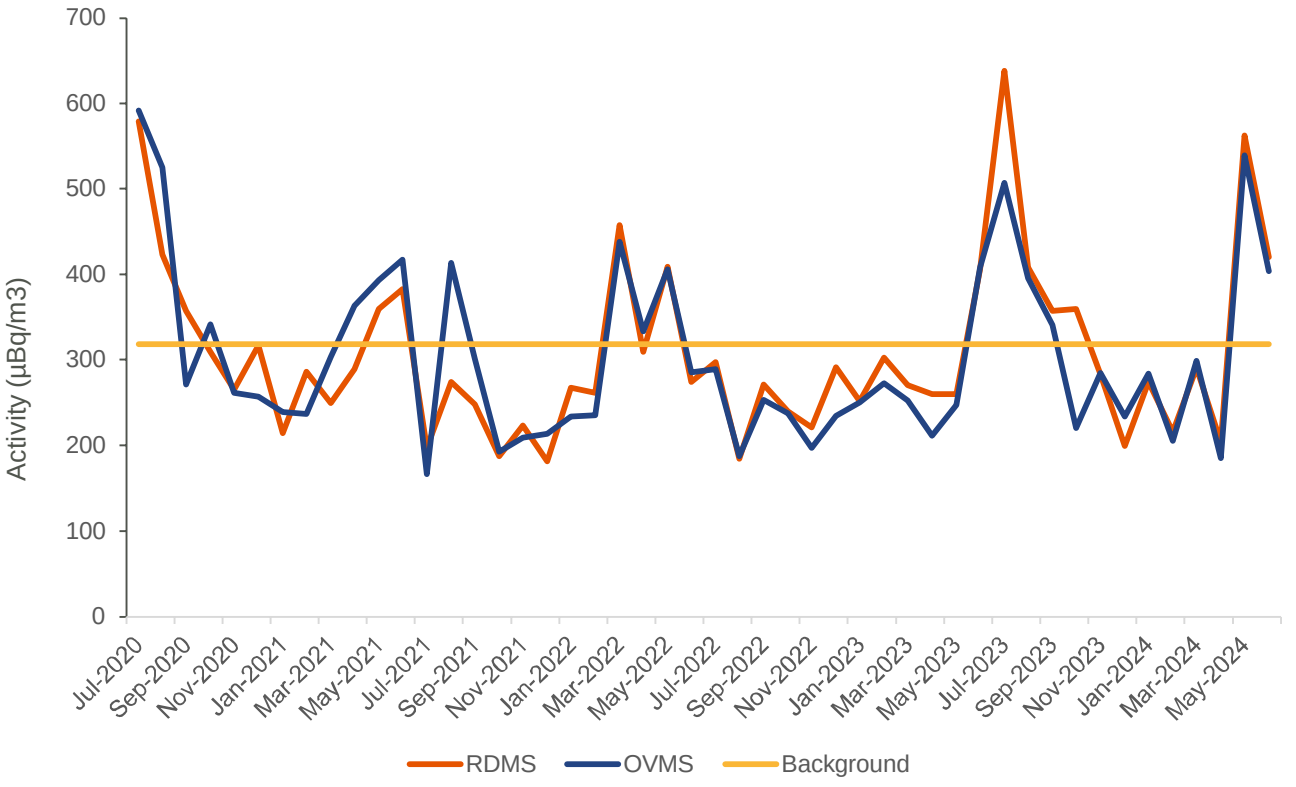


Figure 54: ^{210}Pb concentration for the 4-year period FY21 - FY24 (PM_{10})

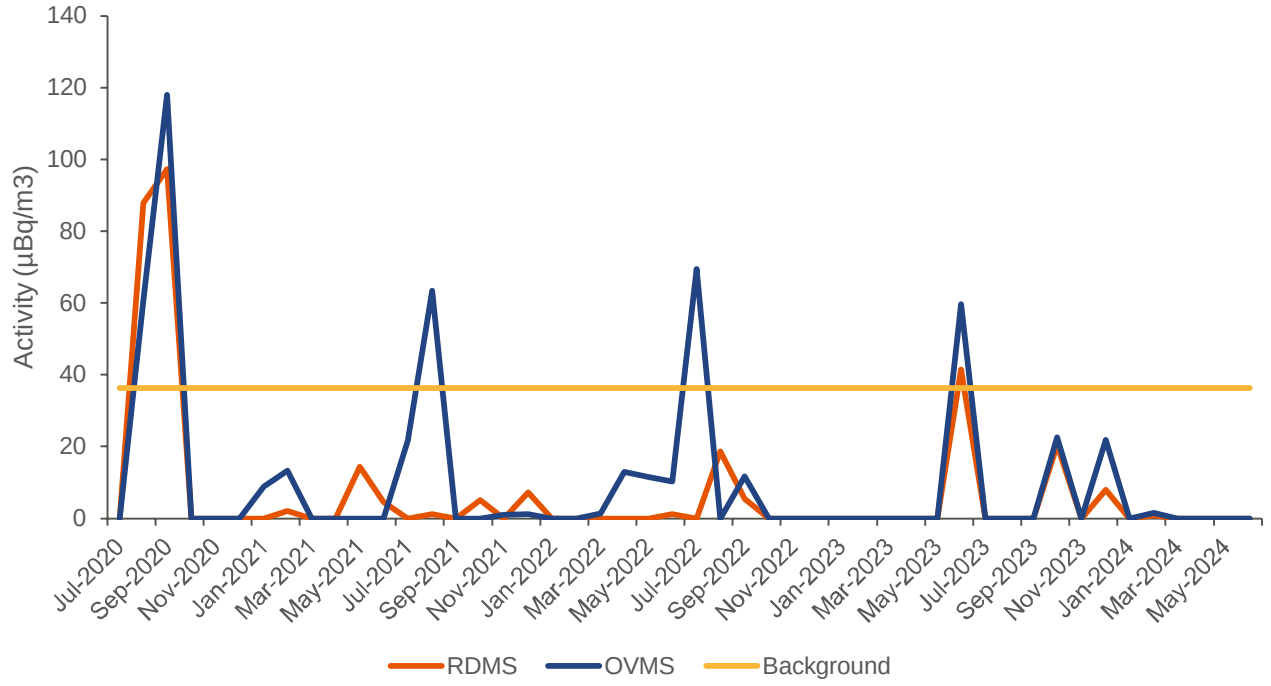


Figure 55: ^{210}Po concentration for the 4-year period FY21 - FY24 (PM_{10})

Total Dose to Members of the Public

In FY24, the total estimated dose contributed by ODC operations to members of the public at the RDMS and OVMS was 0.030 mSv and 0.027 mSv respectively. This is well below the 1 mSv/year public dose limit and OD's internal dose constraint of 0.3 mSv/yr. Figure 56 shows the annual trend of public doses at RDMS and OVMS.

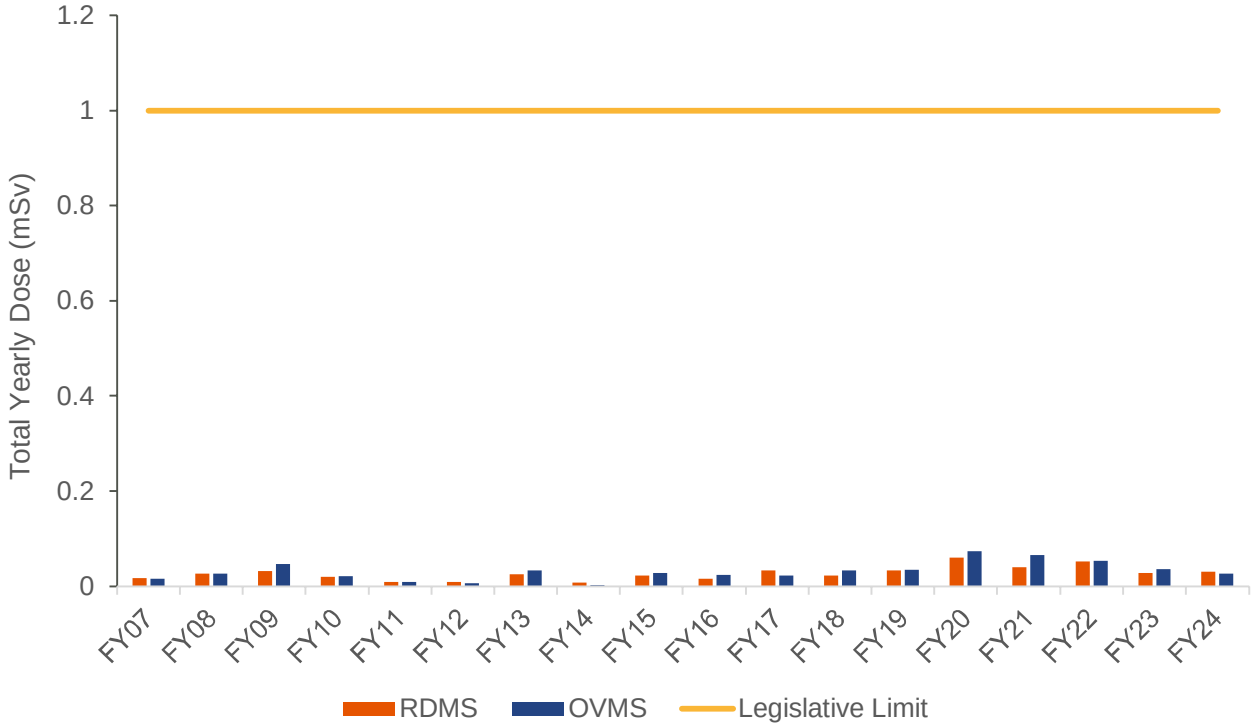


Figure 56: Annual total effective dose trends for RDMS and OVMS

3.3.5 Deliverables (ER 3.3)

Records from passive dust deposition monitoring sites and comparison with the annual compliance rate of 25 Bq/m^2/y of project originated ^{238}U at the NHB monitoring sites.

Assessment of the impacts to reference plants and animals (ARPANSA 2010) for the appropriate ERICA Tier level, including as necessary comparison of the results with the reference level of 10 µGy/h.

Dust Deposition

Passive dust monitoring data for FY24 indicated an average project-originated (after background subtraction) ^{238}U deposition rate of 1.58 becquerels per square metre per year (Bq/m^2/yr). Passive dust (PD) monitoring sites PD1, PD4, PD8 and PD13 were used for this assessment (Figure 57), with site PD14 used as the background site. The results, shown in Table 32, are well below the criterion of 25 Bq/m^2/yr.

Table 32: FY24 Project originated dust and ^{238}U deposition

Location	Project Originated Total Dust Deposition* (g/m^2/y)	Project Originated 238U Deposition* (Bq/m^2/y)	Compliance Criteria (Bq/m^2/y)
PD1	8.85	3.83	25
PD4	6.03	1.65	25
PD8	-	0.48	25
PD13	7.25	0.34	25

**Cells left blank indicate that the result was less than background measurement.*

Dose Rate Reference Level

The ERICA software tool (v1.3.1.51) was used to assess the significance of measured radionuclide dust deposition data, with a Tier 2 analysis conducted for all default terrestrial organisms. Table 33 shows the results of the ERICA analysis. It can be seen that dose rates for all organisms are less than 10% of the reference dose level of 10 micrograys per hour (µGy/h). The risk quotient is a unit-less measure that compares the calculated NHB dose rate with the reference dose level.

Table 33: FY24 ERICA screening dose level and risk quotients

Organism	Total Dose Rate (µGy/h)	Reference Level (µGy/h)	Risk Quotient
Bird	0.0055	10	0.00055
Grasses and herbs	0.0637	10	0.00637
Mammal - small-burrowing	0.0128	10	0.00128
Mammal - large	0.0124	10	0.00124
Reptile	0.0158	10	0.00158
Shrub	0.0718	10	0.00718
Tree	0.00784	10	0.000784
Lichen and bryophytes	0.391	10	0.0391

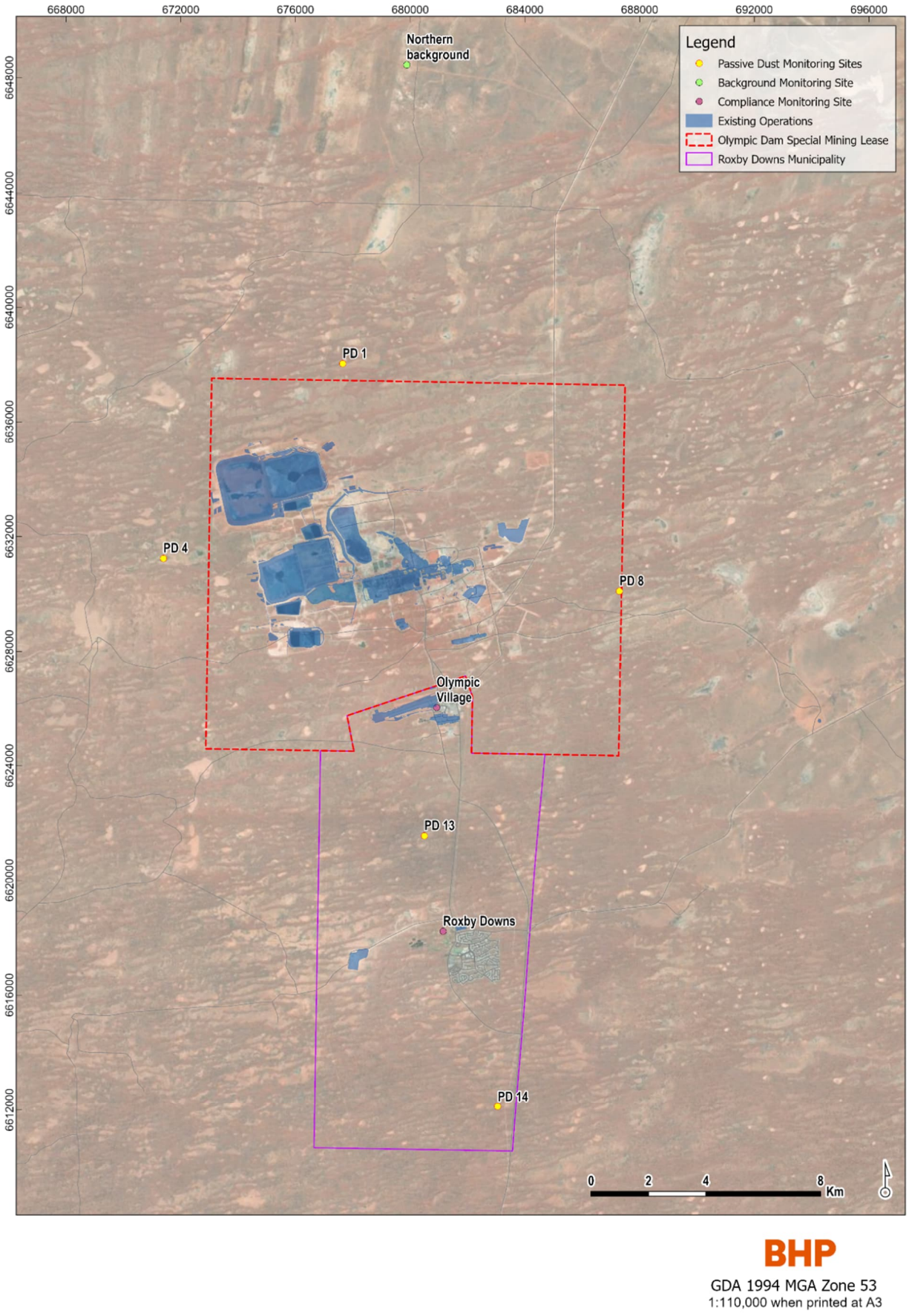


Figure 57: Location of dust deposition monitoring sites

3.3.6 Deliverables (ER 3.4)

A database of radionuclide concentrations in the environment over the long-term.

A database of radionuclide concentrations has been maintained since 2005. Figure 51, Figure 52, Figure 53, Figure 54, and Figure 55 show the monthly trends of radionuclide concentration at the RDMS and OVMS.

3.3.7 Targets FY24

Maintain radiation doses as low as reasonably achievable, as assessed through the annual Radiation Management Plan Review.

The results of the monitoring program have shown operational contributions to radiation dose for members of public to be extremely low, being less than 10% of the public dose limit of 1mSv/yr.

3.3.8 Actions FY24

None applicable.

3.3.9 Continuous Improvement Opportunities FY24

International and national standards, guidance and codes are subject to change from time to time, to ensure effective protection of humans and the environment from the harmful effects of radiation. Any new recommendations or revisions should be reviewed and implemented as necessary.

Opportunity: Maintain a watching brief on ICRP and IAEA recommendations and any new or revised national Codes and implement as necessary.

Opportunity: Consider impacts of potential changes to ICRP recommended dose conversion factors for radon decay products and implement as required.

Opportunity: Consider impacts of potential changes to ICRP recommended internal dose coefficients and implement as required.

Opportunity: Develop an updated method of calculation of operationally sourced radionuclides in the environment now that sufficient historic data has been collected.

None applicable.

3.4 Greenhouse Gas Emissions

3.4.1 Environmental Outcome

Contribute to stabilising global atmospheric greenhouse gas concentrations to minimise environmental impacts associated with climate change.

BHP's climate change strategy focuses on reducing its operational greenhouse gas (GHG) emissions, investing in low emissions technologies, seeking to support our suppliers and customers to decarbonise to address Scope 3 emissions in its value chain, managing climate-related risk and opportunity, and working with others to enhance the global policy and market response. As a BHP group asset, ODC operates under the BHP group climate change strategy.

3.4.2 Compliance Criteria

Progress on GHG and energy reduction and abatement opportunities that contribute to BHP strategy and response to climate change, and OD's contribution to that strategy, reported annually (EG 3.2).

In 2020, BHP set a medium-term target to reduce operational GHG emissions (Scopes 1 and 2 emissions from its operated assets) by at least 30% from FY2020 levels by FY2030. This FY2030 target was informed by the Pathways to Net Zero (P2NZ) project, which was established to understand opportunities to achieve and maintain net zero operational emissions by 2050. The P2NZ project identified a range of options for decarbonisation of BHP's operated assets. The key areas of focus are renewable electricity, low to zero GHG emissions material movement (e.g., reducing and, where possible, displacing diesel use in mining vehicles and equipment) and reducing hard-to-abate operational GHG emissions. ODC is focusing on decarbonising its electricity supply by FY2030 to help enable BHP to meet this target and prepare for future electrification and decarbonisation of our mining vehicles and equipment. See Section 3.4.4 for a discussion of GHG emissions reduction opportunities and achievements at OD.

3.4.3 Leading Indicators

None applicable.

3.4.4 Deliverables (EG 3.1)

Calculation of the site-wide Scope 1 and Scope 2 GHG emissions, expressed as kilotonnes of carbon (dioxide) equivalent (kt CO_2-e).

Calculation of the site-wide GHG emission intensities, expressed as carbon (dioxide) equivalent intensity (kg CO_2-e/t ore milled).

Scopes 1 and 2 GHG emissions were calculated using the National Greenhouse and Energy Reporting (NGER) guidelines and emissions intensity was calculated and reported internally within BHP, in line with monthly corporate reporting requirements. For Scope 2, two reporting methods have been used based on the GHG Protocol Scope 2 Guidance (Scope 2 Guidance) (BHP 2024c):

- Market-based reporting: Scope 2 emissions based on the generator(s) supplying the electricity (and therefore the generation fuel mix from which the reporter contractually purchases electricity and/or is directly provided electricity via a direct line transfer).
- Location-based reporting: Scope 2 emissions based on average energy generation emission factors for defined geographic locations, including local, subnational, or national boundaries (i.e., grid factors). In the case of a direct line transfer, the location-based GHG emissions are equivalent to the market-based GHG emissions.

For market-based reporting, electricity emission factors are sourced directly from the supplier where available, as evidenced by Renewable Energy Certificates (RECs) and/or supplier-provided documentation in line with the Scope 2 Guidance, unless otherwise specified. Where supplier-specific factors are not available, a default location-based emission factor for electricity is used instead, as published in local regulations or industry frameworks.

The calculated GHG market-based emission intensity in FY24 was 45.3 kg $CO_{2\text{-}e}$/t ore milled, compared to 48.1 kg $CO_{2\text{-}e}$/t ore milled in FY23 (Table 34). The lower intensity is the result of the surrender of large-scale generation

certificates (LGCs) associated with a renewable energy Power Purchase Agreement (PPA) reflecting arrangements with Iberdrola that commenced from FY23 and was in effect during FY24.

Increased Scope 1 emissions (Table 34) are due to a record production of copper at OD and increased mill throughput in FY24 and the processing of 5,000 t of copper concentrate imported from Carrapateena and 23,738 t of copper concentrate imported from Prominent Hill.

For FY23, the market-based and location-based reporting values for Scope 2 were identical, noting that no LGCs were surrendered with respect to the FY23 reporting period.

Table 34: GHG emissions and intensity

	Total emissions (kt CO_2-e)	Scope 1 (kt CO_2-e)	Scope 2 (kt CO_2-e)	GHG intensity (kg CO_2-e/t ore milled)
FY24 (location-based)	533	244	288	49.2
FY24 (market- based)	490	244	246	45.3
FY23 (location-based & market-based)	502	221*	281	48.1

*Numbers have been rounded to the nearest kt. *FY23 data includes 3 kt of Scope 1 emissions from Oak Dam exploration; Oak Dam emissions have been removed from the emissions report for FY24. For FY24, the Scope 1 emissions associated with Oak Dam were 6 kt.*

An annual report on BHP initiatives and progress on GHG and energy reduction and abatement opportunities that contribute to BHP strategy and response to climate change, and OD's contribution to that strategy.

The BHP Annual Report 2024 (BHP 2024b) and BHP Environmental, Social and Governance (ESG) Standards and Databook 2024 (BHP 2024c) report on BHP's progress against its long-term goal to achieve net zero operational GHG emissions by 2050, its medium-term target to reduce operational GHG emissions by at least 30% by FY2030 against a FY2020 baseline, and provide additional GHG emissions and energy consumption data.

