



Finniss Lithium Project - BP33

Underground

Water Balance Modelling Report

Core Lithium
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For and on behalf of WRM Water & Environment Pty Ltd
 3 Whitfield Street, Darwin
 GPO Box 43348 Casuarina NT 0811
 Tel 08 8911 0600



Julian Orth
 Principal Engineer

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1 Introduction

1.1 GENERAL

WRM Water & Environment Pty Ltd was commissioned by EcOz Environmental Consultants on behalf of Core Lithium Ltd to undertake a Water Balance (WB) assessment for the proposed BP33 underground, which forms part of the greater Finnis Lithium Project.

The Finnis Lithium Project is located in the Northern Territory approximately 25 km southwest of Darwin. The product will be hauled to the East Arm Port for distribution. A locality plan of the Finnis Lithium Project is shown in Figure 1.1.

1.2 STUDY SCOPE

This report describes the proposed water management system including water supplies, water demands and water storages. The BP33 site water balance has been modelled using the GoldSim simulation model. The risk of offsite spills, water management strategies and the site storage behaviour has been assessed for the life of mining for the Finnis Lithium project. The water balance results were assessed against the site-specific objectives, which are as follows:

- Manage surface water such that community values and ecosystems are maintained downstream of the BP33 mine lease;
- Ensure all onsite water demands are met (including the underground demand and haul road dust suppression);
- Site and operate all mine water storages to limit the risk of uncontrolled offsite spills; and
- Design and operate the water management system to limit the risk of underground interruption (interruption due to water inundation).

1.3 REPORT STRUCTURE

This report is structured as follows:

- Section 2 summarises the available data.
- Section 3 describes the water balance model setup.
- Section 4 presents the forecast performance appraisal for the water management system.
- Section 5 presents a forecast inventory tracking assessment.
- Section 6 summarises the assessment.
- Section 7 provides a list of references.

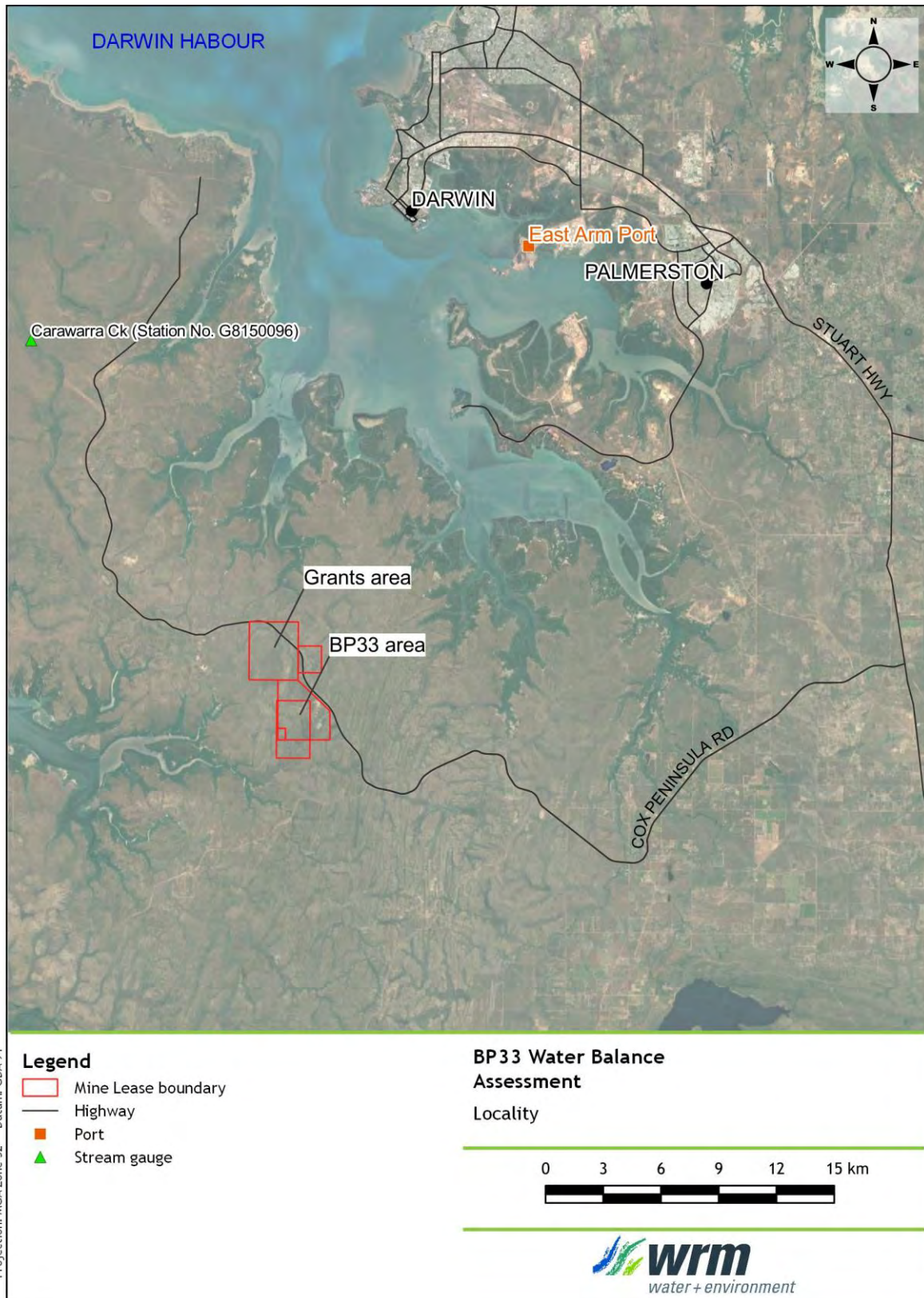


Figure 1.1 - Locality

2 Available data

2.1 OVERVIEW

The following information was provided by Core Lithium and EcOz to inform the WB for BP33:

- Finnis Lithium production schedule;
- BP33 site layout;
- Grants Supplementary Environmental Impact Statement (EIS) report (Core, 2019);
- Grants Mining Management Plan (MMP) report (Core, 2019a); and
- Groundwater modelling assessment (CloudGMS, 2021).

2.2 SITE CONFIGURATION AND SCHEDULE

BP33 forms part of the greater Finnis Lithium Project, which encompasses both BP33 and the adjacent open cut and underground operation, Grants. The locations of the two sub-projects are shown in Figure 2.2. The two areas would be interconnected; BP33 ore would be processed at the Grants facilities and water transfer between the sites would be undertaken to supply demands and provide additional storage capacity.