Due to the significant contribution of grid electricity to the OD operational GHG emissions profile, the focus of the operational decarbonisation plan in the near to medium-term for OD is on the transition to renewable energy. Diesel displacement and options to further reduce, and ideally eliminate, remaining GHG emissions will be regularly reviewed to leverage technological maturity and market readiness.

In FY23, BHP signed a large-scale renewable PPA with Neoen for the supply of 70 megawatts (MW) of electricity from FY2026. The PPA is supporting the construction of the 203 MW Goyder 1b Wind Farm, which will form part of the larger Goyder Renewables Zone in South Australia. In addition, a large-scale battery energy storage system in Blyth, South Australia will support the PPA and assist in improving the stability of the South Australian electricity grid. This PPA builds on the arrangements put in place in FY22 with Iberdrola that commenced in FY23 and include supply from the Port August Renewable Energy Park in South Australia.

ODC will continue to explore commercial opportunities to accelerate the move toward 100% renewable energy. During FY24, ODC continued a 12-month trial of a fully electric jumbo in collaboration with Epiroc.

3.4.5 Targets FY24

None applicable.

3.4.6 Actions FY24

None applicable.

3.4.7 Continuous Improvement Opportunities FY24

Continue to identify and implement energy efficiency projects for the existing operation to support Asset-level GHG reductions.

ODC has continued to operate an energy use improvement capture process to identify energy reduction or efficiency improvements across OD. These are captured as Retailer Energy Productivity Scheme (REPS) activities, which are

tracked through the project delivery lifecycle and provide evidence of the energy savings. ODC also aims to establish a system and pipeline of ideas that will lead to future REPS projects and improvement initiatives.

In FY24, ODC's REPS team evaluated a number of projects, some of which will enter the project pipeline and be submitted to government via the retailer at the appropriate time.

4. GENERATION OF INDUSTRIAL WASTE

4.1 Embankment Stability of TSF

4.1.1 Environmental Outcome

No significant TSF embankment failure.

During FY24 the TSFs were managed in accordance with the TRS Operation, Maintenance and Surveillance Manual (BHP Olympic Dam 2024a) and the Tailings Retention System Management Plan (BHP Olympic Dam 2022a) and no embankment failures occurred.

4.1.2 Compliance Criteria

No significant radioactive contamination arising from uncontrolled loss of radioactive material as a result of an embankment failure to the natural environment (ER 3.4, WA 3.1).

Note: Any embankment failure that leads to a reportable spill under the Bachmann Criteria will be considered significant. Significant is defined as requiring assessment and remedial action in accordance with NEPM (Assessment of Site Contamination) 1999 or SA Environment Protection (Water Quality) Policy 2015 and the Mining Code. Measurement and monitoring is carried out in response to a specific event.

No uncontrolled loss of radioactive material to the natural environment because of an embankment failure occurred during FY24. To manage the risk of embankment failure, the rate of rise of tailings was maintained below 2 m per annum and the supernatant pond area was maintained below the target set for this purpose.

4.1.3 Leading Indicators

Indications that the rate of rise of tailings will exceed an average of 2 m per annum.

The rate of rise of tailings has been limited to 2 m per annum or less for all cells to ensure consolidation of tailings material. During the reporting period, tailings were distributed to TSF cells 5 and 6.

TSF 5 had average rates of rise of the perimeter tailings beach of 0.93 m. TSF 6 continued to undergo commissioning and early operation during FY24 with an average rate of rise of the perimeter beach of 1.35 m.

Indications that the rate of rise of pore pressures within or adjacent to the TSF embankment will exceed the rate of rise of tailings.

Assessing pore pressure against the rate of rise provides an indication of whether excess pore pressures are developing in the embankment. The rise in phreatic levels at Vibrating Wire Piezometer (VWP) locations (Figure 58, Figure 59, and Figure 60) FY24 is less than or equal to the average rate of rise in tailings.

Indications that the maximum supernatant pond area of individual TSF cells will exceed 15 ha for TSF1, 23 ha for TSF2/3, 90 ha for TSF4, 135 ha for TSF5 and 135 ha for TSF6.

Note: Each TSF has been assigned a maximum supernatant pond size which is calculated using critical operating parameters, surface contours and an allowance for significant rainfall events. Operating beyond these ponds sizes may not result in embankment failure but are considered an appropriate leading indicator in which operational processes should be reviewed. The maximum supernatant pond area for TSF6 is based on TSF5 parameters and the determination of the final maximum supernatant pond area for TSF6 will be based on the actual beach slope and distance to embankment which is not expected to be known until several years post commissioning.

The supernatant ponds are visually checked daily, surveyed monthly and assessed quarterly using satellite imagery. During FY24 the recorded pond sizes were below the leading indicator specified sizes.

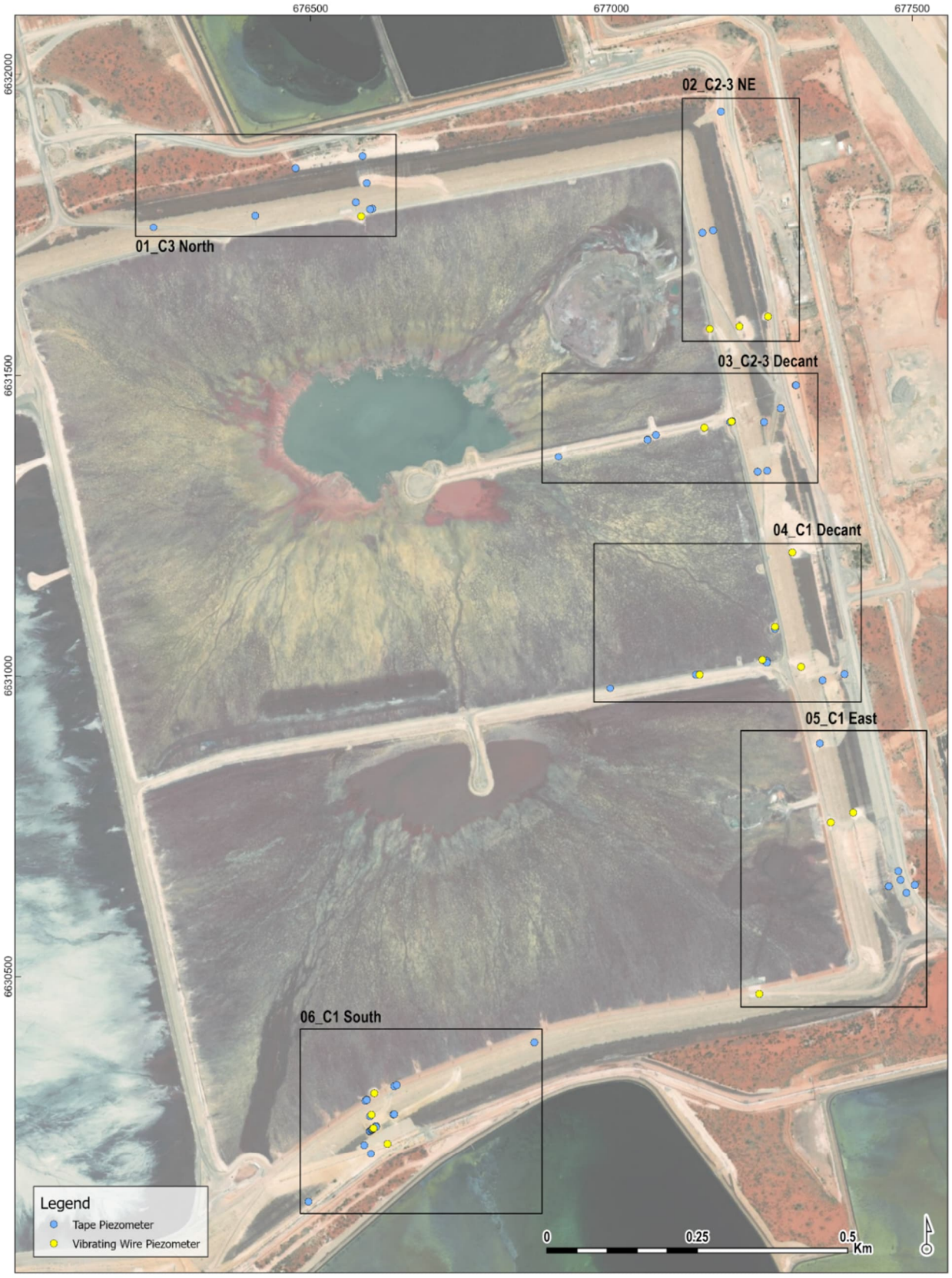


Figure 58: TSF 1-3 piezometer locations

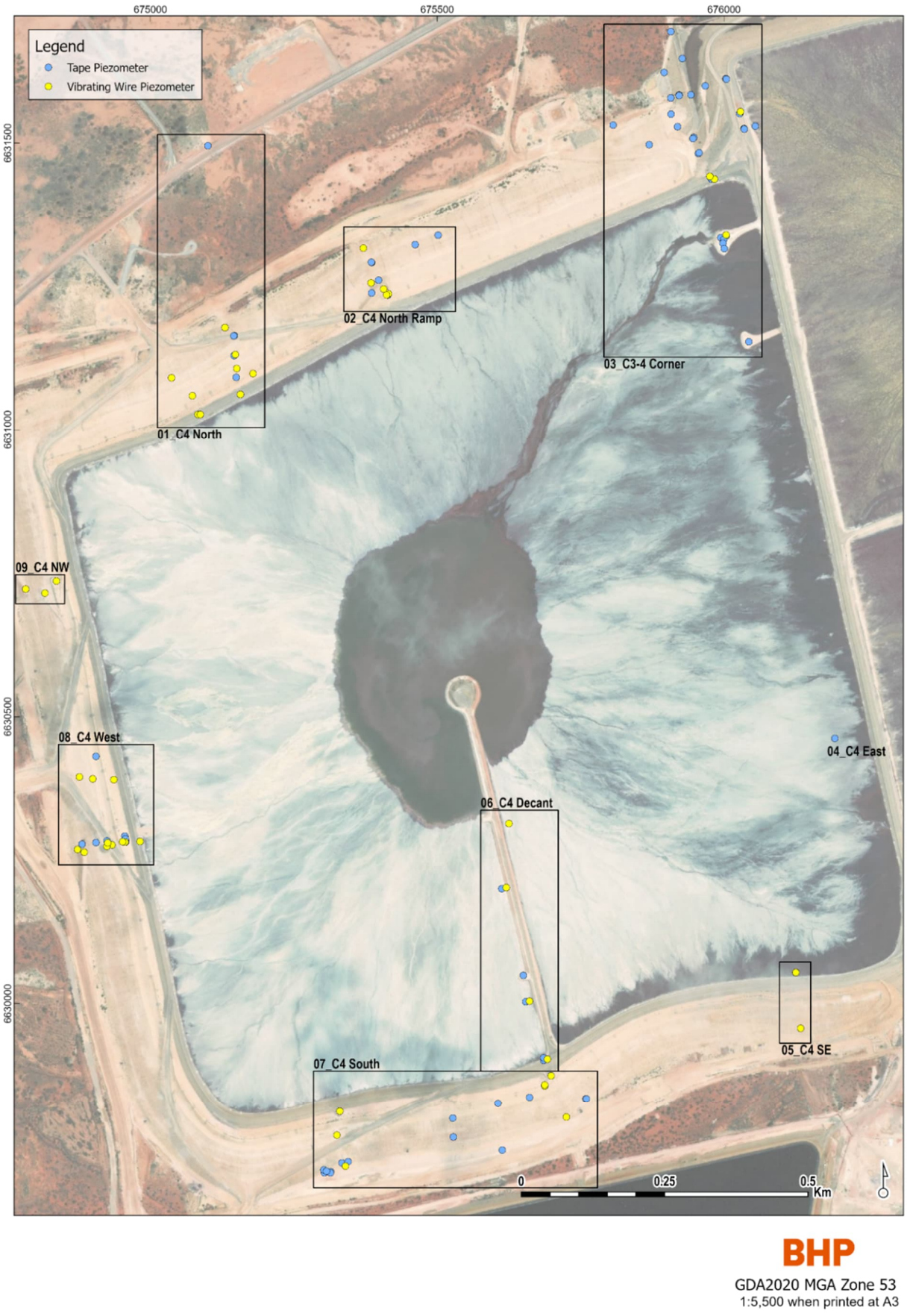


Figure 59: TSF4 piezometer locations

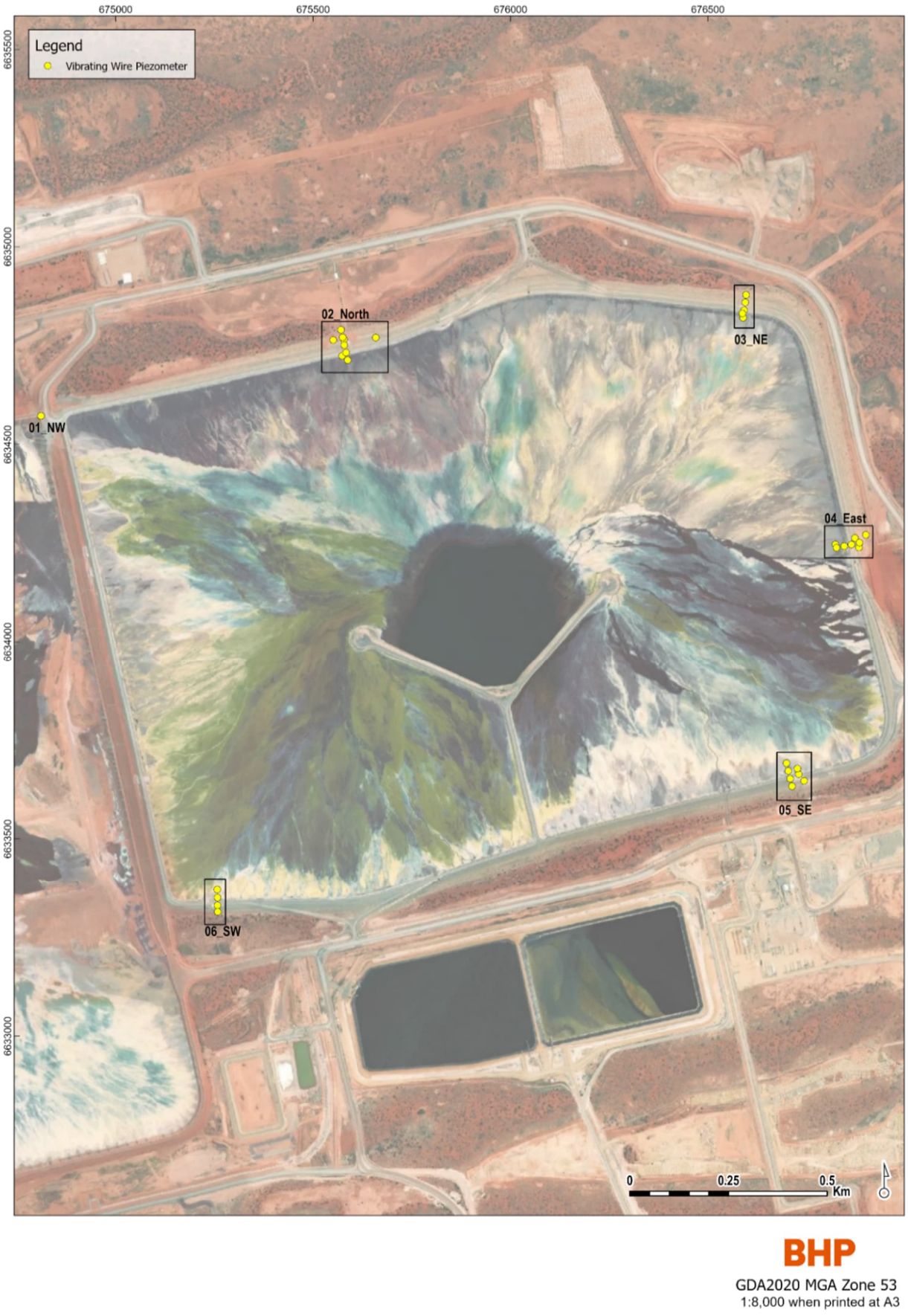


Figure 60: TSF5 piezometer locations

4.1.4 Deliverables (WA 3.1)

The tailings stored at the TSFs are defined as radioactive material as they contain uranium radioactive decay chain products with an activity level exceeding the 1 Becquerel per gram (Bq/g) limit that is referenced in the regulations under the *Radiation Protection and Control Act 2021*.

Monitoring of the TSFs, including rate of rise of tailings, supernatant pond areas and pore pressure all contribute to management of the TSFs to ensure no uncontrolled loss of radioactive material to the natural environment or significant embankment failure.

Monitoring data showing the size and location of the supernatant liquor ponds in each TSF cell on a monthly basis (EPA 1301.U-535).

Large supernatant liquor ponds have the potential to impact upon embankment stability by increasing the phreatic surface within the tailings and embankments, which in turn can lower the strength of the tailings and embankment materials. The combined TSF pond areas during FY24 are shown in Figure 61. The combined pond size was within the normal operating zone throughout the financial year.

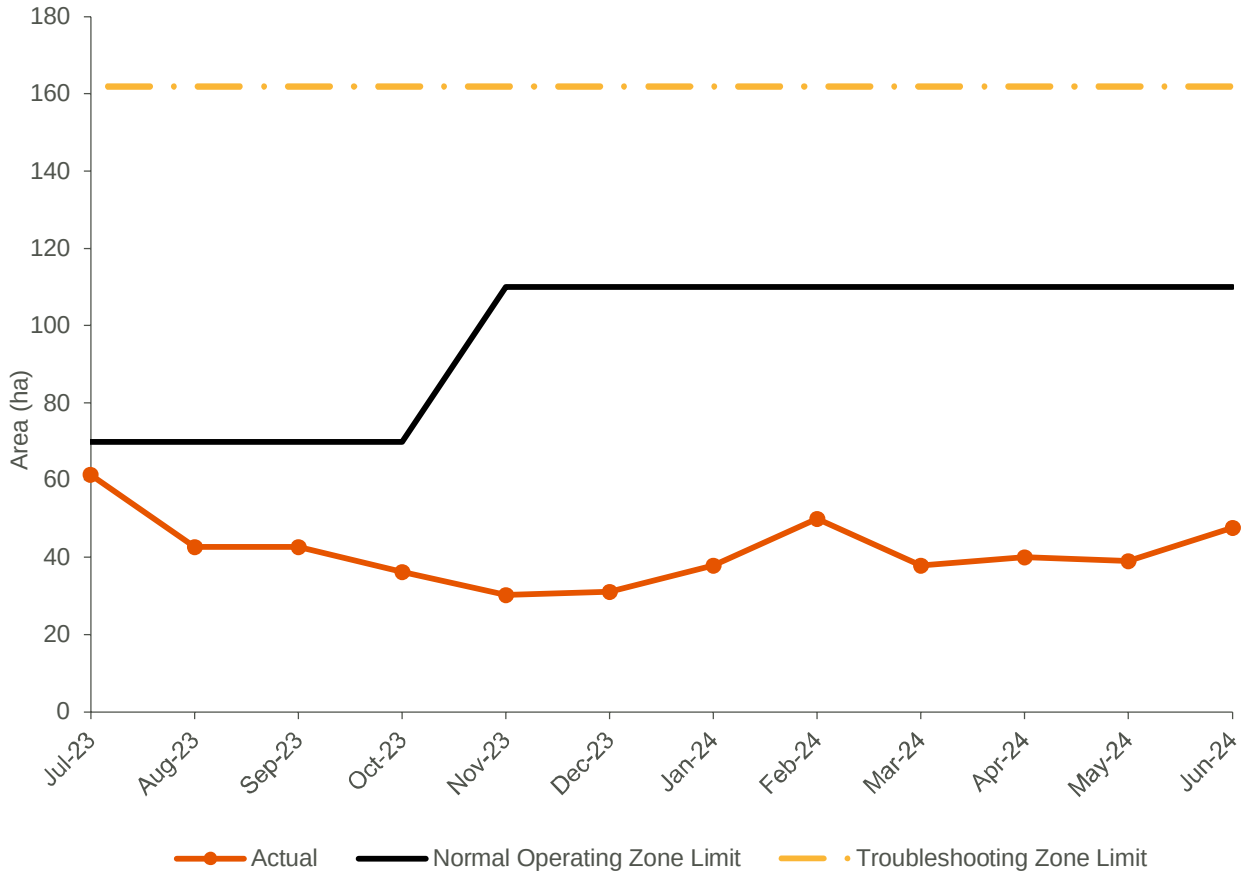


Figure 61: FY24 combined TSF pond size (ha)

In October 2023 BHP received approval from the EPA and DEM to temporarily increase the Normal Operating Zone pond size targets for TSF 5 and TSF 6 to 35 ha each, as a contingency for possible delays in the commissioning of EP7, which is due to be complete in Q4 2025. The Normal Operating Zone target will be returned to its normal level three months after EP7 is commissioned.

Monitoring data showing the rate of rise of tailings in each TSF cell.

At current processing rates approximately 9 - 10 million tonnes per annum (Mtpa) of tailings containing low levels of radioactivity are disposed of in the TSFs annually.

The rate of rise of tailings has been limited to 2 m per annum or less for all TSF cells to ensure consolidation of tailings material. Tailings were distributed to TSF cells 5 and 6 with an average rate of rise of the perimeter tailings beach of 0.93 m and 1.35 m per annum, respectively.

The elevation of tailings in the cells illustrated in Figure 62 gives an indication of the rate of rise of the perimeter tailings beaches.

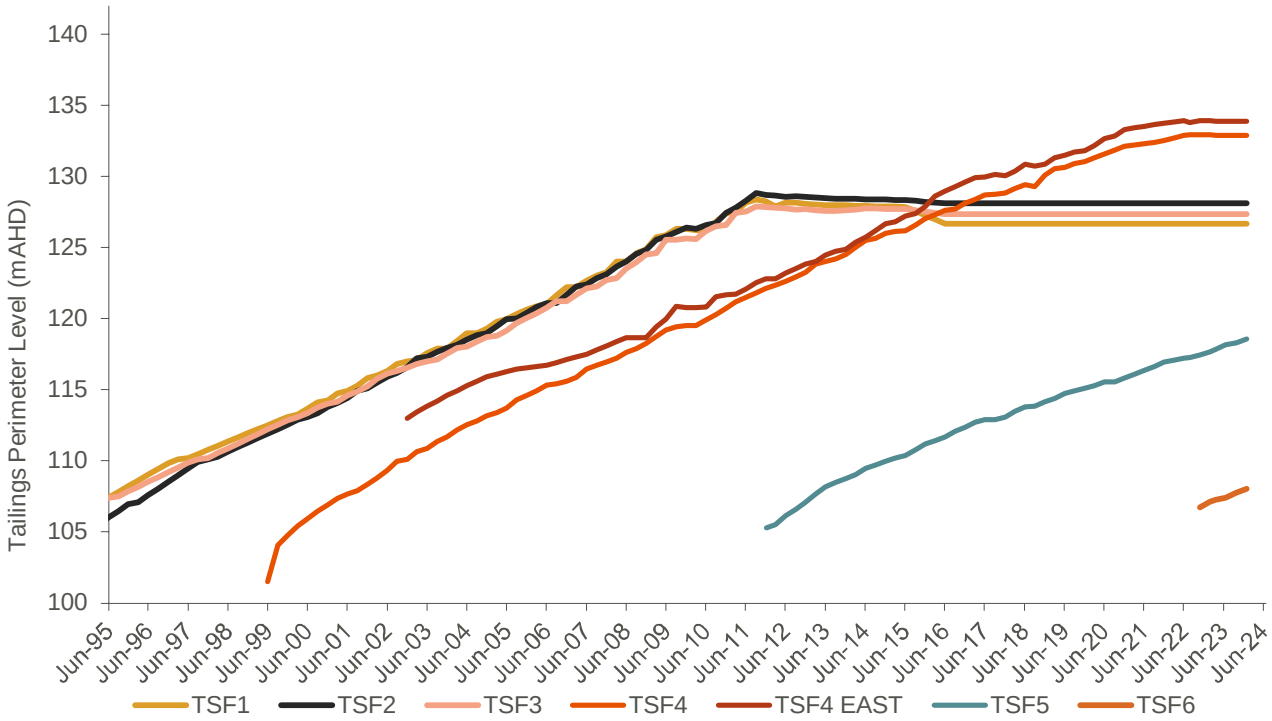


Figure 62: TSF rate of tailings rise

Monitoring data showing the pore pressures within tailings adjacent to the external walls of the TSF.

Piezometers are monitored on a 3-weekly basis to assess the pore pressures within the tailings adjacent to the embankments of the TSFs (refer to figures below for piezometer locations). Piezometers used include standpipe and VWPs. Most of the network is now fully automated, including trigger alarms for Critical Operating Parameters (COPs) for embankment stability.

The Australian National Committee on Large Dams (ANCOLD 2019) provides minimum Factors of Safety (FoS) for different loading conditions. Results of the biennial stability assessment undertaken in FY23 are presented in Table 35. All results are for the current height of the embankments, with each Section (outlined in the tables below) being a conservative representation of a portion of the TSF. Values below the ANCOLD threshold values are in italics.

During FY23 the Engineer of Record (EoR) updated the trigger levels for the phreatic pore pressures COPs (SRK 2023a, SRK 2023b). This included a review of the stability for current conditions. Following construction of the TSF5 buttress COPs were updated as reflected in Table 35.

Table 35: FY23 stability analysis results (SRK 2023a, SRK 2023b)

TSF Status	Wall Section	Peak FoS (min – 1.5)	Post peak FoS (min – 1.0)	Section
Active	TSF 5 North	1.92	>1	6
	TSF 5 East	1.82	>1	7
	TSF 5 Southeast	1.80	*<1*	*8*
	TSF 5 Southwest	2.06	*<1*	*15*
	TSF 5 Shared south	2.40	>1	16
	TSF 5 West	1.95	>1	17
	TSF 5 Northeast	1.72	>1	18
	TSF 6 West Wall	1.96	>1	19
	TSF 6 South Wall	2.58	>1	20
Inactive	TSF 1 East South	1.41	*<1*	*9*
	TSF 1 Southeast	1.62	*<1*	*14*
	TSF 2/3 East North	1.53	*<1*	*1*
	TSF 2/3 North	1.59	*<1*	*2*
	TSF 2/3 East South	1.5	*<1*	*10*
	TSF 4 Northwest	1.79	*<1*	*3*
	TSF 4 West North	1.69	*<1*	*4*
	TSF 4 Southwest	1.40	*<1*	*5*
	TSF 4 North	1.75	*<1*	*11*
	TSF 4 West Southwest	1.40	*<1*	*12*
	TSF 4 Southeast	1.53	*<1*	*13*

ANCOLD (2019) and the Global Industry Standard on Tailings Management (GISTM 2020) provide renewed guidance on the method for assessment of post peak (post-seismic or liquefied) tailings strengths. In particular, that the design should apply a conservative approach to stability assessment involving materials susceptible to static liquefaction by assuming that triggering (liquefaction) does occur (ANCOLD 2019). ANCOLD (2019) provides updated guidance to ANCOLD (2012) Section 6.1.6 – Acceptable Factors of Safety and Deformation. This outlines an advanced numerical methods approach to determine if deformations under various loading conditions are within acceptable limits to confirm that release of tailings is unlikely.

As a part of its commitment to TSF integrity, actions have been identified, planned and progressed by BHP as follows:

Post Peak Scenario:

- TSF 5 was buttressed to reinstate the post peak FoS in FY24.
- TSFs 1-3 have not been in operation since 2011. Hence, they are not being actively loaded, nor the phreatic levels recharged and they continue to be monitored in accordance with the ANCOLD guidelines. A closure cover trial is planned to commence in FY25. The performance of this cover trial will demonstrate the options for full closure that provide for long-term stability. These options will then progress to a detailed design stage. Following a suitable monitoring period, the full closure of TSFs 1-3 will be implemented.
- TSF 4 underwent an advanced numerical modelling assessment to confirm that release of tailings is unlikely. TSF 4 was determined to not require additional buttressing efforts for the post peak case and was approved by the EoR, Independent Technical Review Board and Accountable Executive in accordance with BHP's tailings governance requirements.

TSF 1-3:

- As shown in Figure 63 and Figure 64 piezometers located in the east, north and south walls and decants of TSFs 1-3 show a continued gradual pressure drop consistent with the cessation of tailings deposition in October 2011.

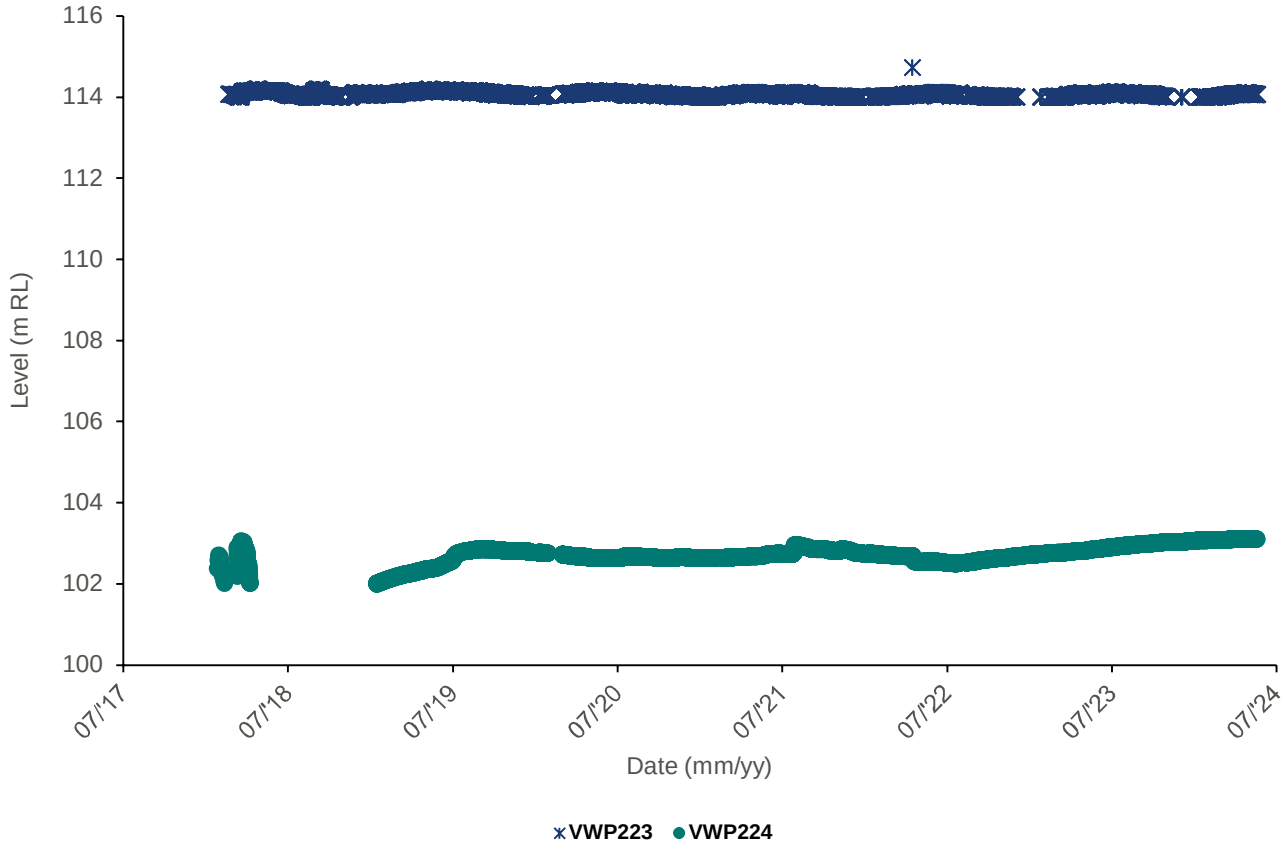


Figure 63: TSF 2/3 north wall VWPs (01_C3 North)

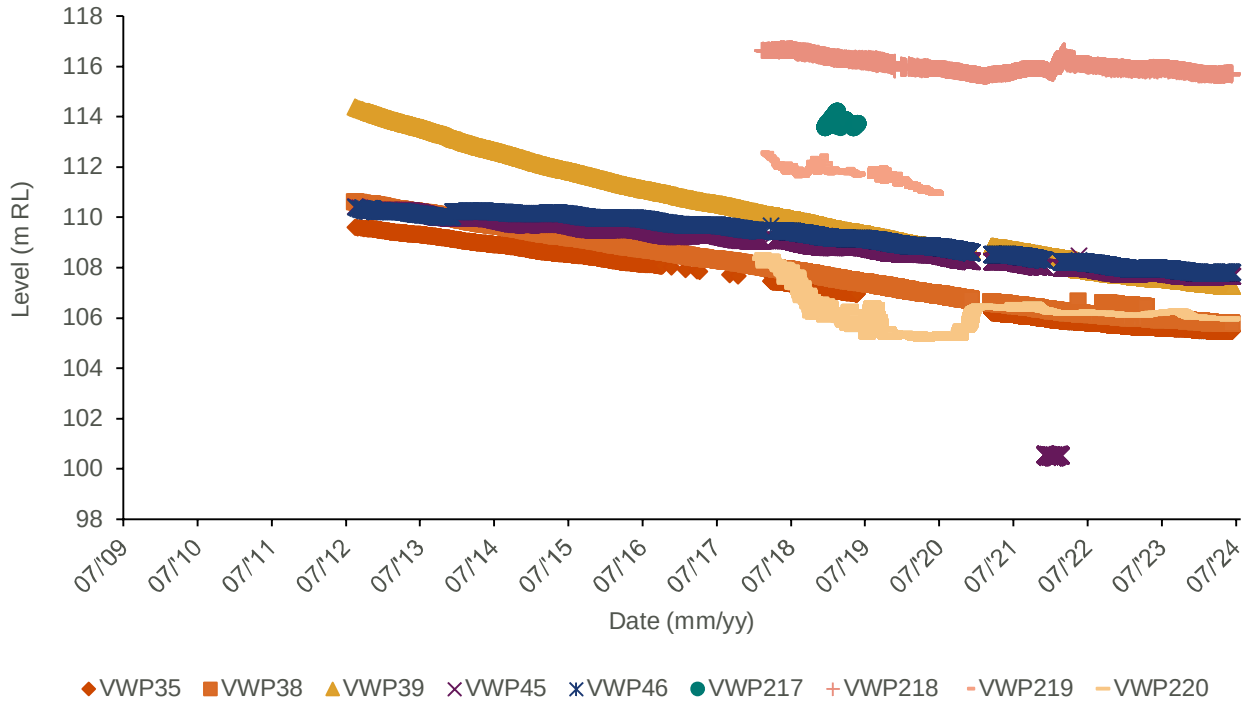


Figure 64: TSF 1 decant VWPs (04_C1 Decant)

TSF 4:

- Piezometers installed in the tailings and upper embankment of TSF 4 show levels have been largely constant over the reporting period. A gradual decrease trend can be seen in some of the VWP readings in Figure 65 and Figure 66 after December 2022, after tailings deposition ceased in this cell in October 2022.
- VWP311 (TSF 4 west wall) continued to show unrealistic trends which suggested equipment failure. Repairs conducted in May 2023 have resolved VWP311 and it is now reading normally.
- VWP201 (TSF 4 south wall) is located in between the saturated and the unsaturated zone in the tailings dam. When it is unsaturated, the pore water pressure is negative and the water elevation is below the installation level of the VWP, which is the reason for the data gaps. Further, this VWP sometimes reads very low frequency values which leads to high pressure value and low water elevation. BHP will either repair or decommission this VWP in FY25.

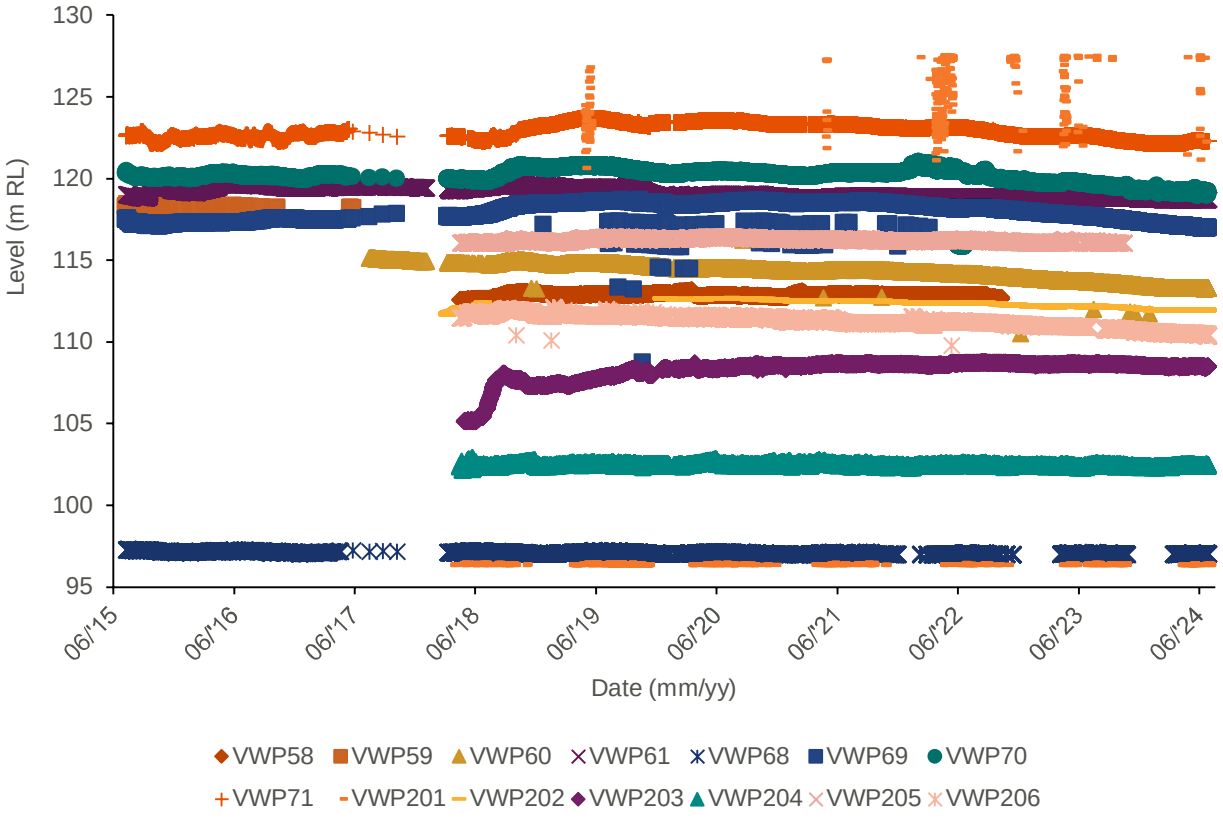


Figure 65: TSF 4 south wall VWPs (07_C4 South)

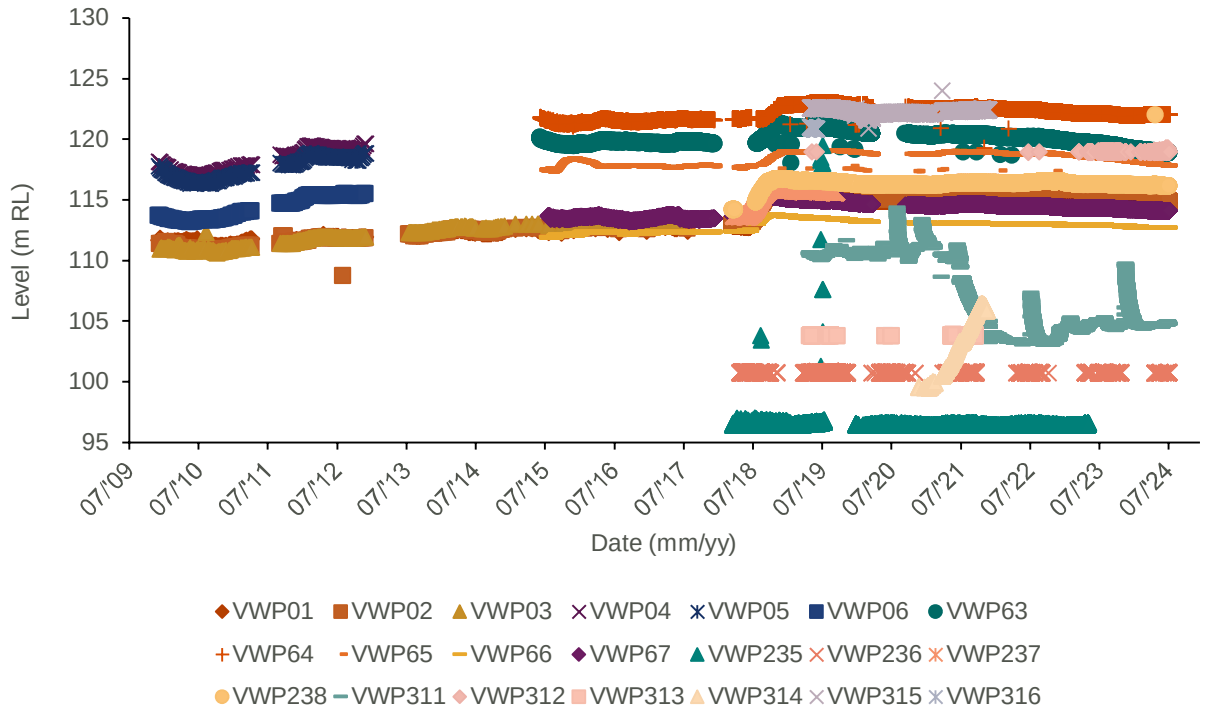


Figure 66: TSF 4 west wall VWPs (08_C4 West)

TSF5:

Piezometers installed in the tailings and upper embankment of TSF 5 show levels have been relatively constant over the reporting period, with minor fluctuations. A gradual increase can be discerned, which is as expected as tailings continue to be added in this TSF. For example, the variation of VWP readings along the TSF 5 north, north-east and south-east walls are shown in Figure 67, Figure 68 and Figure 69. VWP317A and VWP318A were installed during FY24 to replace the VWP317 and VWP318, which were damaged during buttress construction.

In FY24, during the buttress construction period, some of the VWPs exceeded the tailings rate of rise as expected due to the increased external loading. The EoR at the time, SRK Consulting, performed site supervision of the work and validated that the rate of change has not resulted in any negative impact to stability.