The adopted works schedule for the greater Finnis Lithium project is shown in Figure 2.1. The adopted dates are indicative only. The following is of note regarding the schedule of works:

- Construction of the Grants Open Cut (OC) would begin in January 2022 (Month 1), for production to begin in June 2022. Ore extraction in the Grants OC would be completed by July 2024;
- Construction of the Grants Underground (UG) would begin in February 2024, for production to begin in April 2024. Ore extraction in the Grants UG would be completed by September 2024; and
- Construction of the BP33 Box Cut (BC) and UG would begin in May 2023, for production to begin in July 2024. Ore extraction in the Grants UG would be completed by November 2026.

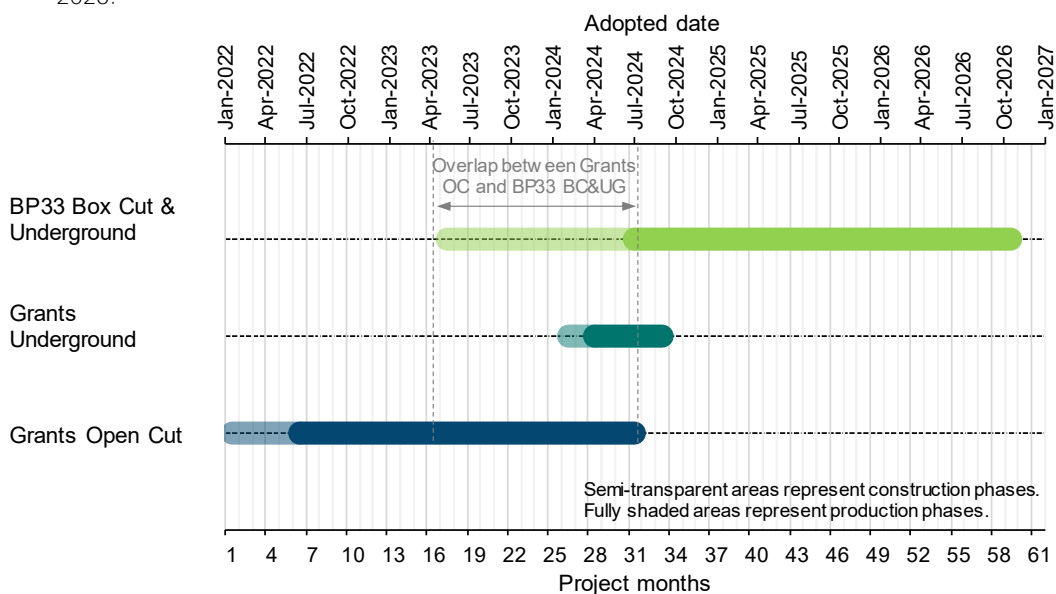


Figure 2.1 - Finnis Lithium adopted work schedule

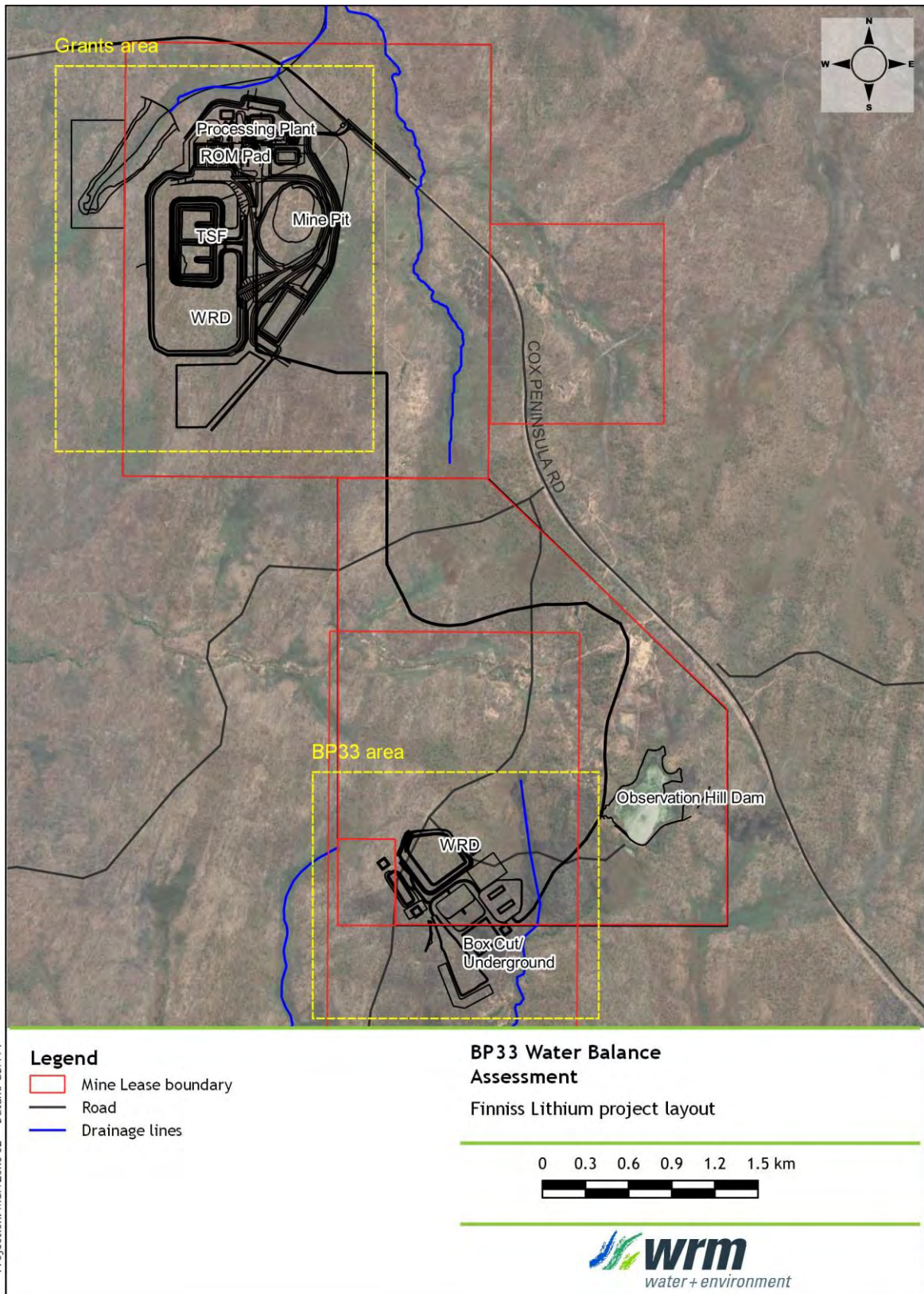


Figure 2.2 - Finniss Lithium project layout

2.3 CLIMATE DATA

Rainfall and evaporation data was obtained for the Mine site from the Department of Environment and Science (DES) SILO Data Drill Service. The SILO Data Drill data provides a continuous daily data set between 1889 and 2021. Derived daily pan evaporation, lake evaporation and actual evapotranspiration rates were also available for BP33 from the SILO Data Drill Service.