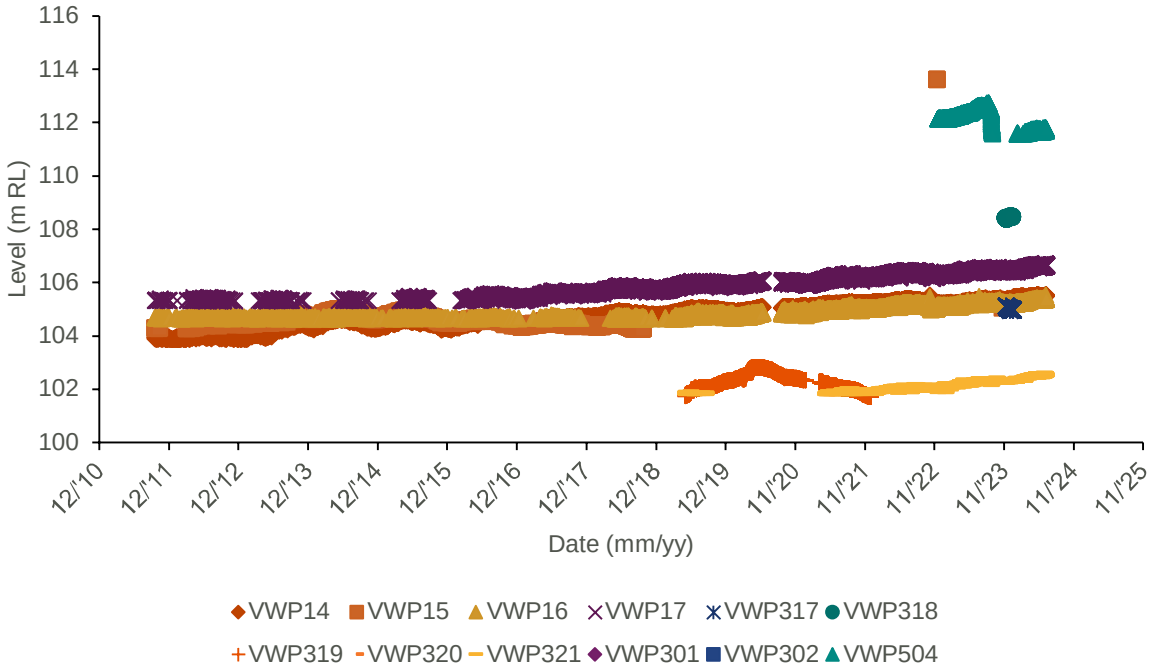


Figure 67: TSF 5 north wall VWPs (02_North)

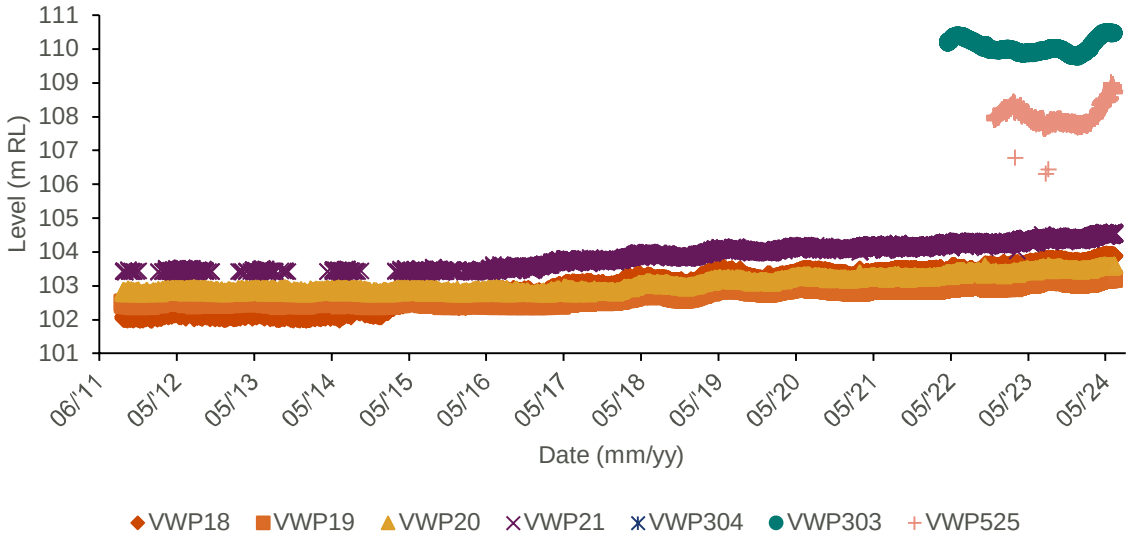


Figure 68: TSF 5 north-east wall VWPs (03_North-East)

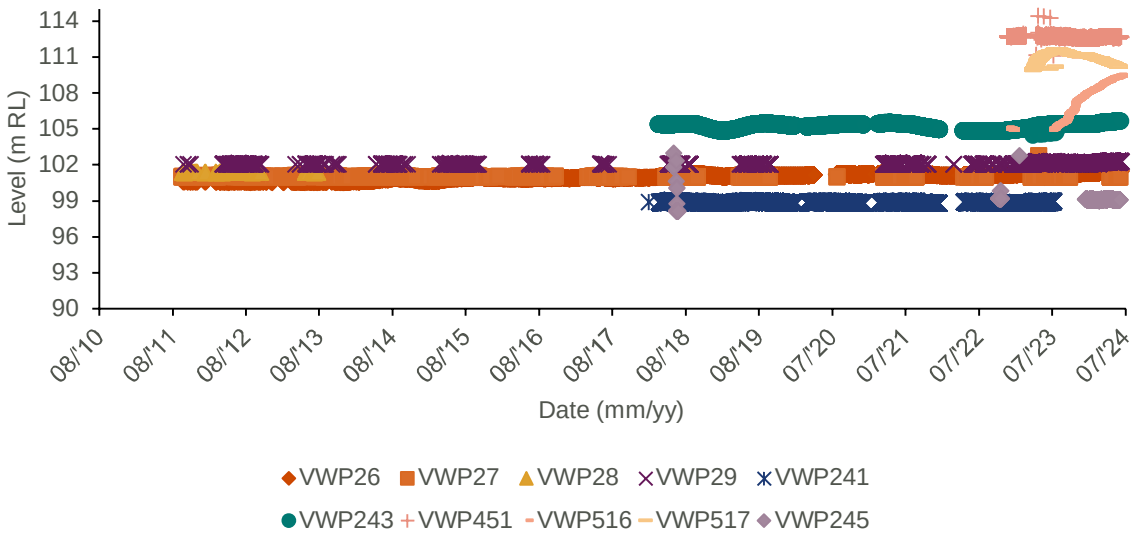


Figure 69: TSF 5 southeast wall VWPs (05_South-East)

During FY24, the TRS was reviewed by SRK, with one 6-monthly operational review covering May 2023 to October 2023. After transition of the EoR from SRK to WSP, WSP completed the second 6-monthly TRS inspection in May 2024, with the report still being finalised at the time of reporting. The annual comprehensive review covering the period July 2023 to June 2024 is scheduled to be conducted in August 2024. The reviews are carried out in accordance with BHP's Our Requirements for Tailings Storage Facilities, the Tailings and Water Storage Facilities Global Standard and the ANCOLD Guidelines referenced previously. All completed reviews have confirmed that the TRS, including the TSFs and EPs, are in good condition and are well managed.

A review of the water balance on an annual basis (EPA 1301.U-518).

See Section 4.2.

4.1.5 Targets FY24

None applicable.

4.1.6 Actions FY24

Undertake periodic (2-3 year) CPTu testing of tailings to confirm strength parameters used in stability analysis.

Cone penetrometer test (undrained) (CPTu) testing of all the TSFs was completed in FY23 with results incorporated in the FY23 biennial stability assessment (reported above) conducted by the EoR at the time (SRK Consulting).

4.1.7 Continuous Improvement Opportunities FY24

Several contingency options exist to maintain slope stability and reduce the risk of potential piping failures.

Opportunity: Identify, design and install contingency options as required.

Regular audits of the TRS operation are undertaken as described in the Waste MP.

Opportunity: Ensure improvement actions and recommendations from audits are documented and where appropriate implemented in a timely manner.

Contingency options, actions and recommendation from audits have been implemented as appropriate.

4.2 Tailings Seepage

4.2.1 Environmental Outcome

No significant adverse impact on vegetation as a result of seepage from the TSF.

No significant adverse impact to vegetation as a result of seepage from the TSFs has occurred. Eighty metres AHD (20 m below ground level) is considered as the level below which groundwater cannot interact with the root zone of plants in the OD region. Groundwater levels in the vicinity of the TSFs remain below 80 mAHD.

No compromise of current and future land uses on the SML or adjoining areas as a result of seepage from the TSF.

No compromise of current and future land uses on the SML or adjoining areas has occurred as a result of seepage from the TSFs. Groundwater levels in the vicinity of the TSFs remain below 80 mAHD and sampling indicates that seepage is being attenuated (see Section 1.2).

No compromise of the environmental values of groundwater outside the SML as a result of seepage from the TSF.

No compromise of the environmental values of groundwater outside the SML has occurred as a result of seepage from the TSFs. Sampling indicates that seepage is being attenuated within the SML, and groundwater levels of bores along the SML boundary are consistent with other regional bores. Seepage modelling confirms that there are no expected future offsite impacts.

4.2.2 Compliance Criteria

Maintain groundwater level (attributable to seepage from the TSF) outside the external perimeter road of TSF Cells 1 to 6 to not higher than 80 mAHD (20 m below ground level) (GW 3.2).

Groundwater monitoring results indicate that the groundwater level has not reached a level higher than 80 mAHD outside of the TSF and external perimeter road footprint for TSF cells 1 to 6 (refer to Figure 29 in Section 1.2). The maximum groundwater level recorded within the external perimeter road footprint for TSF cells 1 to 6 during the current reporting period was 69.5 mAHD at LT67A.

All TSF seepage attenuated within the SML, as demonstrated by a numerical geochemical model, confirmed by monitoring (GW 3.3).

Geochemical modelling was carried out for the Expansion EIS (BHP Billiton Olympic Dam 2009) and demonstrated that all TSF seepage would be attenuated within the SML. This modelling was updated in 2015 (SRK 2015) and again in 2020 (SRK 2020a) to account for the current mine configuration (underground only) and including the recently constructed TSF 6. Within the timeframe assessed (10,000 years), the modelling results indicate that no impacts on baseline groundwater quality at the mine lease boundary (SML) would be expected as travel times are predicted to be well beyond this timeframe and there is expected to be significant attenuation of pollutants within the SML.

Laboratory analysis of on-site and regional groundwater monitoring bores confirms the attenuation of TSF seepage within the SML. Samples from regional monitoring bores collected during FY24 contained analytical concentrations either below limits of reporting, or within concentrations previously reported (refer to Section 1.2).

4.2.3 Leading Indicators

A measurement of groundwater level outside the external perimeter road of the TSF that exceeds 70 mAHD (30 m below ground level) as a result of seepage.

The leading indicator value was not reached at any monitoring bore outside the external perimeter road of the TSFs during FY24. The maximum groundwater level recorded outside the external perimeter road of the TSFs for the current reporting period was 69.5 mAHD at LT67A.

The groundwater depth at bore LT67A has stabilised during FY24 at a level just below the Leading Indicator (70 mAHD) as shown in Section 1.2, Figure 29. Although there is still a possibility that the leading indicator will be

breached in FY25, based on current trends it is not expected to breach the compliance criteria. BHP has developed a shovel ready project (being the installation of bores to dewater the area in the vicinity of the elevated groundwater levels) that, if implemented, is expected to reverse the increasing groundwater level trend at this location well before the compliance criteria could be exceeded. Ongoing monthly monitoring of the groundwater level at this location will continue and trends will be analysed to determine if, and if so when, this project should be implemented.

A numerical geochemical model trend that indicates that all TSF seepage may not be attenuated within the SML should the trend continue (GW 2.3).

No geochemical seepage trend was noted during FY24. Laboratory analysis of on-site and regional groundwater monitoring bores, when combined with groundwater level data, confirms the validity of the 2015 and 2020 geochemical modelling findings (SRK 2015, SRK 2020a) that all TSF seepage would be attenuated within the SML.

4.2.4 Deliverables (WA 3.1)

A review of the water balance on an annual basis (EPA 1301.U-518).

Unaccounted liquor is the liquor balance inputs (refer to Figure 70 for FY24 inputs) minus the liquor balance outputs (refer to Figure 72 for FY24 outputs). For FY24 the input liquor volume for TSF cells 4, 5 and 6 was the same as the output liquor volume (9,374 ML), with contribution to inputs and outputs represented in Figure 70 and Figure 71.

The water balance for TSF cells 4, 5 and 6 indicates that disposal of liquor via evaporation is approximately 46.27% of the total inputs. This is lower than the FY23 value due to TSF 4 being inactive. The water balance also shows 6.17% of liquor input due to rainfall in FY24, which was slightly lower than the FY23 value.

Flushing liquor is liquor pumped out of the EPs to the TSFs for the purpose of flushing lines. In FY24 there was no significant liquor flush back from EPs to TSFs due to limited line blockages occurring.

Seepage from pond areas has been calculated based on the average supernatant pond areas for TSF cells 1 – 6 (40.26 ha) and using an assumed tailings permeability of $2x10^{-8}$ m/s.

Liquor retained in tailings was assumed to be 30% of the weight of tailings solids deposited. This was based on previous testing of in-situ tailings.

A discussion on groundwater levels in the vicinity of the TSFs in FY24 is provided in Section 1.2. Aquifer Level Drawdown.

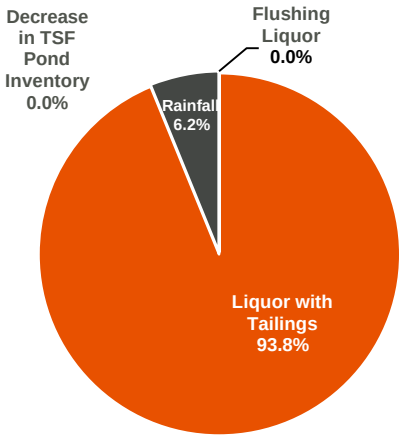


Figure 70: TSF Cells 4, 5, & 6 Liquor Balance – Inputs, FY24

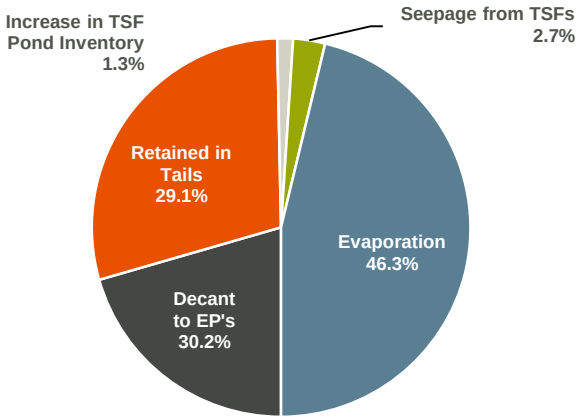


Figure 71: TSF Cells 4, 5, & 6 Liquor Balance – Outputs, FY24

4.2.5 Deliverables (WA 3.2)

Monitoring data showing the liquor level in each cell of the EPs.

Figure 72 shows the liquor levels in the EPs with respect to freeboard limits. Freeboard in the EPs consists of allowances for wind, waves and rainfall runoff. EP 1 and EP 2 were inactive during the reporting period due to being full of solids. In FY24, the EP 4A solid level reached the freeboard and hence become inactive. EP 5B remained out of service for the reporting period.

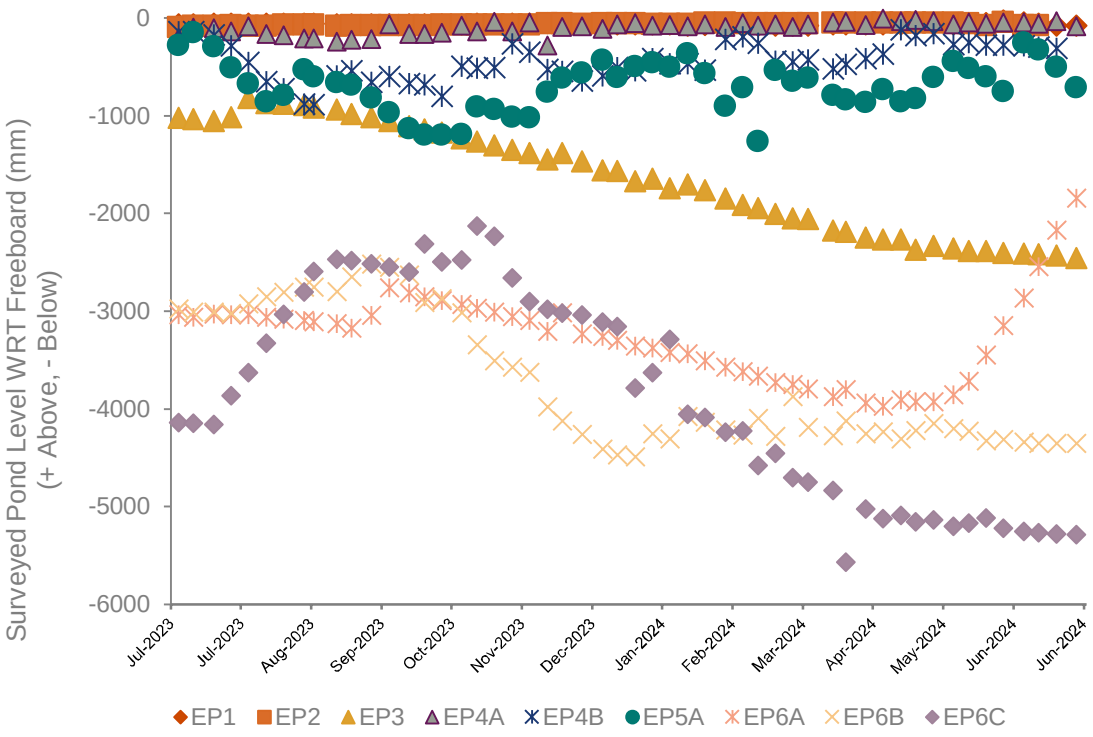


Figure 72: Evaporation pond liquor levels (note that the EP 1 trend line sits behind the EP 2 trend line)

Monitoring data showing the overall (solids and liquor) inventory in the EPs.

Figure 73 shows the EP capacity in relation to the normal maximum operational storage capacity. Additional pond capacity is available as a contingency to allow for large rainfall events.

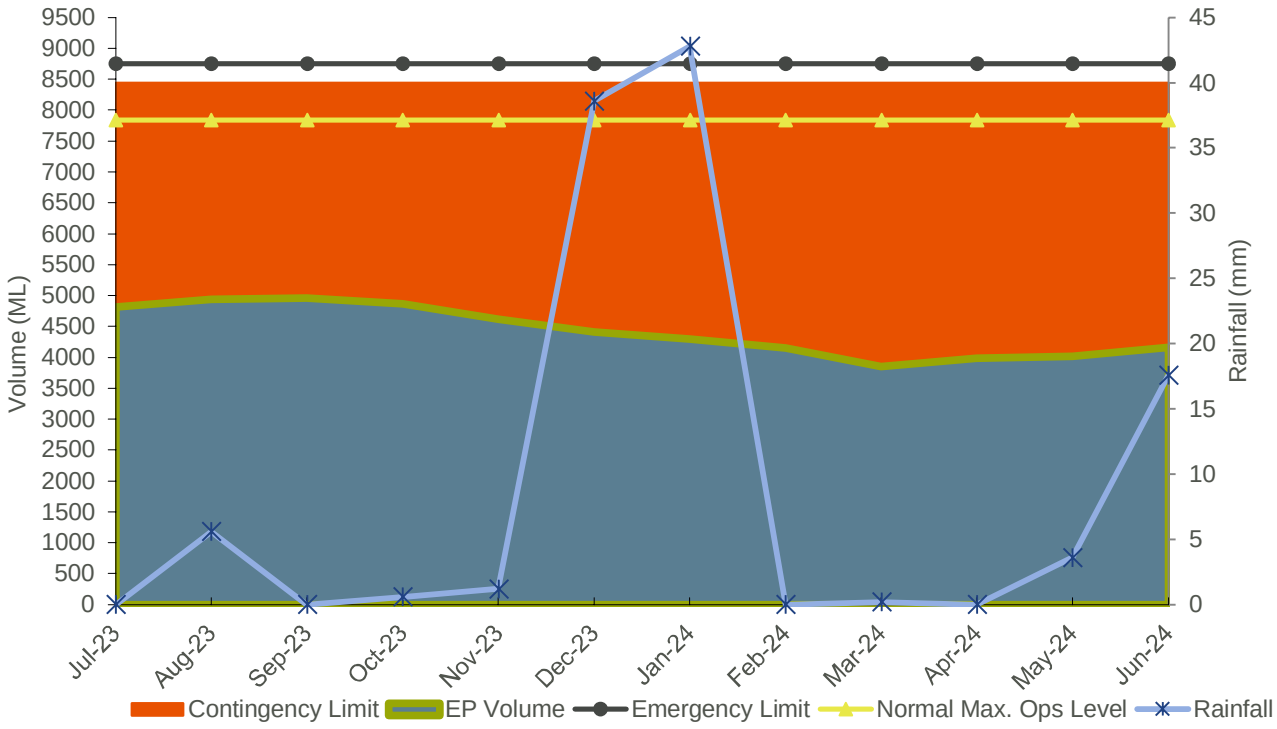


Figure 73: Evaporation pond capacity and rainfall

Results of a liquor balance for each EP cell.

Figure 74 shows the cumulative evaporation trends for the EPs. A liquor balance is performed to highlight cells with potential significant leaks by comparison of the apparent evaporation from each cell of each EP. The comparison is carried out on a monthly basis.

The evaporation response for each cell is broadly consistent, demonstrating that significant unexplained losses have not occurred. Variations between each pond can be attributed to usage, and the overall evaporation loss is consistent with previous years.

EP 4B showed the highest evaporation rate, which was very similar to other active ponds. EP 5A showed a lower value than FY23.

During the reporting period EP 2 was used infrequently for pipeline maintenance and EP 5B was out of service except for a short period in October 2023 when a shallow layer of liquor was added to facilitate a trial to demonstrate capability to dredge the precipitated solids that have built up in the pond.

Evaporation cells occasionally dry out when the free liquor is evaporated, exposing the surface of the precipitated solids built up in the cell. During these periods a liquor level is not able to be measured and the cumulative evaporation trends level out. Under these circumstances the water balance method is no longer effective in confirming cell integrity. However, as the cell is inactive there is minimal, if any, free liquor available and therefore very little potential for seepage from these cells.

Groundwater level data collected in and around the ponds is used as an additional control to detect seepage from the EPs (refer to Section 1.2) and to support the liquor balance calculations.