2.3.1 Rainfall

The average monthly rainfalls at BP33 exhibit distinct wet (October to April) and dry (May to September) seasons during the year, with a dry season low of 1.2 mm in July to a wet season high of 389 mm in January. The wet season average monthly rainfalls (57 mm to 389 mm) are significantly higher than the equivalent dry season monthly rainfalls (1.2 mm to 14.1 mm). The recorded mean annual rainfall at the site over the period 1889 to 2021 is approximately 1,526 mm.

Table 2.1 shows the mean monthly and annual SILO Data Drill rainfall at the BP33 based on the available 132 years of data. Figure 2.3 and Figure 2.4 show the statistical variation of monthly and cumulative rainfall at BP33.

2.3.2 Evaporation

Table 2.1 shows the mean monthly and annual SILO Data Drill pan evaporation values at BP33 based on the available 131 years of data. Table 2.1 shows the variation of mean monthly evaporation and evapotranspiration at BP33. The average annual pan evaporation at the site is estimated to be approximately 2,291 mm, which is approximately 1.5 times the average annual rainfall. Table 2.1 also shows FAO56 Penman-Monteith evapotranspiration (Allen et al., 1998) rates obtained from the SILO Data Drill service. The FAO56 evapotranspiration data was used to calculate the irrigation requirements at BP33.

Soil moisture evapotranspiration losses in the AWBM model were estimated using Morton's Wet evapotranspiration, which is on average 98% of Morton's Lake evaporation in the vicinity of the project.

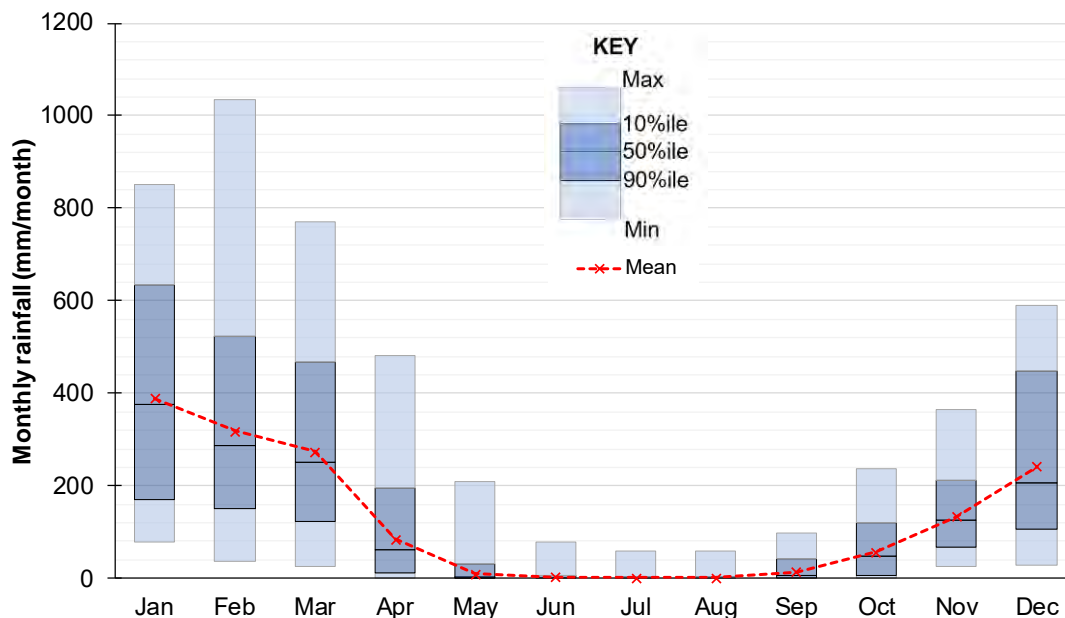


Figure 2.3 - Monthly rainfall at BP33 from 132 years of SILO Data Drill rainfall data

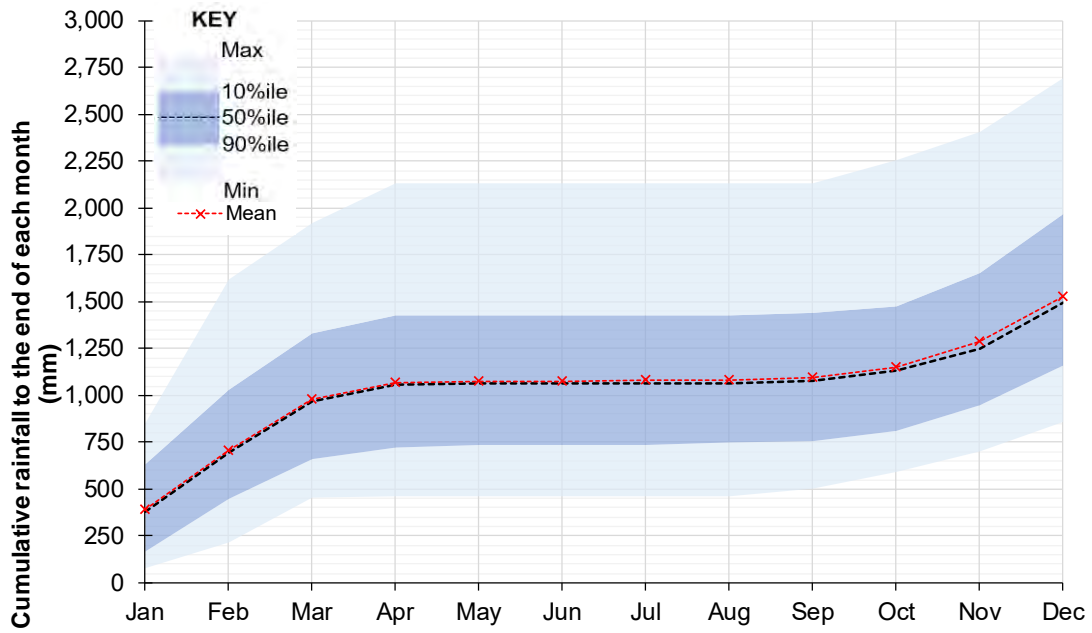


Figure 2.4 - Cumulative monthly rainfall at BP33 from 132 years of SILO Data Drill rainfall data

Table 2.1 - SILO Data Drill mean monthly rainfall and evaporation at BP33

Month	Mean Monthly Rainfall (mm)	Mean Monthly Pan Evaporation (mm)
January	389	173
February	318	148
March	274	163
April	84.1	176
May	10.0	186
June	2.3	178
July	1.2	193
August	1.3	211
September	14.1	223
October	57.0	238
November	133	210
December	241	191
Annual	1,526	2,291

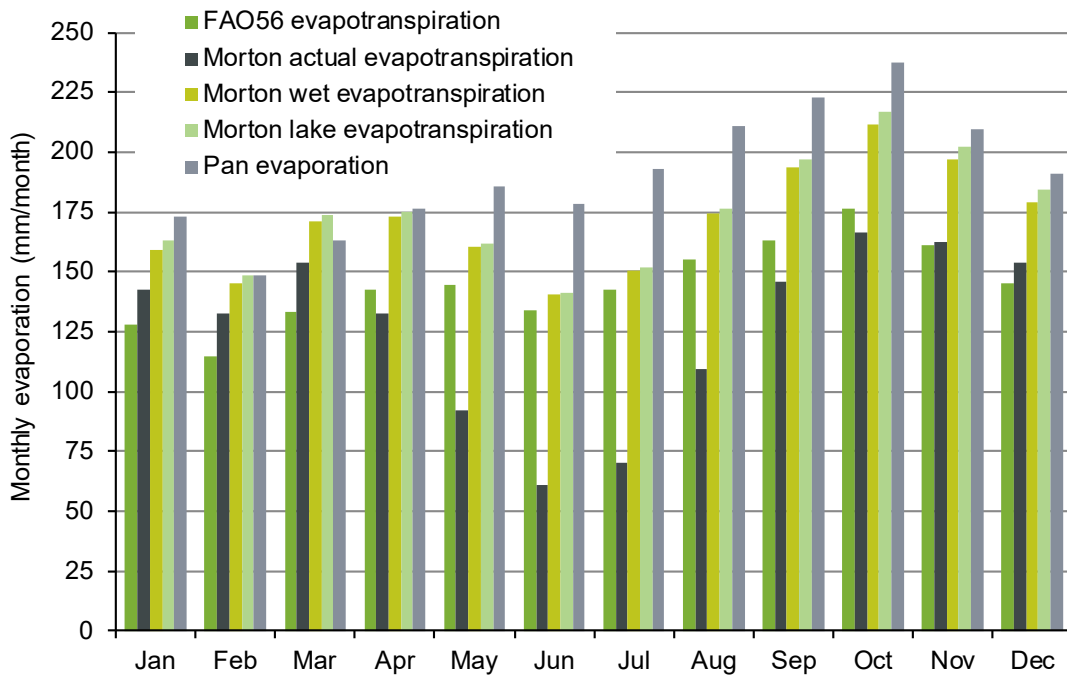


Figure 2.5 - Mean monthly evaporation and evapotranspiration at BP33 from 132 years of SILO Data Drill rainfall data

3 Water balance model configuration

3.1 OVERVIEW

A computer-based operational simulation model (GoldSim) was used to assess the dynamics of the mine water balance under conditions of varying rainfall, water quality and production rates between January 2022 and November 2026. The GoldSim model dynamically simulates the operation of the water management system (WMS) and keeps complete account of all site water volumes and contaminant loads on a daily time step. For the purpose of this assessment, two contaminants were tracked through the BP33 WMS:

- Electrical conductivity; and
- Arsenic.

Tracking these contaminants informs key operations, including maximum allowable controlled release rates.

The model has been configured to simulate the operations of all major components of the mine water management system. The simulated inflows and outflows included in the model are given in Table 3.1.

Table 3.1 - Simulated inflows and outflows to the BP33 WMS

Inflows	Outflows
Catchment runoff	Evaporation from water storages
Groundwater supply	Underground demand
Direct rainfall	Haul road dust suppression demand
Observation Hill Dam water supply	Miscellaneous demand
Grants area water supply	Transfers to Grants area (excess water storage)
	Controlled release

3.2 SIMULATION METHODOLOGY

The WB assessment simulated the period from 1 January 2022 (Month 1) to 30 November 2026 (Month 59) on a daily timestep to include the Grants area operations from 1 January 2022 (Month 1) to 30 September 2024 (Month 31). The configuration of the Grants water balance model is documented in WRM (2021). The results presented in this assessment only show the period in which BP33 is active, which includes:

- Start-up phase: 1 May 2023 (Month 17) to 1 October 2024 (Month 32); and
- Production phase: 1 October 2024 (Month 33) to 1 January 2027 (Month 59).

The Start-up phase represents the BP33 construction activities (1 May 2023 to 1 July 2024) and the initial months of production (1 July 2024 to 30 September 2024). The Start-up phase ends when mining is completed in the Grants area (by 30 September 2024). The Production phase represents the majority of ore production at BP33 (1 October 2024 to 1 January 2027).

The same WMS configuration was adopted for the Start-up and Production phases.

The BP33 water balance model was run for 127 climatic realisations developed using the 132 years of rainfall and evaporation data in order to assess a wide range of climatic scenarios. As the BP33 is yet to commence, there was no data available for model calibration.

GoldSim version 12.1.5 was used for all simulations.

3.3 WATER MANAGEMENT SYSTEM

3.3.1 Water management system configuration and schematic

The water management objectives for BP33 that were adopted for this assessment include:

- Where possible, divert clean runoff from undisturbed areas around areas disturbed by mining activities and allow to drain from the site;
- Capture suspended sediment in site runoff in accordance with an Erosion and Sediment Control Plan. This will include controlling sediment-laden runoff and passing it through sediment control structures prior to releasing it to limit any potential downstream sedimentation;
- Contain mine water in on-site water storages for reuse as a water supply to the mine demands; and
- Mine runoff and groundwater inflows will drain to collection sumps and be pumped to dedicated on-site storage dams or, if required, to the completed Grants pit.

A summary of the modelled WMS operating rules for the forecast period is outlined in Table 3.2 and shown schematically in Figure 3.1.