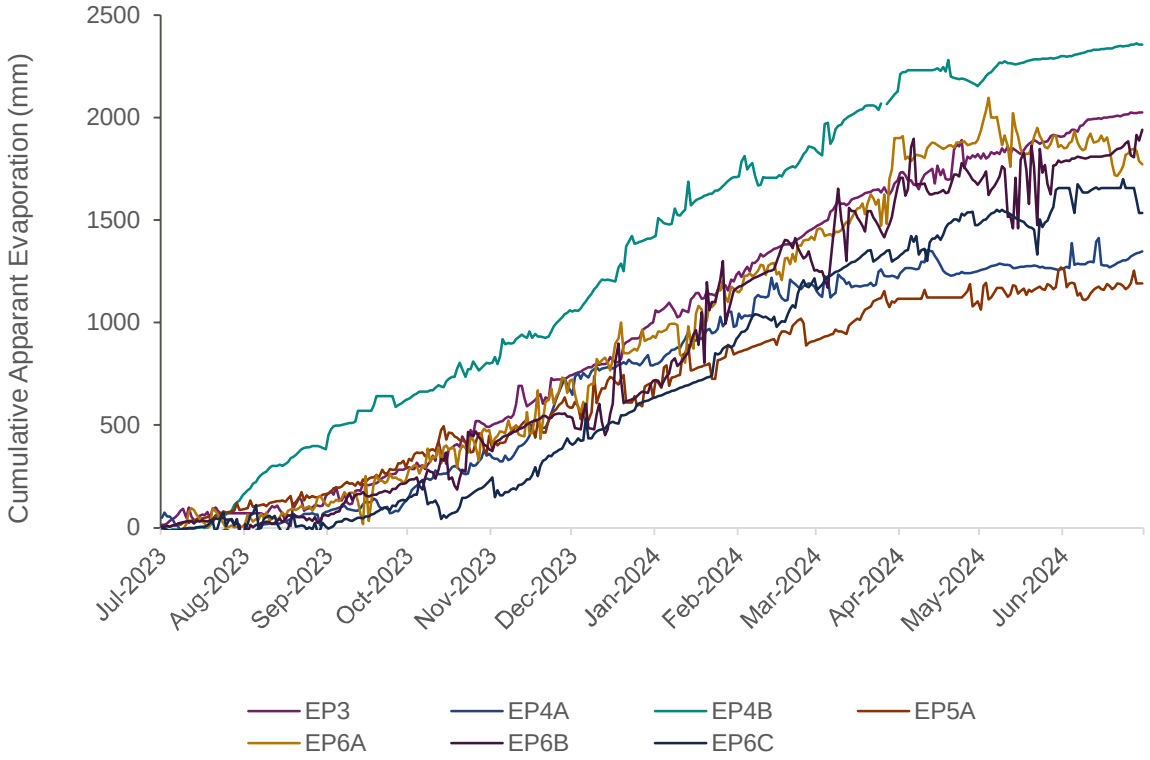


Figure 74: All evaporation pond liquor balance cumulative apparent evaporation

4.2.6 Targets FY24

None applicable.

4.2.7 Actions FY24

Identify and install additional liquor interception systems as required.

A summary of seepage locations is shown in Table 36 with spatial locations shown in Figure 75 and Figure 76. No new seepage areas were identified during the FY24 reporting period and the summary of seepage status remains the same as in FY23, depicted in Table 36.

Table 36: List of TSF monitored perimeter features

Identifier	Location	Discovery	Identifier
TSF Cell 1			
C1S-03	**South wall of TSF cell 1 on the embankment face**	**February 2008**	**Filter blanket installed over area. Area has become drier over the reporting period.**
C1E-14S	**East wall of TSF cell 1 at the toe and pipe corridor**	**2008**	**Interception drain, sump and pump is returning seepage to EP 2. Seepage flows show reduced trends to FY22 over the reporting period. Increase in flows following large rain event in October 2022.**
C1E-14N	**East wall of TSF cell 1 at the toe**	**2008**	**Interception drain, sump and pump is returning seepage to EP 2. Seepage flows show steady trends with FY22 over the reporting period.**
C1E-17, C1E-18	**Cell 1 crest of starter embankment and at toe**	**2009**	**Interception trench, sump and pump in place. Dampness remained similar to FY22 observations. Continued gradual decrease in seepage flows observed. C1E-18 area covered with buttress activities during FY22.**

TSF Cell 2			
C2E-01, C2E-02	**East wall of cell 2 at the embankment toe**	**2009**	**Interception trench, sump and pump in place. Some dampness noted. The flows have been largely constant to FY22 rates with pumps operating continuously.**
TSF Cell 3			
C3E-05 &06	**East wall of cell 3 at the embankment toe**	**October 2016**	**Filter blanket, drain and pump system installed. Flows fluctuate between 1-10 m^3 per day. Dampness remained consistent with FY22 observations.**
C3NE-07	**Northeast corner of cell 3**	**December 2010**	**Area has become dry.**
C3N-13	**North wall of TSF 3**	**September 2018**	**Area covered by mini buttress.**
C3N-15	**North wall of cell 3 at the embankment toe**	**August 2016**	**Area covered by mini buttress. Dampness evident at toe of mini buttress.**
C3/4CN - 22	**Intersection of TSF cell 3 and TSF cell 4 at toe**	**April 2008**	**Beneath cell 3-4 buttress. Flows into sump have stayed low over the reporting period, similar to previous years.**
TSF Cell 4			
C4N-09	**Eastern side of the north ramp of cell 4**	**November 2012**	**Flow has shown reduced trends.**
C4S-28	**South wall TSF 4 adjacent ramp**	**2006**	**Area covered by mini buttress construction with sand blanket installed.**
C4E-39	**Base of the TSF 4 east wall**	**June 2022**	**Damp area at base of TSF 4 south-east corner with no increase in dampness over the reporting period.**
C4NW-14	**North ramp TSF 4 west side**	**June 2022**	**Area slightly damp showing very minor signs of seepage.**
TSF Cell 5			
C5S–0 to 2	**South wall near western corner**	**June 2020**	**No increase in dampness, area disturbed with TSF 5 buttress and drain project.**
C5S-12 to 14	**South wall TSF 5 towards eastern corner**	**January 2018**	**No increase in dampness, area disturbed with TSF 5 buttress and drain project.**
C5E-28	**Eastern wall towards northern corner**	**June 2019**	**No increase in dampness, area disturbed with TSF 5 buttress and drain project.**
C5NE-31	**NE corner of TSF 5**	**July 2019**	**No increase in dampness, area disturbed with TSF 5 buttress and drain project.**
C5N-40	**North wall of TSF 5**	**April 2017**	**No increase in dampness, area disturbed with TSF 5 buttress and drain project.**

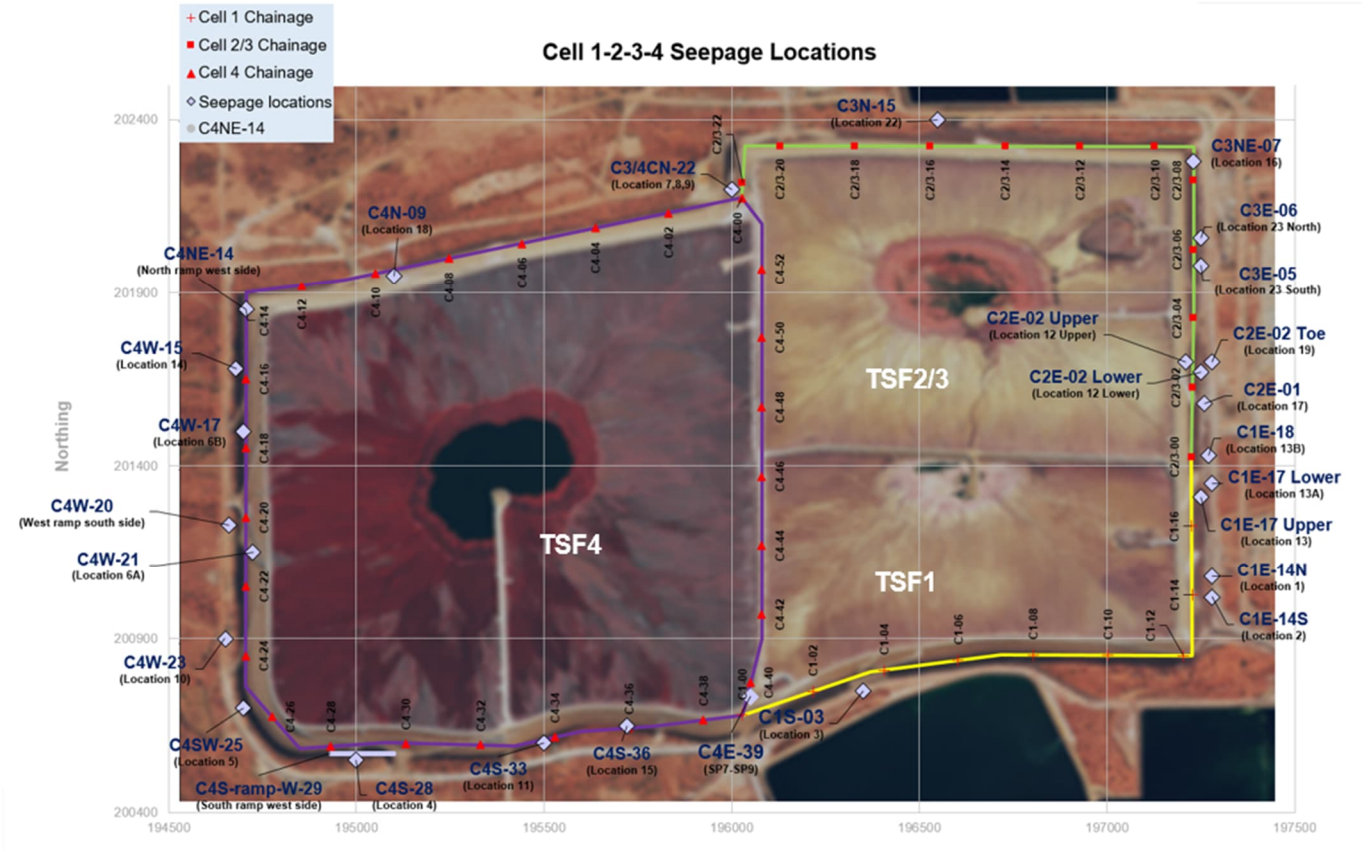


Figure 75: Location of perimeter features, cells 1, 2, 3 and 4

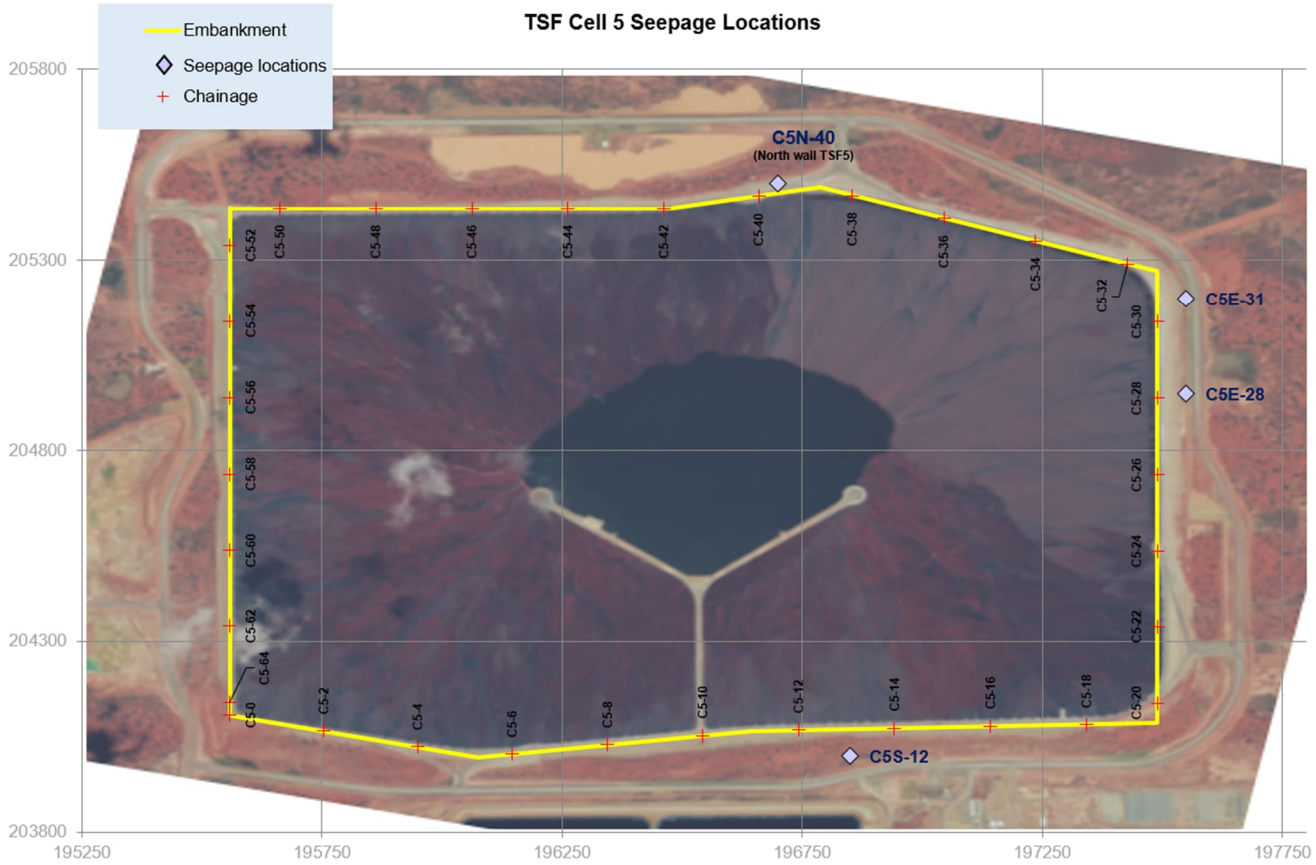


Figure 76: Location of perimeter features, cell 5

4.2.8 Continuous Improvement Opportunities FY24

Regular inspections around the perimeter of the TSF identify any new areas of lateral seepage. Existing perimeter features are also monitored to determine if there is any change in size, location and appearance.

Opportunity: Install a liquor interception system where seepage of liquor has potential to impact native vegetation.

Regular inspections around the perimeter of the TSFs have been caried out in accordance with standard operating procedures. Liquor interception systems have been installed as necessary to prevent potential impacts to native vegetation.

4.3 Fauna Interaction with Tailings Retention System

4.3.1 Environmental Outcome

No significant adverse impacts to listed species (South Australian, Commonwealth) as a result of interactions with the Olympic Dam TRS.

No significant adverse impacts to listed fauna species as a result of interactions with the OD Tailings TRS occurred in FY24.

The Banded Stilt (*Cladorhynchus leucocephalus*), which is listed as Vulnerable under the NPW Act, was observed interacting with the TRS during FY24 (n=63 alive and n=12 dead recorded). Banded Stilts were recorded alive and interacting with TRS on two separate occasions. A flock of n=62 was recorded in February 2024, across EP 6a, EP 4a, and TSF 5. The second record was one lone stilt later that same month. In South Australia, the largest flock of Banded Stilts recorded was 250,000 at the Coorong (Pedler 2017). Considering this flock size and the likely overall population size of the Banded Stilt, it is concluded no adverse impacts to a listed species have occurred as a result of interactions with the TRS.

The Australasian Darter (*Anhinga novahollandiae novahollandiae*) listed as Rare under the NPW Act was also observed at the TRS in FY24 (n=17 dead).

4.3.2 Compliance Criteria

No significant adverse impact on the size of an important population of Banded Stilt (*Cladorhynchus leucocephalus)* as a result of interactions with the Olympic Dam TRS (FA 3.7).

Note: Significant impact is as defined in the Significant Impact Guidelines and greater than predicted in the EIS.

The Banded Stilt, listed under the NPW Act was observed within the TRS during routine weekly monitoring undertaken by trained Environment personnel in FY24 (n=63 alive and n=12 dead recorded). TRS technicians opportunistically observed n=30 Banded Stilts on EP 5a the day before the Environment team recorded the n=62 alive banded stilts in February 2024.

4.3.3 Leading Indicators

None applicable.

4.3.4 Deliverables (FA 3.3)

An assessment of fauna activity and losses within the TRS.

An evaluation of the effectiveness of applicable control measures in reducing the number of listed migratory birds lost within the TRS.

During FY24, 48 different bird species and eight other animal species were observed during the weekly monitoring of the TRS. A total of 538 dead animals were observed throughout FY24. The most abundant dead bird species was the Little Black Cormorant *(Phalacrocorax sulcirostris*) with 61 recorded (Figure 77).

A total of 1,262 alive animals were observed during the financial year (Figure 77). The most abundant alive bird species was the Budgerigar *(Melopsittacus undulatus)* with a total of 445 individuals observed. All but two individuals were recorded as unimpaired and showing activities of sitting, standing and/or flying, with no interaction with the tailings liquor. The remaining two were found deceased on the banks of EP 6a and EP 3 in January and February, respectively.

The alive observations of common species including White-backed Swallows *(Cheramoeca leucosterna),* Nankeen Kestrels *(Falco cenchroides)* and Zebra Finches *(Taeniopygia castanotis),* was increasing before a sudden drop during the summer period. The Roxby Downs AQMS (supplemented with Olympic Dam Airport BOM data) recorded 107.8 mm across the financial year. This was less than FY23, with 349.07 mm. Rain was not recorded in July, September, February and April, and as such much of the region's standing water dried between rainfall. Bird activity appeared to increase during or after rainfall events during FY24 (Figure 77). The relationship between

rainfall and bird activity has historically showed a lag after rainfall or shows a closer pattern with the filling of inland lakes such as the Lake Eyre-Kati Thanda basin.

Overall, there has been an increase in alive and dead birds observed at the TRS from FY13 to FY24 as shown in Figure 78 (alive: $F_{1,48} = 7.99$, $p = 0.069$; $R^2 = 0.148$; dead: $F_{1,48} = 1.33$, $p = 0.254$; $R^2 = 0.03$). The variability in the numbers observed is most likely explained by environmental factors, such as rainfall.

Opportunistic observations recorded by TRS technicians is presented in Figure 79.

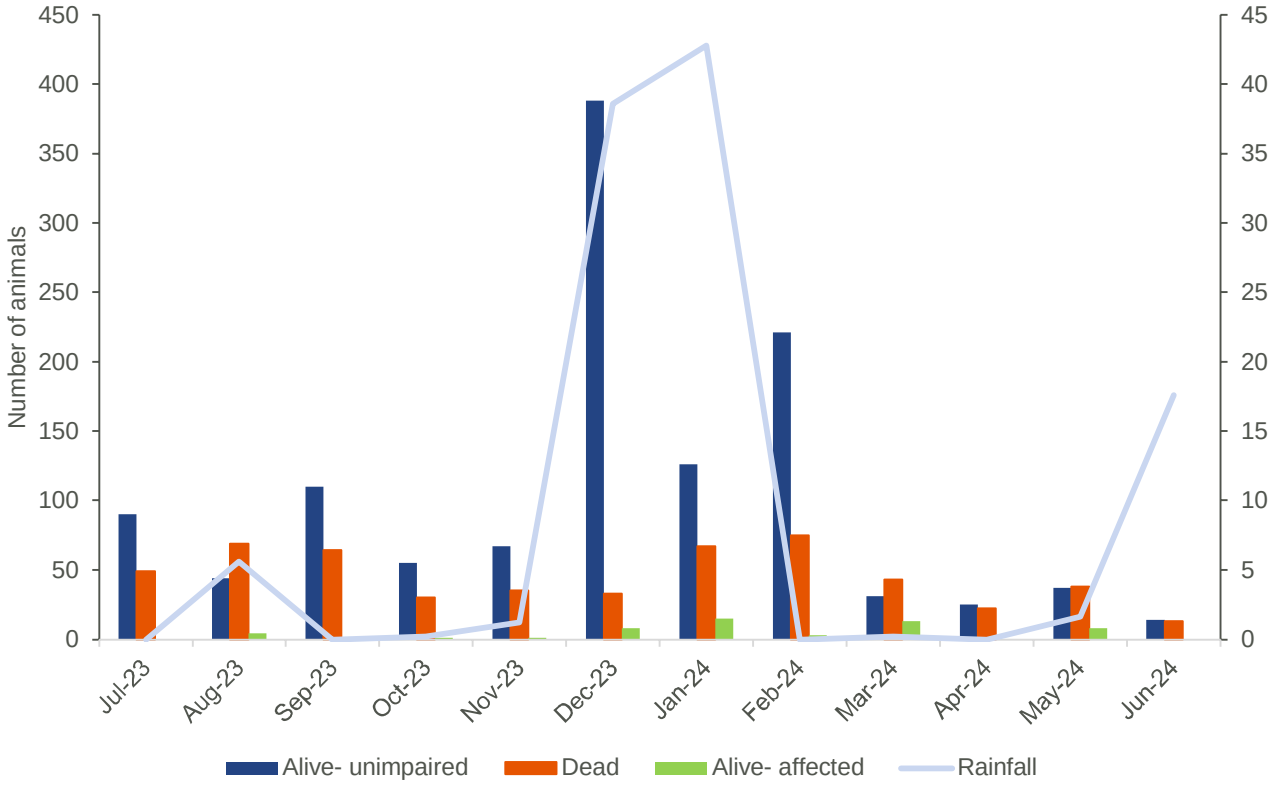


Figure 77: Monthly summary of weekly TRS fauna monitoring for FY24

The number of animals are recorded as either alive-unimpaired, alive-affected, or dead. Rainfall data presented is collected from the Roxby Downs AQMS and BOM.