Table 3.2 - Operational rules for the BP33 WMS

Item	Node Name	Strategy/purpose	Operating Rules
<u>1.0 External water supply</u>			
1.1	Observation Hill Dam (OHD)	Clean water dam that collects natural runoff to make-up any site demands	<ul style="list-style-type: none"> • Transfers make-up water to RWD, if required to meet onsite water demands • Receives bore water inflows • Supplies ablation and surface facilities demand
1.2	Grants area	Water from the adjoining Grants project could be transferred to BP33 if required	<ul style="list-style-type: none"> • Transfers make-up water to RWD, if required to meet onsite water demands
1.3	Bore water	Bore water can be sourced in the event that stocks are low in OHD. Bore water would only be used as a last resort, and is not expected to be required for the BP33 project at this stage.	<ul style="list-style-type: none"> • Transfers make-up water to OHD, if required to meet onsite water demands
<u>2.0 Supply to demands</u>			
2.1	Haul road dust suppression	Water required to meet haul road dust suppression demands	<ul style="list-style-type: none"> • Supplied by MSD
2.2	Underground water demand	Water required for underground works	<ul style="list-style-type: none"> • Supplied by MSD
2.3	Miscellaneous water demand	Water required for vehicle washdown, fire water, ect.	<ul style="list-style-type: none"> • Supplied by OHD
2.4	Irrigation demand	Water used for irrigation to manage BP33 site inventory	<ul style="list-style-type: none"> • Supplied by MSD when MSD stored volume is greater than 20 ML
<u>3.0 Operation of active mining areas</u>			

Item	Node Name	Strategy/purpose	Operating Rules
3.1	Box Cut (BC)	Groundwater and runoff entering BC would be collected in a sump to prevent water from overflowing down the decline and into the UG.	<ul style="list-style-type: none"> • Receives rainfall runoff and groundwater inflows • Dewateres to MSD, if possible
3.2	Underground (UG)	The UG would be kept as empty as possible by continuous dewatering, to prevent any interruptions to mining operations.	<ul style="list-style-type: none"> • Receives groundwater inflows • Dewateres to MSD, if possible
4.0 Operation of water storages			
4.1	MSD	Out of pit storage for BC and UG, as well as the controlled release location for BP33.	<ul style="list-style-type: none"> • Receives dewatering inflows (in order of priority): <ul style="list-style-type: none"> ○ UG ○ BC • Controlled release to receiving environment • Receives make-up water from RWD, if required to meet onsite demands • Supplies irrigation demand • Supplies underground demand • Supplies haul road dust suppression demand • Emergency transfer to Grants void if water is accumulating in the UG (and production at Grants has ceased) • Overflows to receiving environment
4.2	RWD	Supplies site demands and receives make-up water inflows from external sources including OHD and the Grants area.	<ul style="list-style-type: none"> • Receives make-up water from (in order of priority): <ul style="list-style-type: none"> ○ OHD ○ Grants area • Supplies make-up water to MSD • Overflows to receiving environment
4.3	SB1	Collects sediment runoff	<ul style="list-style-type: none"> • Overflows to the receiving environment
4.4	SB2	Collects sediment runoff	<ul style="list-style-type: none"> • Overflows to the receiving environment
4.5	SB3	Collects sediment runoff	<ul style="list-style-type: none"> • Overflows to the receiving environment

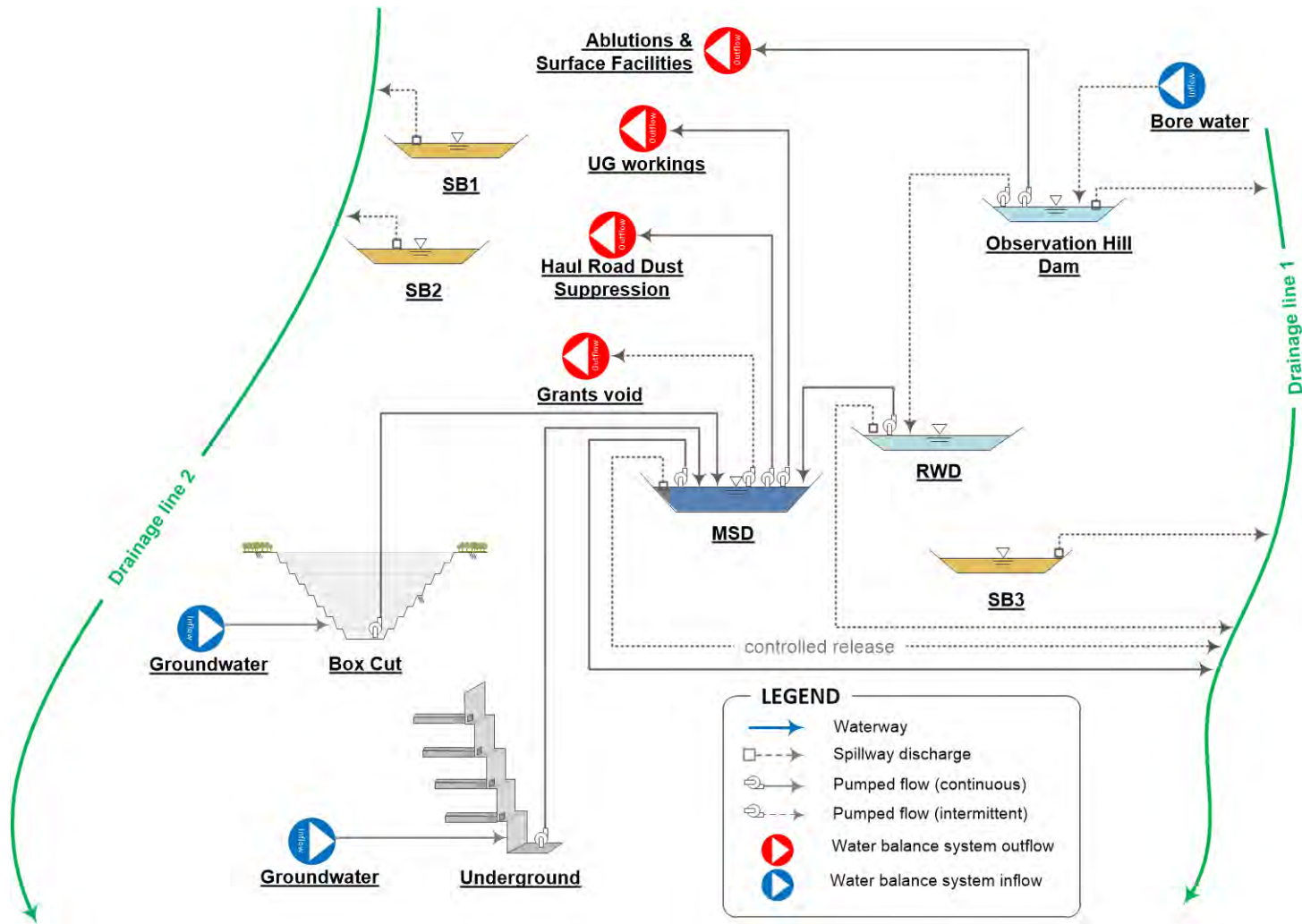


Figure 3.1 - Schematic of the proposed BP33 mine water circuit

3.3.2 Storage characteristics

‘Trigger’ volumes related to the management of water dams at BP33 are defined as follows:

- Maximum Operating Volume (MOV) is the volume that, when exceeded, triggers the dam to cease receiving further water transfer inflows from other storages. The maximum **operating volume determines the “operating water level” of the dams.**
- Total Storage Volume (TSV) is the overall storage capacity of the dam from the base to the spillway level.

Table 3.3 shows the TSVs and MOVs for the BP33 water dams. When water storage inventories exceed their MOVs they will dewater to the receiving storage (provided that the receiving storage has capacity below its MOV). Where a water storage accumulates water to the TSV, it will then overflow to a downstream storage or the environment.

Table 3.3 - Storage characteristics for the BP33 WMS

Dam Name	TSV (ML)	MOV (ML)	Footprint Area (ha)
MSD	156	120	4.0
Box Cut sump	5	0*	up to 7.8
RWD	6.25	5	0.5
SB1	5.0	N/A	0.4
SB2	9.3	N/A	0.4
SB3	20.0	N/A	0.4
OHD Dam	620	N/A	19.8

* the Box Cut sump should only store water in emergency wet conditions.

The MOV for each storage was determined based on preliminary water balance optimisation assessments. That is, the water storages were configured to maximise the available storage capacity, while maintaining an appropriate spill risk.

Appendix A shows the adopted stage-storage-surface area relationships for the mine water storages. The adopted relationships were taken from design drawings of the BP33 area and assumed volumes.

3.3.2.1 Box Cut sump sizing requirements

Based on advice from Core personnel, the BC sump capacity would be approximately 5 ML. A preliminary sizing assessment was undertaken using the daily water balance model to determine the pump size to dewater the sump. The pump size requirement to manage a 10% AEP 7-day storm (including groundwater) would be approximately 100 L/s. It is recommended that a detailed sump sizing assessment is undertaken once the sump site has been confirmed to determine the sump dewatering requirements taking into account sub-daily and daily design storms.

Due to the small size of the sump, more frequent, short duration (<1 day) storm events may exceed the 5 ML sump capacity when considering delays in turning the pump on and/or equipment failure. Hence, it is also recommended that Core consider redundancy in this dewatering system, given how critical the BC sump dewatering in prevent UG inundation (i.e., a backup 100 L/s diesel pump and second pipeline).

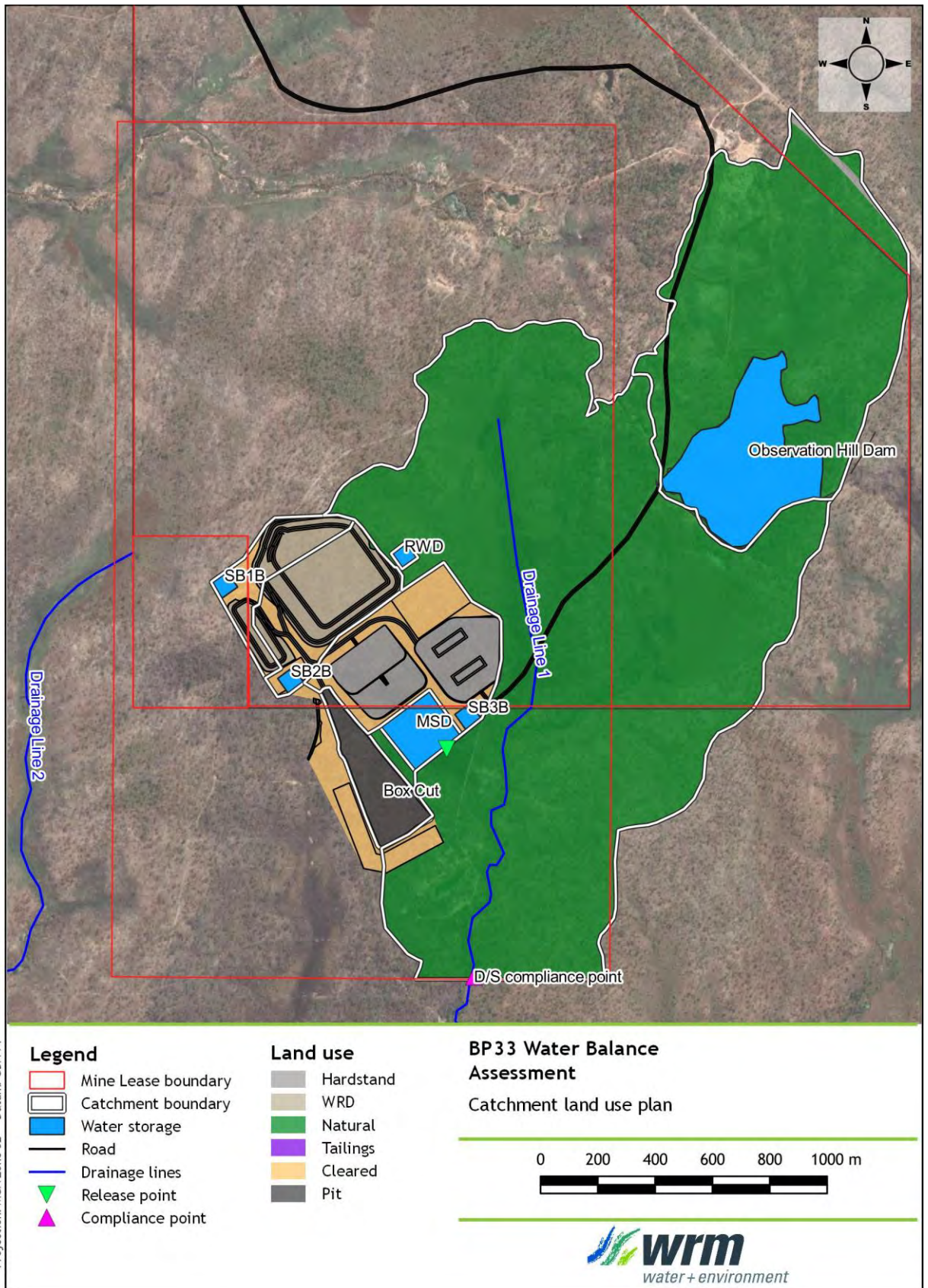


Figure 3.2 - BP33 catchment areas and landuse mapping

3.3.3 Catchment areas and land use classification

The breakdown of catchment areas reporting to each of the water storages at BP33 is shown in Error! Reference source not found. and Figure 3.2.