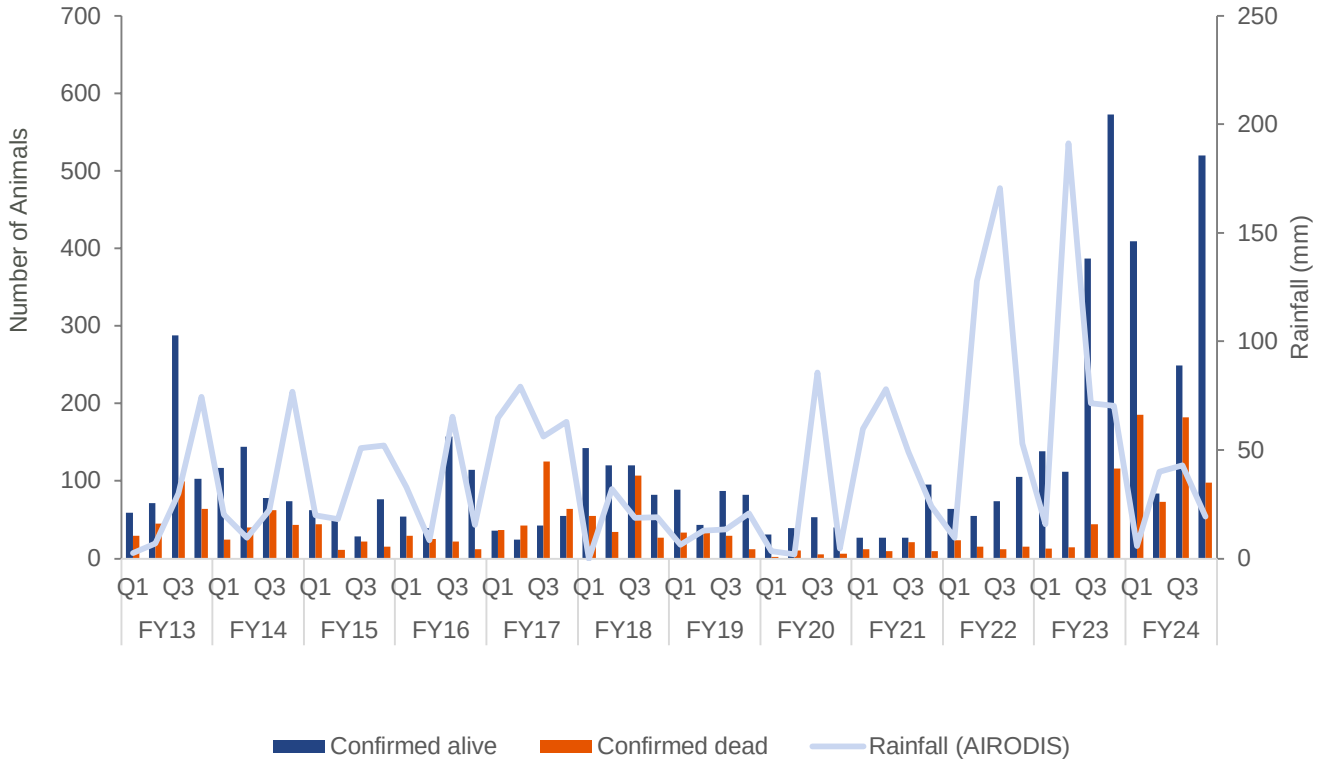


Figure 78: Quarterly summary of weekly monitoring since FY13

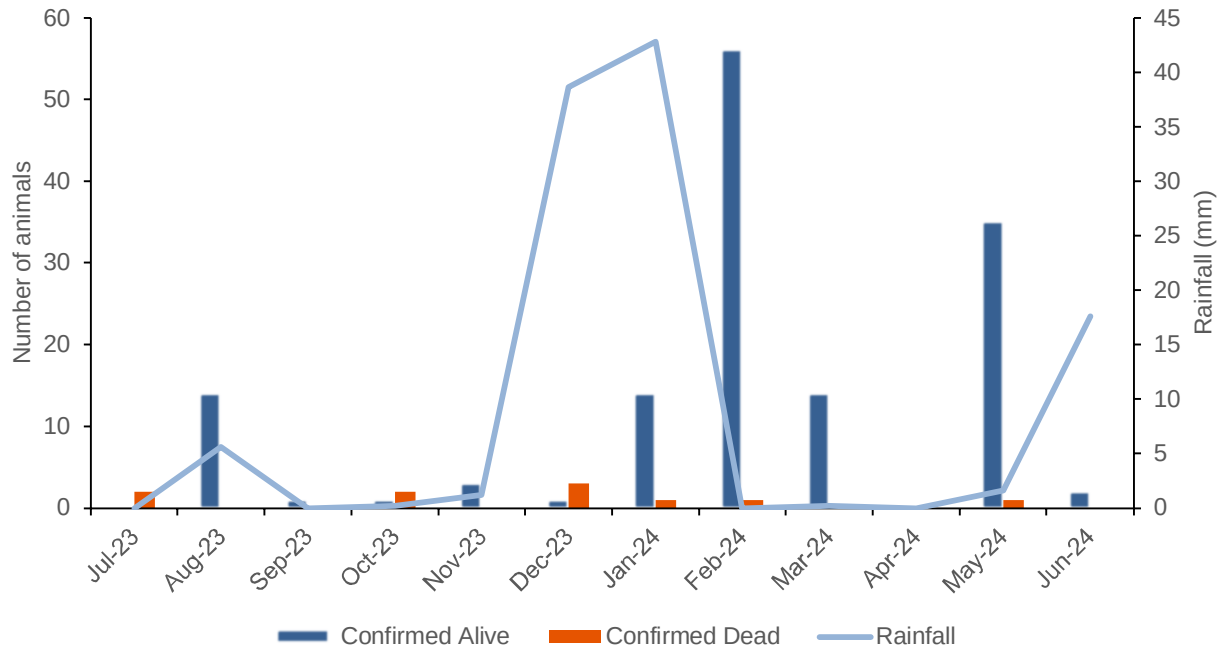


Figure 79: Monthly summary of opportunistic observations in FY24

Rainfall data presented is collected from the BOM.

The data presented indicates the number of fauna counted and does not represent total numbers; they are presented as an index only. Several factors are considered when interpreting and refining the monitoring and data analyses, these include:

- Birds may be seen and recorded as alive on one day and subsequently may be observed as dead on a subsequent day. The total includes both observations, leading to a possible overestimate;
- Scavenging by birds of prey and corvids means that some carcasses may be removed from the system prior to an observation being made;
- Carcasses floating in the liquor may sink and disappear before being recorded; and
- Some fauna species may leave the system and die elsewhere.

The number of birds recorded as dead at the TRS may represent a small proportion of those that visited. Preventing and deterring visitations by large flocks of birds, particularly Banded Stilts, remains a focus of management efforts at the TRS.

4.3.5 Targets FY24

None applicable.

4.3.6 Actions FY24

Continue investigating and trial alternative deterrent technologies when they become available.

A summary of deterrents trialled to-date was compiled in FY21, and the process derived a short-list of potential deterrent and offset options to be further explored based on their high feasibility, low cost and unknown effectiveness (e.g., most deterrent options only had anecdotal evidence available). As a result of this process, ODC identified the wetland wailer, an audio-based deterrent as a feasible option to investigate, and field trials of the wetland wailer commenced in October of FY22 and are ongoing.

The wetland wailer combines natural bird vocalisations of wading bird species in distress, predatory bird calls and electronic sounds to create a 350 m radius that is uncomfortable for birds to remain in. The use of natural and electronic sounds, in combination with multiple speakers, changes in duration and strobe lighting prevents birds from habituating to the patterns of the deterrent.

In October 2021, two deterrents were deployed on the northern and southern cell roadways of EP 3. The targeted fauna for the trial is water bird species that find the liquor attractive. Resident bird species such as Zebra Finches, Swallows (Welcome, White-backed, Black-faced) and Willy-wagtails are habituated to the EP 3 area (and display behaviour such as perching on pump equipment) and have not been observed interacting with the liquor during the period October 2021 - June 2024 (as they are considered non-target species). Therefore, they have been removed from the analysis of the wetland wailer trial.

The remaining bird species not excluded in the analysis may not have been observed interacting with the liquor in the monitoring period but have been recorded in historic data as having an interaction with the liquor. One Banded Stilt (*Cladorhynchus leucocephalus*), which is listed as Vulnerable under the NPW Act was observed as dead at EP 3 in FY24. The Australasian Darter (*Anhinga novahollandiae novahollandiae*) listed as Rare under the NPW Act was also observed at the TRS in FY24 (n=12 dead). No Commonwealth listed species were observed at EP 3 during FY24.

The most abundant dead species observed was the Little Black Cormorant (n= 21 recorded). There was significant difference in both alive and dead observations at EP 3 since October 2020 as shown in Figure 80 (alive: $F_{1,20}$ = 2.963, p = 1.329; R^2 = 0.0644; dead: $F_{1,20}$ = 29.31 p = 4.34, R^2 = 0.405).

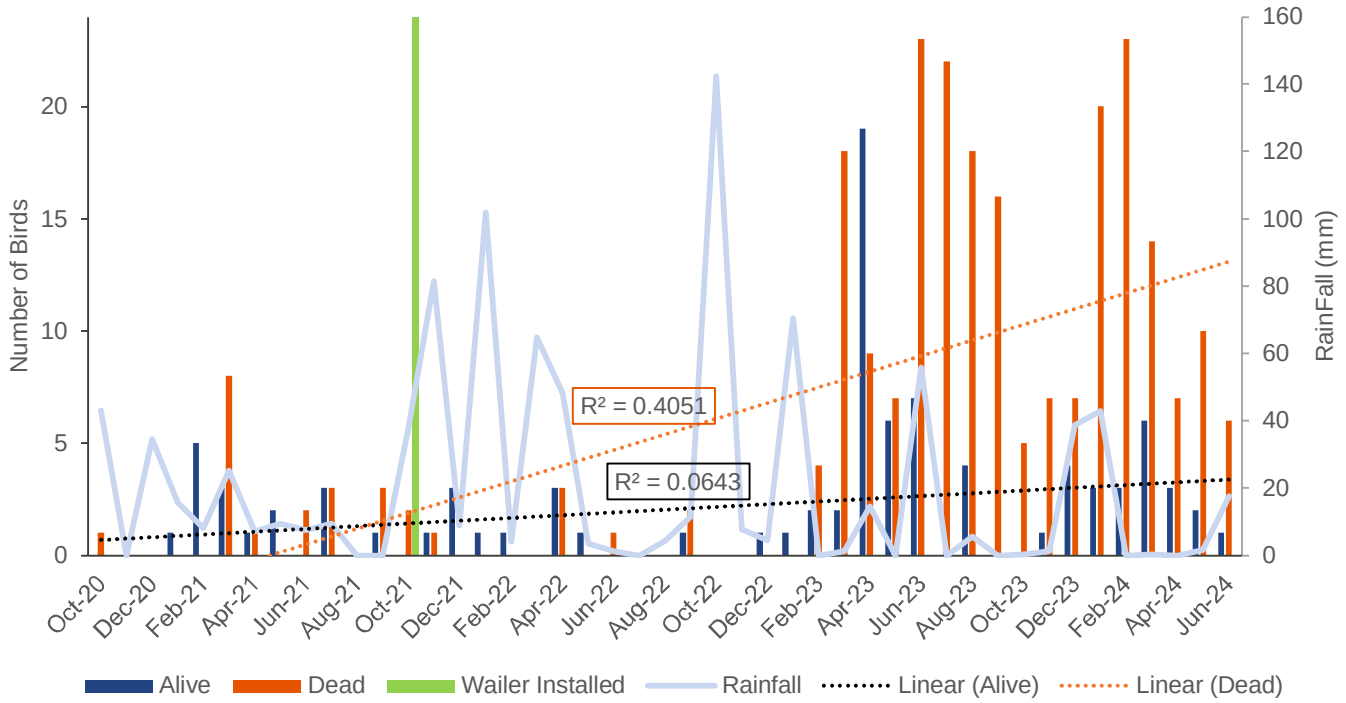


Figure 80: Monthly summary of weekly monitoring at EP 3 from October 2020 to June 2024

4.3.7 Continuous Improvement Opportunities FY24

The TRS fauna project was initiated after an increase in numbers of birds interacting with the TRS became apparent in 2004.

Opportunity: Identify new opportunities to reduce fauna mortalities through ongoing research into management practices relating to fauna interaction with tailings storage systems.

ODC continued to operate two wetland wailer devices on EP 3 throughout FY24. Since the operation of the wetland wailer, the region has experienced significant rainfall and higher bird visitations than during the dry period. When comparing ponds of an equivalent size and liquor content (such as EP 6) the wetland wailer deterrents of EP 3 do not appear to be effectively deterring. BHP is committed to continuing using the wetland wailer throughout FY25, particularly to capture longer term seasonal data and BHP will continue to investigate alternative bird deterrent technologies when they become available.

During FY24 ODC again contributed funding to the Coorong District Council to complete a reed planting project on the Lower Lakes (Alexandrina and Albert). The project will continue to be executed throughout FY25 when the lakes are shallower. The project aims to plant reeds on the shoreline to prevent further erosion of key habitat to bird species.

Opportunistic and standardised monitoring of fauna interactions at the TRS has occurred since 2004.

Opportunity: Continue to assess the impact to fauna and the efficacy of various management tools through monitoring.

Weekly fauna monitoring of the TRS by trained Environmental personnel has been undertaken since June 2005.

4.4 Solid Waste Disposal

4.4.1 Environmental Outcome

No significant adverse environmental impacts as a result of management of solid waste.

The Resource Recovery Centre (RRC) effectively managed solid waste as per the EPA approved Landfill Environmental Management Plan 2022 (LEMP) (BHP Olympic Dam 2022b). No evidence of material environmental harm was identified through routine auditing or reporting of materials disposed of to the landfill. Therefore, it can be concluded that no significant adverse impacts resulted from the management of solid waste at OD during FY24.

During FY24 the RRC experienced six fires. A combined investigation into the fires determined the most likely cause was due to the incorrect disposal of Li-Ion batteries. Following the investigation the following actions were taken:

- A site-wide communication was distributed to re-enforce waste management processes within work areas.
- Additional battery disposal bins were distributed across site to improve battery segregation at the source.
- A random audit of general waste bins was undertaken.
- Two additional fire tanks have been added to the existing tank farm at the RRC to support the Emergency Services Officers (ESOs) as the first line of defense in the event of a fire.

The continued implementation of corrective actions resulting from recent landfill fires has shown an improvement in waste segregation at the source across the OD operation. For example, from March to April 2024 a 23% increase was recorded for batteries disposed of via battery disposal bins across site.

A waste working group continues to meet fortnightly to discuss various waste management improvement opportunities.

4.4.2 Compliance Criteria

No site contamination leading to material environmental harm arising from the operation of the Resource Recovery Centre (GW 3.3, WA 3.5).

Solid wastes which cannot be reused or recycled by the RRC and have not been contaminated by processing chemical wastes are disposed of into the general waste landfill facility. The RRC effectively manages solid waste as per the EPA approved LEMP so that no actual or potential material environmental harm is caused by the storage of non-chemical waste materials.

Waste is minimised, stored, transported and disposed of in a manner that controls the potential risk of adverse impacts to the environment and communities through implementation and maintenance of the LEMP. No evidence of site contamination leading to material environmental harm arising from the operation of the RRC was identified based on routine auditing and reporting conducted during FY24.

4.4.3 Leading Indicators

None applicable.

4.4.4 Deliverables (WA 3.5)

Records of quantities of general and industrial waste disposed of to landfill.

Records of all waste delivered to the RRC were maintained by the waste management contractor during FY24. The total amount of waste and recycling materials delivered to the RRC for further management and disposal in FY24 was 13,674 t (Table 37). Of this, 3,354 t was disposed of directly to the permanent landfill. A total of 10,320 t was sent to recycling stockpiles within the RRC in FY24, prior to recovery or recycling off-site.

Table 37: Quantities of materials delivered to the RRC for either permanent disposal or recovering/recycling

Location	FY23 (t)	FY24 (t)
Disposed to permanent landfill	4,017	3,354
Delivered to recoverable and recycling stockpiles	9,664	10,320
Total entering RRC	**13,681**	**13,674**

Historical volumes of waste disposed to the landfill and recyclable/recoverable materials sent offsite to a licenced facility between FY03 and FY24 are shown in Table 38. In FY24, 22,360 m^3 of waste was permanently disposed of to the landfill and 9,272 t of recycling or recoverable materials were sent off-site to a licenced facility.

FY24 continued to see the implementation of initiatives to remove waste stockpiled onsite for recycling, steel being the main waste stream recycled. Recycling continued to deliver value across the RRC with a significant volume of waste diverted from landfill. Figure 81 shows the estimated tonnage of waste disposed of to the landfill on an annual basis from FY03 to FY24.

Table 38: Historical total waste received at the RRC (FY03 - FY24)

Year	Landfill Disposal (m^3)	Estimated Landfill Disposal via Conversion (t)	Total Recycled Materials (t)
2003	30,622	4,593	193
2004	27,348	4,102	617
2005	14,578	2,187	510
2006	45,361	6,804	347
2007	47,964	7,195	685
2008	52,171	7,826	673
2009	40,898	6,135	936
2010	32,980	4,947	1,890
2011	37,511	5,627	1,735
2012	36,291	5,444	2,644
2013	17,739	2,661	1,248
2014	31,433	4,715	1,232
2015	34,939	5,241	3,073
2016	27,355	4,103	2,651
2017	30,081	4,512	1,957
2018	55,254	8,288	1,513
2019	59,608	8,941	3,145
2020	60,469	9,304	3,409
2021	64,055	9,519	3,568
2022	28,853	4,328	12,111
2023	26,780	4 017	6,867
2024	22,360	3,354	9,272

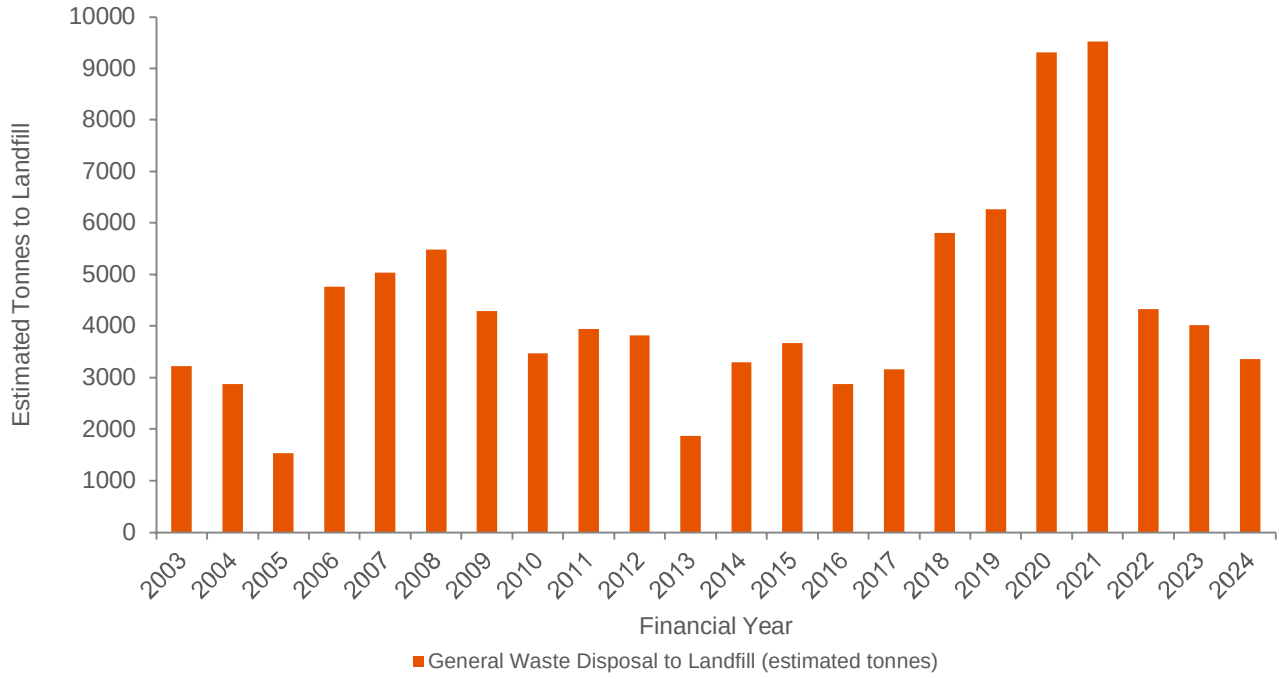


Figure 81: Historical overview of general waste quantities to landfill disposal FY03 - FY24

Note from 2003 to 2021 estimated tonnes is based on recorded cubic metres and then applying volume to weight conversion factors. These conversion factors are updated in line with the EPA guidelines at the time; therefore, fluctuations in estimated tonnes to landfill may be the result of changing conversion factors as opposed to raw increase in waste entering the landfill. From FY22 waste data is captured through weighbridge data, with tonnes converted to a volume using the mixed waste conversion factor (150 kg/m^3).

Records of quantities of material recovered for reuse and recycling.

Records maintained by the RRC waste management contractor show the total recyclable material transported off-site in FY24 equaled 9,272 t, which is a ~16% increase in recycling since FY23, with ~71% of recyclables recovered, maintaining ODC's focus on recycling over disposal of waste.

Table 39 provides an overview of the recyclable materials captured and the quantity of each material removed from site during FY24 to licenced facilities for recycling.

Table 39: Recyclable material transported off-site for recycling in FY24

Recycling Removed from Site	Quantity (t)
Batteries	17
E-waste	10.56
Copper cable	230.22
Hydrocarbon waste	488
Intermediate bulk container (IBC)	4.84
Tram steel	69.43
Poly pipe/high density polyethylene (HDPE)	893.78
Rubber (shredded)	195.18
Scrap steel	4,581.37
Mill liners	550.14
Cardboard	231.6
Timber	2,000.47
Total*	**9,272**

**Note: Total may not equal sum of numbers due to rounding.*

Figure 82 provides an overview of the historical off-site recycling trends to appropriately licenced facilities (FY03-FY24 inclusive).

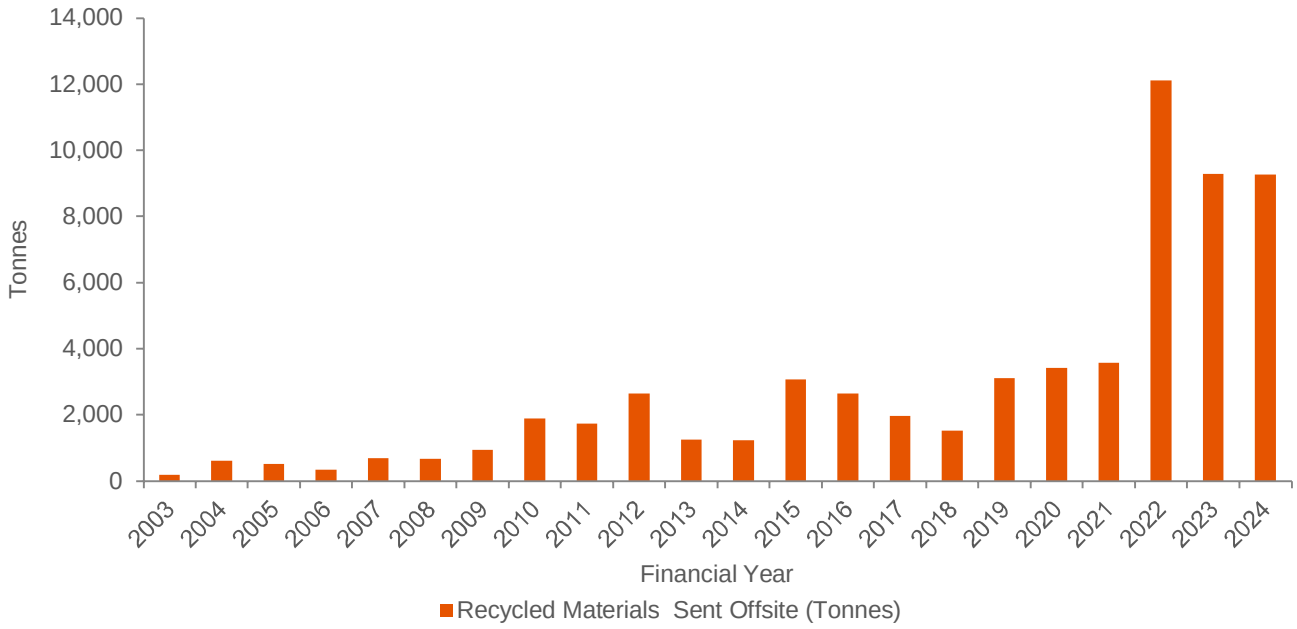


Figure 82: Recyclable materials transported offsite to suitably licenced facilities for re-processing FY03 - FY24

4.4.5 Deliverables (WA 3.6)

Records of categories, quantities and location of hazardous waste materials disposed of within the SML.

Depending on the type of hazardous or contaminated material, quantities are measured in cubic metres or tonnes. Records of hazardous waste disposed of within the SML are shown in Table 40 whilst records of hazardous waste disposed of offsite are shown in Table 41.

Contaminated waste disposed of within the SML is discussed within the radioactive waste section of this report (Section 4.5), whilst disposal of hazardous waste is to the TSF. Risk assessments of materials being disposed of to the TSF ensure that TSF integrity is not compromised.

Where possible, process waste is disposed of via bunded areas and directed to tails disposal. This reduces the amount of waste disposed of at the tailings waste finger.

Records to provide evidence that listed waste is appropriately managed, specifically:

- **That listed waste is stored, contained and treated in a manner that does not cause environmental harm or nuisance or present risks to human health and safety;**
- **That all listed waste storage containers are of a suitable strength and durability, are clearly marked and contain appropriate safety warnings;**
- **That all listed wastes do not contact soils or stormwater, and that measures to prevent and recover spillages are implemented as necessary.**

The waste management contractor is responsible for maintaining all hazardous waste management records at the RRC. The location, type and quantity of hazardous waste is recorded in an electronic register, as per all relevant regulations and site procedures. The transport of hazardous waste off-site is documented through the EPA waste transport and tracking system, providing assurance that wastes are managed appropriately so as not to cause environmental harm or present a risk to human health and safety. Table 40 provides an overview of waste management streams which are approved under the TRS Waste Management Plan for disposal to the TRS.

Table 40: Hazardous wastes disposed of within the TRS in FY24

Source of Waste	Quantity of Waste (t)
Process waste	40
Waste fingers	1
Smelter	15
Acid Plant	90
Electro Winning and Gold Room	10
Miscellaneous waste cleared for TRS	75.5
Onsite laboratory	2
Refinery	77.55
Concentrator/Hydromet	47.5
SX Area	613
***Total**	**970.65**

**Total may not equal sum of numbers due to rounding.*

Other hazardous waste removed from site for disposal at licenced facilities consists of hydrocarbon waste such as oily rags, oily filters, oil (collectively hydrocarbon waste) and PFAS generated during the decommissioning of PFFF.

ODC complies with the requirements of EPA Licence 1301 pertaining to listed and controlled waste by adhering to the approved LEMP. Spill kits are available at all collection and loading points for listed waste (e.g., Waste Oil Facility and Distribution Centre).

Table 41: Records of hazardous waste collected and removed off-site for further treatment during FY24

Waste Type	Quantity of Waste (t)
Batteries	17
Hydrocarbon	488
Fluorinated fire fighting foam	51.8

Note: Batteries and hydrocarbon also reported within recycling Table 39.

4.4.6 Targets FY24

Increase at source waste segregation to reduce waste to landfill.

Olympic Dam has continuously improved waste management onsite and this has assisted in achieving a recycling rate of 71.6% for all waste entering the RRC during FY24. This can be attributed to ongoing improvements in source segregation and site awareness to support effective waste management.

4.4.7 Actions FY24

Implement a site wide paper/cardboard recycling programme with bailing and off-site removal /recycling.

The RRC has continued to build on cardboard/paper recycling, recycling over 230 t of cardboard for FY24. This has been supported by improved source segregation and ongoing improvements to the site cardboard bailer.

Continue to monitor and store LV/HV tyres in line with accepted guidelines.

Olympic Dam Corporation has continued to improve waste tyre storage onsite through improved stockpiling and installation of emergency response infrastructure. In addition to site management, a project team has been established and started investigating the option to recycle tyres and reuse them in asphalt for service roads at OD.

Improve paper and cardboard recycling awareness and on ground participation.

Cardboard recycling has remained a focus, the recycled volume continues to increase year on year.

4.4.8 Continuous Improvement Opportunities FY24

The opportunity to reuse and recycle materials would be greater if more waste materials were segregated at their source. Segregation reduces contamination and double handling and enable more accurate tracking of waste streams. Waste segregation has been rolled out across the site however still needs improvement and extension to the mine and underground mine.

Opportunity: Improve at source segregation waste segregation system.

One of the largest volumes of waste generated on site is rubber tyres. Used tyres are already reused on site where possible, as road berms and for area demarcating. Investigations regarding initiatives to increase tyre life will be progressed during detailed design of the projects (DEIS 5.6.3; SEIS 5.4.3).

Additional improvement opportunity: Battery recycling.

New battery recycling infrastructure will continue to be expanded onsite. The aim is to eliminate or reduce Li-ion battery disposal to general waste. Eco-battery boxes and buckets will continue to be trialled onsite. The batteries will be recycled offsite.

4.5 Radioactive Waste

4.5.1 Environmental Outcome

No adverse impacts to public health as a result of radioactive waste from ODC's activities.

Olympic Dam has consistently operated in a manner that limits radiation dose to members of the public from radioactive waste, to less than a small fraction of the ICRP 1 mSv/y limit. As a result, there were no adverse radiation exposure impacts to the public from activities undertaken at OD in FY24.

No significant adverse impacts to populations of listed species or ecological communities as a result of radioactive waste from ODC's activities.

During the reporting period there were no significant adverse impacts to populations of listed species or ecological communities as a result of radioactive waste from ODC's activities. Monitoring of radiation doses to the public and the deposition of ^{238}U at NHB assessment sites is used as an indicator of the potential exposure of listed species to radioactive waste.

Deposition of ^{238}U at NHB assessment sites during FY24 was at a level which poses no significant adverse impacts to NHB.

4.5.2 Compliance Criteria

Radiation doses to members of the public less than 1 mSv/y above natural background (ER 3.2).

The total estimated does (during FY24) to members of the public at the RDMS and the OVMS that was contributed by OD operations was 0.030 mSv and 0.027 mSv respectively.

Deposition of project originated ^{238}U less than 25 Bq/m^2/y at the non-human biota assessment sites (ER 3.3).

The average deposition of ^{238}U, calculated as an average of results at the four monitoring sites was determined to be 1.58 Bq/m^2/y, well below the 25 Bq/m^2/y compliance criteria.

4.5.3 Leading Indicators

Indications that a dose constraint of 0.3 mSv/y to members of the public above natural background will be exceeded (Aus 5f, 6, 14; State 34) (ER 2.2).

Indications that a reference level of 10 uGy/h for impacts on non-human biota above natural background will be exceeded (Aus 5f, 6, 14; State 34) (ER 2.3).

Note: The reference level for non-human biota is set as an interim criteria until such time as an agreed national approach is determined.

The two leading indicators were not triggered during the reporting period. Doses to members of the public are below OD's internal dose constraint of 0.3 mSv/yr during the reporting period. Similarly, the reference level of 10 uGy/h for impacts on NHB was not triggered during the reporting period.

4.5.4 Deliverables (WA 3.7)

Records of the categories, quantities, radiation levels and location of LLRW stored within the SML.

A waste management register is maintained by site staff and the waste management contractor to track origins of the structural waste, waste categories, quantities, radiation testing results, and final disposal or storage locations.

Contaminated waste is defined as structural waste from within the operational mining and processing areas which after surface cleaning retains a surface area activity of greater than 3,700 Bq/m^2 and an average activity concentration level below 1 Bq/g. Any structural waste which returns a surface area activity reading below 3,700 Bq/m^2 can be safely recycled and any cleaned materials which remain above the surface area activity threshold of 3,700 Bq/m^2 must remain onsite or undergo further cleaning.

Table 42 shows the total tonnage of structural waste (2017-2024 inclusive) which once cleaned has remained above 3,700 Bq/m^2 and below an average activity concentration level of 1 Bq/g and therefore has been placed into a purpose-built Contaminated Waste Disposal Facility (CWDF).

Table 42: Permanent CWDF

CWDF Storage Location	Type of Waste	FY	Quantity of Waste (t)
Cell 1 Stage 1	Contaminated structural equipment	2017	3,304
Cell 1 Stage 1 **Cell 1 Stage 2**	Contaminated structural equipment	2018	2,088
Cell 1 Stage 2	Contaminated structural equipment	2019	2,042
Cell 1 Stage 2	Contaminated structural equipment	2020	1,566
Cell 1 Stage 2	Contaminated structural equipment	2021	738
Cell 1 Stage 2	Contaminated structural equipment	2022	693
Cell 1 Stage 2	Contaminated structural equipment	2023	1,115.81
Cell 2	Contaminated structural equipment	2024	2,152
Total in storage end FY24			**13,700**

The use and closure of each CWDF Cell stage is implemented through the requirements of the approved Contaminated Waste Management Plan (CWMP). CWDF Cell 1 Stage 1 was approved and constructed adjacent to the RRC during FY17 and was backfilled in FY18 once capacity was achieved. CWDF Cell 1 Stage 2 (Lift 1), directly above Stage 1, was constructed in FY18 and is now at maximum capacity. Construction of Cell 2 was completed during FY23 and has been in operation during FY24.

The regulatory framework for a CWDF is contained within the current licence conditions for the Olympic Dam LM1, which requires ODC to comply with the Mining Code (ARPANSA 2005). ODC is required to seek regulatory authorisation for various stages of the CWDF facility/cells and to have a Radioactive Waste Management Plan (RWMP) developed and maintained. Figure 83 provides an overview of the tonnages sent for disposal to each respective CWDF cell stage.

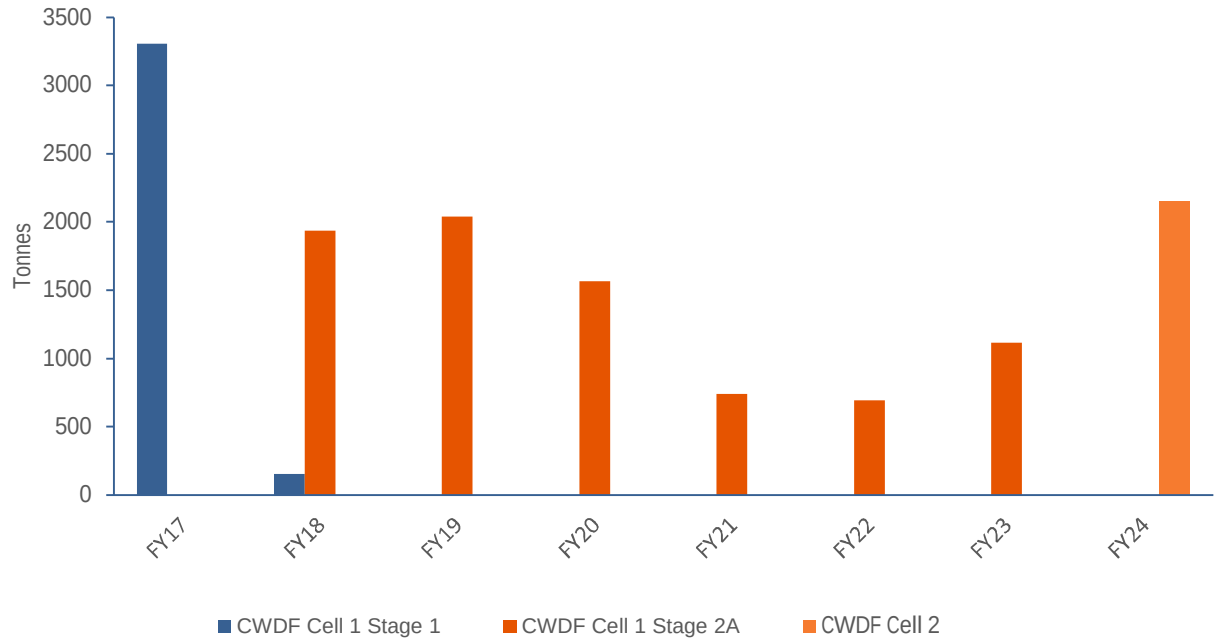


Figure 83: Tonnage of structural waste received at each of the CWDF cells FY17 - FY24

Some structural waste materials return surface area activity readings above 3,700 Bq/m^2 and activity concentration readings above 1 Bq/g after cleaning and decontamination processes have been implemented. These materials are classified as low level radioactive waste (LLRW) and are therefore segregated away from other structural contaminated waste materials. Table 43 summarises the quantity of LLRW stored in accordance with the approved CWMP.

Table 43: LLRW currently in storage

Storage Location	FY	Quantity of Waste Stored (t)
LLRW Area	FY18	115
LLRW Area	FY19	44
LLRW Area	FY20	173
LLRW Area	FY21	545**
LLRW Area	FY22	1.5*
LLRW Area	FY23	28.25
Total in storage end FY24		**914.36**

**A small volume of LLRW was disposed of to the LLRW facility during FY22. Due to SCM21, the volume of LLRW waste streams were reduced significantly. This was further supported by improvements for cleaning structural waste.*
***During FY21 an estimated total of 540 t of clarifier overflow bricks had to be sent to the LLRW holding area. All other waste sent to the LLRW came to a total of 5 t.*

The cleaning of structural materials from processing and mining areas of the mine has continued in FY24 and proved to be a successful method for reducing the radiation levels, with the overall volumes of contaminated waste required to stay on site in a CWDF cell or the LLRW holding area greatly reduced, as shown in Figure 84. The testing program has enabled OD to safely recycle a large quantity of metal waste.

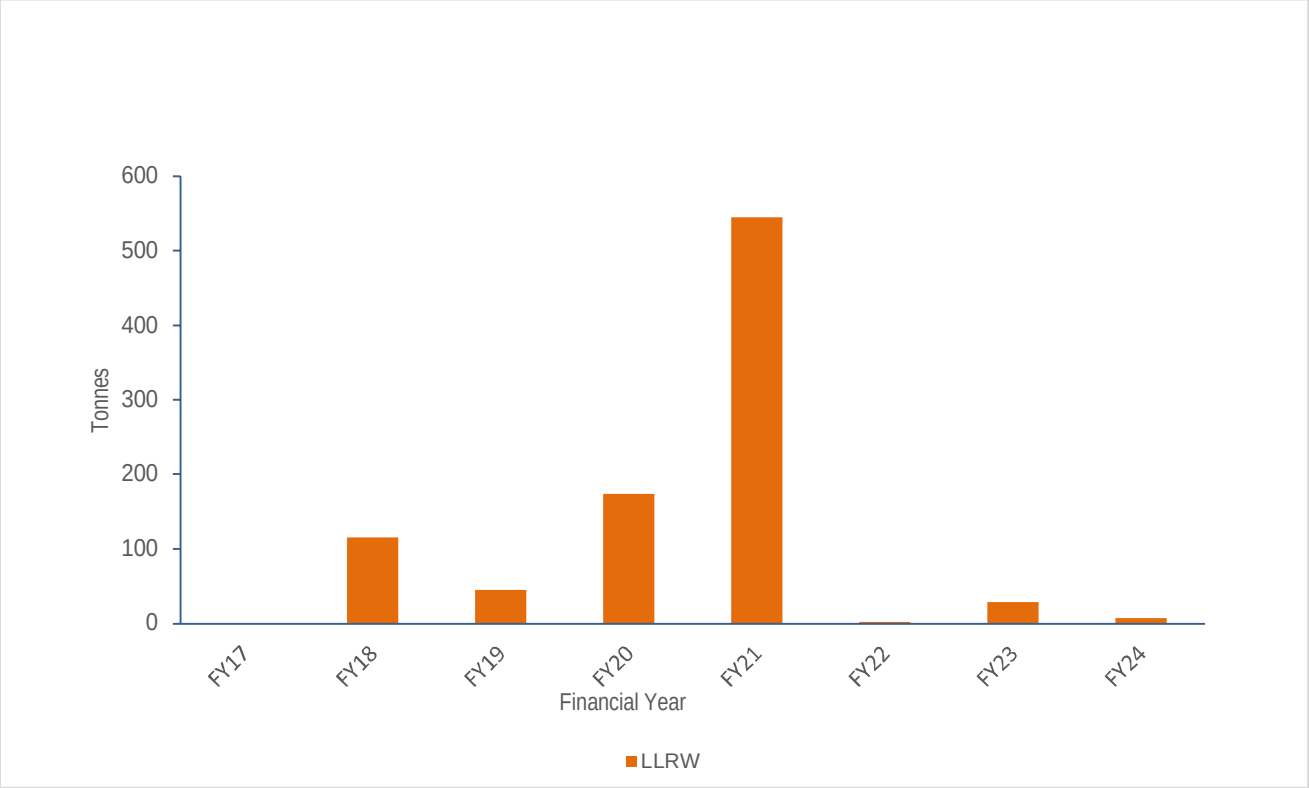


Figure 84: Tonnage of structural waste received at the LLRW pre-disposal holding area FY17 - FY24

4.5.5 Targets FY24

Maintain radiation doses as low as reasonably achievable, as assessed through the annual Radiation Management Plan Review.

Quarterly ODC radiation monitoring results, radiation dose calculations and occupational hygiene results are presented to the regulatory authorities for review. In addition, an annual adequacy and effectiveness review is completed each year confirming that doses are as low as reasonably achievable (ALARA).

4.5.6 Actions FY24

None applicable.

4.5.7 Continuous Improvement Opportunities FY24

International and national standards, guidelines and codes are subject to change from time to time, to ensure effective protection of humans and the environment from the harmful effects of radiation. Any new recommendations or revisions should be reviewed and implemented as necessary.

Opportunity: Maintain a watching brief on ICRP and IAEA recommendations and any new national Codes of Practice and implement as necessary.

During FY24 OD commenced operations in the new Cell 2. Cell 2 incorporates improved volume and protection layers, including a Tensar geogrid for extra strength. Improved waste management practices onsite aim to extend the life of Cell 2, maximising airspace through targeted recycling.

As low as reasonable achievable is built into the design of the operation. This means that all reasonable efforts are made to ensure that radiation and radioactive emissions are controlled and managed in the design of new plant. Radiation protection design criteria have been established and are mandatory for all facilities.

Opportunity: Develop and implement optimisation in design process.

Olympic Dam produces waste of various streams as a result of normal operations. A permanent facility specifically designed for disposing contaminated waste has been established. Maximising the capacity whilst minimising the volume of waste deposited at the facility, is a key factor in reducing the environmental impact through land disturbance and improved resource recovery.

As low as reasonably achievable is built into the design of the operation. This means that all reasonable efforts are made to ensure that radiation and radioactive emissions are controlled and managed in the design of new plant. Radiation protection design criteria have been established and are mandatory for all facilities. An optimisation (ALARA) study will be conducted for all phases of any future expansion with findings incorporated into designs.

5. INTERACTION WITH COMMUNITIES

5.1 Community Interaction

5.1.1 Environmental Outcome

Residents in Roxby Downs, Andamooka and Woomera have a favourable view of ODC.

The Community Perception Survey (CPS) is undertaken biennially and was completed in FY24. These survey results indicated that ODC is viewed favourably (trusted) by 42% of respondents in its local communities, an increase of 12% from the last CPS survey in FY22.

Actions undertaken prior to the FY24 CPS included community consultation to develop a draft Community Development Plan and provision of resources for childcare.

Due to recent CPS results the environmental outcome for FY24 has been classified as 'significant progress towards achieving the Environmental outcome'.