Table 3.4 - BP33 catchment areas

Dam Name	Undisturbed area (ha)	Hardstand area (ha)	Box cut area (ha)	Waste Rock area (ha)	Cleared area (ha)	Total area (ha)
MSD	0.1	4.0	0	0	0.2	4.3
Box Cut sump	0	0	7.8	0	0	7.8
RWD	0	0.4	0	0	0	0.4
SB1	0.2	0.4	0	6	1.8	8.4
SB2	0.1	1.1	0	12.7	2.2	16.1
SB3	0.3	14.3	0	0	9.6	24.2
Total	0.7	20.2	7.8	18.7	13.8	61.1
OHD	92.8	1.0	0.0	0.0	0.0	93.8

Catchment runoff was modelled using the Australian Water Balance Model (AWBM). Catchments across the site were characterised into the following land use types:

- Natural/undisturbed, representing areas in their natural state (the derivation of the **'natural' AWBM runoff parameters is shown in Appendix B**);
- Hardstand and water management areas, including the ROM pad;
- Box cut;
- Waste rock dumps (WRD) - we have assumed that the WRDs would be capped with low permeability material following placement; and
- Cleared areas, representing cleared areas with relatively consolidated soils.

The adopted rainfall runoff parameters are summarised in Table 3.5.

Table 3.5 - Adopted AWBM parameters for the BP33 water balance

Parameter	Undisturbed	Hardstand	Box cut	WRD	Cleared
C1 (mm)	10	2	1	50	6.0
C2 (mm)	20	10	30	150	25.0
C3 (mm)	120	30	-	200	100
A1	0.5	0.33	0.20	0.133	0.133
A2	0.3	0.33	0.80	0.433	0.433
BFI	0.4	0	0	0	0
Kbase	0.95	0	0	0	0
Ksurf	0.4	0	0	0	0

3.4 GROUNDWATER INFLOWS TO THE PITS

The adopted groundwater inflow rates to the pits are based on estimates provided by CloudGMS (2021). The groundwater inflows were provided as monthly inflow volumes for the BP33 BC and

UG over the project life. Figure 3.3 gives a summary of the predicted monthly groundwater inflow volumes that were adopted for the WB assessment. Note that the volumes presented are net inflows after considering any seepage out of each void.

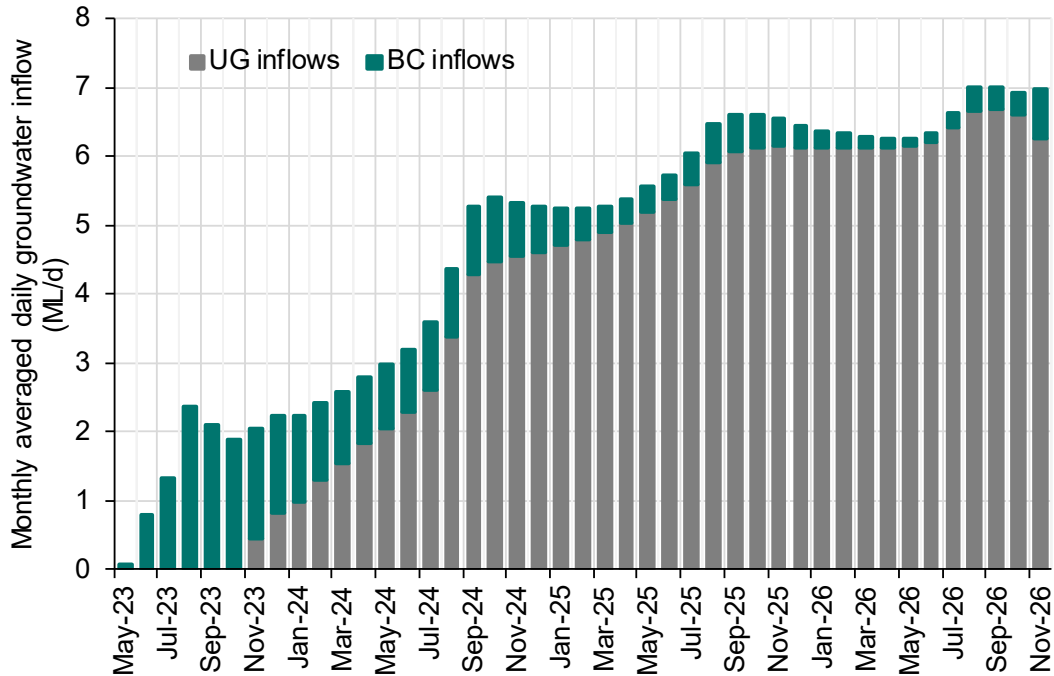


Figure 3.3 - Predicted groundwater inflows into the BP33 Box Cut and UG

3.5 PRODUCTION

The adopted BP33 production schedule is shown in Figure 3.4. The production schedule was developed using the following assumptions:

- Moisture contents:
 - ROM ore: 3 w/w%
 - Product: 10.0 w/w%
 - Fine tailings: 50 w/w%
 - Coarse rejects: 10.0 w/w%
- Product yield: 21% (dry tonnes of Product divided by Rejects)
- Fine tailings / coarse reject spilt: 35% (dry tonnes)

Ore extracted from BP33 will be trucked to the Grants area for processing.