5.1.2 Compliance Criteria

Community concerns are tracked and all legitimate complaints are addressed where reasonably practicable (SE 3.1).

ODC has a process to receive and track community enquiries, concerns, complaints and grievances through the company's complaints procedure and stakeholder engagement management plan. In FY24, ODC did not receive any formal community concerns. However, issues related to the lack of accessible childcare in Roxby Downs and empty storefronts within the Roxby Downs community were raised by the community through informal channels.

5.1.3 Leading Indicators

None applicable.

5.1.4 Deliverables (SE 3.1)

A description of the extent to which residents in Roxby Downs, Andamooka and Woomera trust ODC (calculated biennially (Community Perception Survey)).

The frequency of the CPS has increased to biennially and additional questions have been included to gauge community sentiment and wellbeing. The CPS was conducted in FY24 and is next scheduled for FY26. In response to the CPS results in FY22, ODC engaged a consultant and conducted consultations with key community stakeholders to identify community issues, which included health and education services, job creation, reactivating the shopping precinct, as well as access to childcare. A draft Community Development Plan is under preparation in collaboration with key stakeholders and the Roxby Downs Council, to ensure commitment to the community.

The FY24 CPS results showed that ODC is viewed favourably (trusted) at 42% of respondents in the local communities, which was an increase from 30% in FY22.

A description of residents' perceptions about quality of life, services and facilities, safety and social fabric in Roxby Downs, Andamooka and Woomera (reported biennially).

The CPS conducted in FY24 showed that community respondents' highest concerns were with sustainability of local businesses, impact of non-residential workforce, access to high quality health services and job creation in the community. Measures undertaken to improve these concerns include:

- In consultation with key community stakeholders, ODC in collaboration with the Roxby Downs Council, has developed a draft Community Development Plan for Roxby Downs. This plan aims to address community concerns raised in the CPS. Additionally, the plan will be circulated to key community stakeholders for feedback prior to finalisation.

- A Stakeholder Engagement Group (SEG) was established in late FY23 for stakeholders to raise issues and share concerns.
- ODC is updating to a broader Copper SA complaints and grievance process to be shared across internal and external stakeholders to provide an avenue for community members to raise questions. A dedicated 24/7 hotline has been established as part of this process.

5.1.5 Targets FY24

None applicable.

5.1.6 Actions FY24

Complete and implement Olympic Dam Social Value Plan for the FY21-25 period.

Social Value is the positive contribution BHP makes to the community, environment and society – its workforce, partners, customers, economies and communities. BHP believes we will have successfully contributed to Social Value when those around us feel they are better off from our presence. Social Value is a company-wide, whole of business approach that BHP is hardwiring into its culture, decisions and actions at every level.

Social Value now forms one of the five themes of BHP's strategic framework designed to operationalise the company's new strategy. The BHP Social Value Plan has six pillars covering Planet, People, and Prosperity and they are detailed in Table 44.

Table 44: BHP's Social Value framework

Social Value Pillar	Social Value Themes	Priorities
Transparent and ethical supply chains	Procurement (local and Indigenous)	• Increased commitment to Indigenous spend.
Thriving, empowered communities	Local community and early childhood education and childcare	• Childcare in Roxby Downs supports diverse community needs. • Continue to create vibrant communities to increase value proposition to regions, government and employees.
Inclusive and future ready workforce	Inclusion and diversity	• Continue to prioritise gender and indigenous diversity.
Indigenous partnerships	Indigenous and Traditional Owner engagement	• Strengthen existing and develop new partnerships with Traditional Owners, local communities and industry to develop shared value.
Healthy environment	Nature positive outcomes	• Contribute to nature positive outcomes.
Decarbonisation	Climate change	• Contribute to stabilising global atmospheric greenhouse gas concentrations to minimise impacts associated with climate change.

The first OD Social Value Plan was developed for the FY21-25 period and a full review and realignment was undertaken at the end of FY22. An amended plan was rolled out for the FY23-27 period following analysis of the most recent data assessing the needs and perceptions of primary stakeholders against the operational priorities of both OD and BHP. ODC's Social Investment covers a variety of recipients over several Social Value pillars, such as:

- Arid Recovery biodiversity conservation project.
- Roxby Downs Innovation Hub (managed in partnership with Healthy Environs).
- Roxby Downs Community Hub (managed in partnership with Healthy Environs).

- Adelaide Football Club – AFLW Adelaide Crows.
- Royal Flying Doctor Service.
- Flipside Youth Mental Health Program.
- Foodbank SA/NT.
- Operation Flinders Foundation.
- Variety of various projects through community donations.

Undertake the biennial Community Perception Survey (2024) to monitor local community perceptions of ODC, and of local services and facilities.

The biennial CPS was last undertaken FY24. As a result of the FY24 CPS and as per OD's Social Value Plan's 'thriving, empowered communities' pillar, ODC (in collaboration with the Roxby Downs Council and key community stakeholders) has developed a draft Community Development Plan for Roxby Downs, addressing community concerns raised in the CPS. Additionally, OD is also working on a long-term sustainable solution to address the childcare shortage in Roxby Downs. These are in direct correlation to the Social Value themes of:

- To create vibrant communities to increase value proposition to regions, government and employees.
- Sustainable Roxby Downs beyond mining.
- Education and childcare in Roxby Downs to support diverse community needs.

Establish a formal community engagement mechanism which will provide regular engagement with community representatives and the provision of measurable shifts in community sentiment.

In FY23, ODC established a SEG, comprised of residents of Roxby Downs and Andamooka. The BHP SEG is an innovative forum for stakeholders to meet and discuss BHP-related issues quarterly. It is also an avenue for stakeholders to have input into aspects of the planning of our operations and to be a part of a unique forum for two-way dialogue and engagement with the company. The SEG provides an opportunity for BHP to request feedback regarding its operating environment, growth programs, sustainable development and environmental and economic impacts to assist with internal decision making.

Members of the SEG were identified through an extensive application and assessment process to ensure that there was representation across all sectors and services from Roxby Downs and Andamooka.

The SEG most recently met in August 2023 and was held at the OD mine following a site tour. In attendance was the Asset President OD and General Manager Mine OD. There were robust discussions regarding OD's operations and community concerns that impact the mine's operations, including sustainability of local businesses and childcare. Due to the integration of the OD, Carrapateena and Prominent Hill sites into Copper SA in FY24, there has been internal movements within the OD Community team, leading to reduced capacity and impacting the ability to coordinate a successful SEG meeting. The SEG will be revived in FY25.

Review and update local procurement plans with targets to maximise the participation of local, regional and State businesses and employment in supplying goods and services to Olympic Dam.

BHP is committed to investing with local, regional and South Australian businesses. In FY24, ODC's total spend in South Australia was (AUD $458,736,685), with AUD $225 M spent with regional suppliers in the Roxby Downs and Upper Spencer Gulf regions.

BHP as a whole spent USD $994,519,062.11 (AUD $1,522,192,351.36) with South Australian based businesses in FY23. BHP's partnership with C-Res delivers the Local Buying Program in its key communities across Australia, which supports small businesses to secure work packages and develop relationships with BHP. In FY23, AUD $32 M was spent through the Local Buying Program in South Australia.

Continue to explore opportunities to build involvement of Aboriginal people and businesses to participate and benefit from Olympic Dam.

Olympic Dam reached a total spend of AUD $98 M with Indigenous businesses in FY24. The Traditional Owner share of spend also grew significantly, with AUD $66.3 M spent across ten Traditional Owner suppliers.

5.1.7 Continuous Improvement Opportunities FY24

Olympic Dam provides opportunities for employment and businesses locally, regionally and state-wide with a focus on Aboriginal people and communities. ODC is also committed to increasing Aboriginal employment in the Olympic Dam workforce and to enabling Aboriginal enterprises from the Northern Region of South Australia to secure contracts at site and ongoing economic development for the region.

Opportunity: Maximise opportunities for South Australian and Aboriginal employment and business participation at Olympic Dam:

- **Develop and implement a local procurement plan with targets to maximise the participation of local, regional and State businesses and employment in supplying goods and services to Olympic Dam;**
- **Continue to explore opportunities to enable Aboriginal people and businesses to participate in Olympic Dam.**

Olympic Dam Corporation has committed to increase Indigenous employment each year by providing roles across Entry level, Apprenticeships and Traineeships. These include Indigenous only campaigns and engagement centres. Indigenous employment initiatives will provide direction and targets to support attraction, retention and development of Indigenous people and communities. Increasing leadership targets for Indigenous employees is also a key initiative for OD. ODC also continues to prioritise the development and growth of businesses owned, managed and controlled by Indigenous and Native Title Holders.

Olympic Dam Corporation is committed to maintaining and enhancing the amenity and lifestyle of Roxby Downs. This requires a good understanding of the social and economic environment and the factors that influence amenity, such as the social cohesion, living costs, housing and social services. It is also recognised that responsibility for some social matters lies outside of the authority of ODC, and as such, will need to be managed collaboratively with the State Government and other key stakeholders.

Opportunity: Maintain and enhance the amenity and lifestyle of Roxby Downs as a desirable place to live and work:

Through OD's Community Donations Program in FY24, OD provided donations towards various community and local council-led initiatives to support the maintenance and enhancement of the Roxby Downs lifestyle. This included donations towards improving changeroom access to the leisure centre, supporting the town oval's LED light conversion and the pump track shade project.

Other examples of donations included community events such as NAIDOC Week, the World Food and Music Festival, the annual Roxby Races and Desert Dash.

ODC has also committed to supporting the Roxby Downs Council-led Roxby Downs Activation Strategy project, with work commencing at the end of FY24 on the planning, design and scoping for community infrastructure projects.

Additionally, the establishment of the SEG provides another avenue for ODC to understand and assess the social and economic environment of Roxby Downs that can benefit from support from OD.

- **Undertake a regular (five-yearly) assessment (social baseline study) of Roxby Downs, Andamooka and Woomera and regular surveying to understand key issues.**

The next social baseline study is expected to take place in FY27.

- **Continue to build on best practice and learnings from other remote Australian mine sites to enhance liveability and build sustainable relationships between the residential community and non-resident workforce.**

None applicable.

- **In collaboration with the South Australian Government and key stakeholders, identify indicators to assist in planning, delivering and monitoring social infrastructure provision.**

None applicable.

- **Work collaboratively with the South Australian Government and key stakeholders to investigate and deliver appropriate social services and infrastructure.**

The draft Community Development Plan addresses the collaborative approach between BHP, the SA government and local council, along with key stakeholders to investigate and deliver appropriate social services and infrastructure.

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7. GLOSSARY

AE	Monitoring Program – Airborne Emissions
AHD	Australian Height Datum - a measure of elevation referenced from approximate sea level
Airodis	Database for AQMS data managed by contracting partner ECOTECH
ANCOLD	Australian National Committee on Large Dams
ANZG	Australian and New Zealand guidelines for fresh and marine water quality. Australian Water Guidelines (2018)
AoI	Area of Influence
ALARA	As low as reasonably achievable
APTS	Acid Plant Tails Stack
Aquifer	Porous water bearing formation of permeable rock, sand, or gravel capable of yielding significant quantities of water
AQMS	Air Quality Monitoring System
ArcGIS	Mapping and analytics software
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
Arid Recovery	An independent not-for-profit running a 123 km2 wildlife reserve adjacent to the SML. ODC is a founding funding partner and continues to support the organisation via BHP's Social Investment program
ARR	Arid Recovery Reserve
Bachmann Criteria	Also known as the "Criteria and procedures for recording and reporting incidents at SA uranium mines". Standard criteria and procedures for reporting uranium incidents | Energy & Mining (energymining.sa.gov.au)
BaU	Business as Usual
BDBSA	Biological Database of South Australia
BOM	Bureau of Meteorology
Bq	Becquerel, a unit of radioactive decay
Bq/g	Becquerel per gram
Bq/m^2	Becquerels per square metre
Bq/m^2/y	Becquerels per square metre per year
CAF	Cemented aggregate fill
Closure	Permanent cessation of operations at a mine or mineral processing site after completion of the decommissioning process, signified by tenement relinquishment
CMP	Calibration Maintenance Plan
CMRP	Closure Management and Rehabilitation Plan
$CO_{2\text{-}e}$	Carbon dioxide equivalent
Context Based Water Targets	Targets that aim to address the shared challenges and opportunities within the catchments where BHP operates

COP	Critical Operating Parameters (for TSF embankment stability)
CPS	Community Perception Survey
CPTu	Cone penetrometer test – undrained
Cu	Copper
CWDF	Contaminated Waste Disposal Facility
CWMP	Contaminated Waste Management Plan
DEM	Department for Energy and Mining
DEW	Department for Environment and Water
Domestic Water Use	Water used in the town of Roxby Downs or Olympic Dam Village
DSI	Detailed Site Investigation
eDNA	Environmental DNA. Organismal DNA that can be found in the environment
EG	Monitoring Program – Energy Use and Greenhouse Gas (GHG) Emissions
EIP	Environment Improvement Program (for PFAS).
EIS	Environmental Impact Statement
EMM or EM Manual	Environmental Management Manual
EM Program	Environmental Management Program
EMS	Environment Management System. The part of an organisation's management system used to develop and implement its environmental policy and manage its environmental aspects (Standards Australia / Standards New Zealand 2004). Note: A management system is a set of interrelated elements used to establish policy and objectives and to achieve those objectives. A management system includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources
Environmental Aspect	An element of the organisation's activities or products or services that can interact with the environment (Standards Australia / Standards New Zealand 2004)
Environmental Impact	Any change to the environment, whether adverse or beneficial wholly or partially resulting from an organisation's environmental aspects (Standards Australia / Standards New Zealand 2004)
EoR	Engineer of Record
EPA	Environment Protection Authority (SA)
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cth)
EPMP	Environmental Protection and Management Program. Describes the environmental management and monitoring activities undertaken by BHP Olympic Dam for the purpose of quantifying any change in the extent or significance of its impacts, assessing the performance of control measures employed to limit impacts, and/or to meet legal and other obligations.
EP 2015, WQ Policy	Environment Protection (Water Quality) Policy 2015
EP	Evaporation Pond. A containment pond to hold liquid wastes to assist with disposal of liquor via evaporation
EP Act 1993	*Environment Protection Act 1993*
ER	Monitoring Program – Environmental Radiation
ERICA	Environmental Risk from Ionising Contaminants: Assessment and Management software tool
ERM	Environmental Resources Management (Consultancy)

ESG	Environmental, Social and Governance
ESO	Emergency Services Officer
FA	Monitoring Program - Fauna
Felixer	Cat grooming trap. Felixers use rangefinder sensors to distinguish target cats and foxes from non-target wildlife and humans, and spray targets with a measured dose of toxic 1080 gel. ODC participated in trials in early 2018 and have since implemented operation of a Felixer as a management tool. (thylation.com)
FL	Monitoring Program - Flora
FoS	Factors of Safety
FY	Financial Year
GA	Monitoring Program – Great Artesian Basin
GAB	Great Artesian Basin
GHG	Greenhouse Gas
GISTM	Global Industry Standard on Tailings Management
GLC	Ground Level Concentration
GMP	Groundwater Management Plan
GPS	Global Positioning System
GW	Monitoring Program – Groundwater
ha	Hectare
HDPE	High density polyethylene
HV	Heavy vehicle
IAEA	International Atomic Energy Agency
IBE	Important Biodiversity and Ecosystems
IBC	Intermediate bulk container
ICRP	International Commission on Radiological Protection
ID	EMP chapter identification
Industrial Water use	Water used in mining or mineral processing operations and excluding domestic water use
IUCN	International Union for Conservation of Nature
kg/m^3	Kilogram per cubic metre
kg $CO_{2\text{-}e}$	Kilograms of carbon dioxide equivalence – a standard measure of greenhouse gas emissions
kg $CO_{2\text{-}e}$/t	Kilograms of carbon dioxide equivalence per tonne of material milled – a measure of greenhouse gas emission intensity of ODC
kL/t	Kilolitres per tonne
kt	Kilotonne
kt $CO_{2\text{-}e}$	Kilotonnes carbon equivalent
Listed Species	Those species or communities that are listed as threatened or migratory under Commonwealth and/or relevant State or Territory legislation
LEMP	Landfill Environmental Management Plan

LGC	Large-scale Generation Certificate
LNAPL	Light Non-Aqueous Phase Liquid
LLRW	Low level radioactive waste
LM1	Licence to Mine
LNAPL	Light non-aqueous phase liquids
LUP	Land Use Permit
LV	Light vehicle
m^3	Cubic metre
mAHD	Elevation in metres with respect to the Australian Height Datum
mg/Nm^3	Milligrams per normal cubic metre
Mining Code	Code of Practice Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing, Radiation Protection Series Publication No. 9, August 2005.
ML	Megalitres
ML/d	Megalitres per day
MP	Monitoring Program. A document which describes the environmental monitoring activities undertaken by ODC for the purpose of quantifying any change in the extent or significance of its impacts, assessing the performance of the control measures employed to limit its impacts, and/or to meet its legal and other obligations
Mt	Million tonnes
Mtpa	Million tonnes per annum
m/s	Metres per second
MSS	Main Smelter Stack
mSv	Millisieverts, a measure of equivalent radiation dose
mSv/y	Millisieverts per year, a measure of equivalent radiation dose per year
MW	Megawatt
MWDP	Mine water disposal pond
Nature Positive	Nature-positive has emerged as a concept that describes a future state of nature (e.g. biodiversity, ecosystem services, and natural capital), which is greater than the current state, where thriving ecosystems continue to support future generations.
NAIDOC	National Aborigines and Islanders Day Observance Committee
NEPM 1999	National Environment Protection Measure (NEPM) (Assessment of Site Contamination) 1999
NGER	National Greenhouse and Energy Reporting
NHB	Non-human biota
nJ/m^3	Nano joules per cubic meter
Nm^3	Normal metres cubed, referring to volume at standard temperature and pressure
NOx	Oxides of nitrogen
NPW Act	*National Parks and Wildlife Act 1972* (SA)
NVC	Native Vegetation Council

NVMP	Native Vegetation Management Plan
ODECC	Olympic Dam Environmental Consultative Committee
ODC	BHP Olympic Dam Corporation Pty Ltd. On 7 May 2021 BHP Billiton Olympic Dam Corporation Pty Ltd changed its name to BHP Olympic Dam Corporation Pty Ltd. The change was a name change only
ODV	Olympic Dam Village, the accommodation camp located at Olympic Dam township
OVMS	Olympic Village Monitoring Site (air quality station)
Pb	Lead
210Pb	A naturally occurring isotope of lead, having atomic number 82, atomic mass 210 and half-life 22.3 years
PD	Passive dust
PFAS	Per- and Polyfluoroalkyl Substances
PFFF	Prohibited fluorinated firefighting foam
pH	A measure of acidity and alkalinity
PIRSA	Department of Primary Industries and Resources South Australia
PM_{10}	Particulate matter with an effective aerodynamic diameter less than or equal to 10 µm
Po	Polonium
210Po	A naturally occurring isotope of polonium, having atomic number 84, atomic mass 210 and half-life 138.38 day
PPA	Power Purchase Agreement
ppm	Parts per million
PS1/PS6A	Pump Station 1/6A Pump stations on the GAB water pipeline
P2NZ	Pathways to Net Zero, P2NZ is BHP's project to achieve and maintain net zero operational emissions by 2050.
Ra	Radium
226Ra	A naturally occurring isotope of radium, having atomic number 88, atomic mass 226 and half-life 1599 years
REC	Renewable Energy Certificate
REPS	Retailer Energy Productivity Scheme (South Australian Government)
RD	Roxby Downs
RDMS	Roxby Downs Monitoring Site (air quality station)
RDP	Radon decay product
Rehabilitation	The reclamation or repair, as far as practicable, of a facility to an appropriate or agreed state as required by law, or company self-regulation
RHDV K5	Naturally occurring Korean variant of the Rabbit Haemorrhagic Disease virus
Rn	Radon. Chemically inert radioactive gaseous element formed from the decay of 226Ra as part of the 238U decay chain
222Rn	A naturally occurring isotope of radon, having atomic number of 86, atomic mass of 22 and half-life 3.8235 days

RRC	Resource Recovery Centre
RWMP	Radioactive Waste Management Plan
SAALLB	South Australia Arid Lands Landscape Board
1SAP	BHP's Systems Applications Products
SE	Monitoring Program – Social Effects
SEB	Significant Environmental Benefit
SEG	Stakeholder Engagement Group
Significant Impact Guidelines	Australian Government, 2013, 'Matters of National Environmental Significance: Significant impact guidelines 1.1, Environment Protection and Biodiversity Conservation Act 1999
SML	Special Mining Lease
SO_2	Sulphur dioxide
SW	Monitoring Program – Surface Water
SX	Solvent Extraction
t	Tonne
TDS	Total dissolved solids
TEC	Threatened Ecological Community
TRH	Total Recoverable Hydrocarbons
TRS	Tailings Retention System - incorporates all elements of the tailings delivery, deposition and storage system and elements associated with the collection and disposal or return of tailings liquor. The TRS includes the Tailings Storage Facilities (TSFs), Evaporation Ponds (EPs) and pipe corridors including tailings delivery pipelines and liquor pipelines
TSF	Tailings Storage Facility - incorporates the tailings deposition and storage system, which currently comprises of six storage cells
Th	Thorium
230Th	An isotope of thorium, having mass number 90 and half-life 7.54 × 104 years.
U	Uranium
^{238}U	The most common isotope of uranium, having atomic number 92, atomic mass 238 and half-life 4.46 × 109 years
$\mu Bq/m^3$	Microbecquerel per cubic meter
$\mu g/m^3$	Microgram per cubic meter - a measure of dust concentration in air
µGy/h	Microgray per hour - a measure of absorbed radiation dose
VWP	Vibrating Wire Piezometers. Used to measure pore water pressure
WA	Monitoring Program – Waste
WoNS	Weeds of National Significance
WWTP	Waste Water Treatment Plant