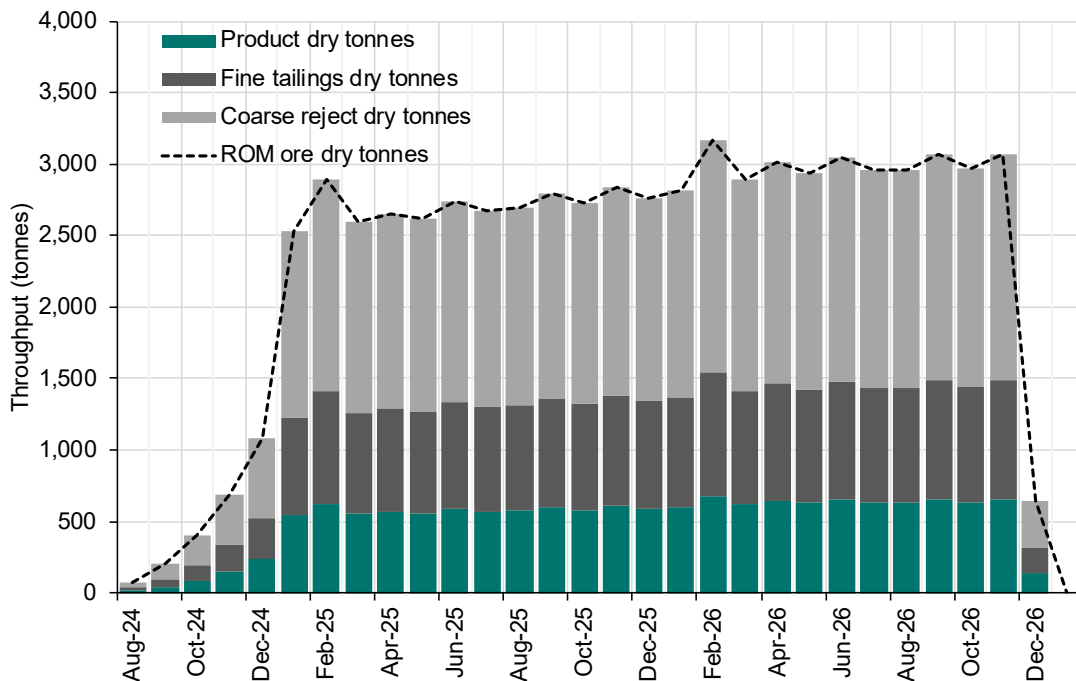


Figure 3.4 - BP33 production schedule

3.6 OPERATIONAL DEMANDS

Operational demands were limited to haul road dust suppression, underground demand and miscellaneous water demand. Table 3.6 shows the proposed water demands adopted for the WB assessment per advice from Core personnel. It is proposed to source haul road dust suppression as well as ablation and surface facility water from RWD while underground water use will be sourced from MSD. Core are investigating the possibility of using MSD water for haul road dust suppression to manage excess water onsite.

Table 3.6 - Estimated operational water demands

Usage	Demand (ML/d)
Haul road dust suppression	up to 2.0 ^a
Underground water use	0.5
Ablution and surface facility use	0.12

^a It has been assumed that haul road dust suppression would not be required when the rainfall on a given day is greater than the daily evaporation rate.

3.7 SUPPLEMENTARY EXTERNAL WATER

The Project has the ability to source external water if required to meet site water demands. It is proposed to source water for haul road dust suppression as well as ablation and surface facility water firstly from OHD prior to using water from external sources. It is proposed to upgraded OHD to have a maximum holding capacity of 620 ML and can transfer water to RWD at a maximum rate of 4 ML/d. If no water is available in OHD, water may need to be sourced from the Grants area.

3.8 WATER QUALITY

Table 3.7 shows the adopted water quality parameters for the modelled contaminants:

- Electrical conductivity (EC); and
- Arsenic.

The majority of the water quality parameters were derived from the baseline surface water quality data presented in the MMP water management plan and waste characterisation report (Core, 2019a), with the exception of expected ground water quality entering Grants and BP33 works, which was supplied by EcOz. Based on available water quality monitoring data, arsenic will be the primary contaminant of concern, due to the naturally elevated concentrations observed in the groundwater sampling.

Table 3.7 - Adopted water quality parameters

Water source/ Land use	EC ($\mu\text{S}/\text{cm}$)	Arsenic ($\mu\text{g}/\text{L}$)
Rainfall	1	0
Undisturbed runoff	16.4	1.0
Hardstand runoff	350	4.5
Tailings runoff	500	200
Open pit runoff	500	4.5
WRD runoff	350	4.5
Cleared runoff	280	4.5
Grants groundwater	172	94
BP33 groundwater	172	215

3.9 CONTROLLED RELEASES

Controlled releases will be undertaken from MSD during wet weather conditions into Drainage Line 1. The maximum allowable controlled release rate for this assessment was determined based on the dilution factors required to meet the arsenic site-specific guideline value (SSGV) of 13 $\mu\text{g}/\text{L}$. The dilution requirements were based on the modelled arsenic concentration in MSD. The flow volumes in Drainage Line 1 at the ML boundary was estimated using a 210 ha **catchment area for Drainage Line 1 and the 'natural' AWBM** parameters. The arsenic concentration in the receiving water was assumed to be 1 $\mu\text{g}/\text{L}$ based on available monitoring data.

3.10 BP33 EXCESS WATER TRANSFERS TO GRANTS

It was assumed that, once mining is completed in the Grants area in September 2024 (Month 34), excess BP33 water will be transferred to and stored in the Grants void. Grants OC void would have a capacity of 13 GL at the cessation of mining.

3.11 IRRIGATION

It is proposed to use irrigation during the Start-up phase of BP33 to manage groundwater inflows that cannot be dewatered to the Grants area (as production would not have finished at the Grants area - see Figure 2.1). The irrigation method is currently being investigated. Current options being considered include woodland irrigation and/or suitable infrastructure areas (e.g., temporary waste rock dumps and the box cut) within the operations.

The irrigation rate was estimated using FAO56 Penman-Monteith evapotranspiration (Allen *et al.*, 1998). The long-term FAO56 evapotranspiration data was obtained from the SILO Data Drill service from 1889 to current. The volume and area that would need to be irrigated to manage the groundwater inflows during the BP33 Start-up phase is discussed in Section 4.3.6.3. The maximum area available for irrigation has been assumed to be 20 ha.

3.12 SUMMARY OF KEY WATER BALANCE ASSUMPTIONS

A number of key assumptions have been made as part of this water balance assessment. Any changes to these assumptions may affect the outcomes of the assessment. The key assumptions are as follows:

- Mining would commence at Grants OC in January 2022 (Month 1).
- Excess water in the BP33 BC and UG will be dewatered to the Grants OC void after September 2024 once mining in the Grants area ceases.
- The Drainage Line 1 runoff characteristics are suitably represented by the calibrated AWBM runoff parameters for Carawarra Creek.
- The modelled controlled release rate would not be capped by a minimum or maximum pump/release rate. Controlled release volumes are only be constrained by the dilution requirements in Drainage Line 1 and only occur during the wet season.
- The BP33 BC sump is assumed to have a volume of 5 ML. Potential BC sump overflows would enter the BP33 UG.
- The FAO56 rates would be representative of the maximum irrigation rates in the vicinity of the Finnis Lithium project.
- BP33 groundwater (from MSD) will be used for haul road dust suppression.

4 Water management system performance assessment

4.1 OVERVIEW

4.1.1 General

The simulated performance of the water management system has been assessed against its design objectives (as listed in Section 1.2). The water volumes that need to be managed by the system will vary widely because of the large range of different weather conditions that can be experienced at the Project. The aspects of the system that would enable it to operate effectively during dry conditions are different to those that would accompany prolonged wet periods. The system will also need to manage short term as well as long term climatic patterns and trends. The ability of the system to meet its design objectives under a range of climatic conditions has been assessed by simulating the system for seven years for 132 simulations using 132 years of rainfall data. An indicative water balance for representative very wet, wet, median, dry and very dry years has also been undertaken.

For the purpose of the water balance assessment, the base case was assumed to be per the calibrated groundwater model. Sensitivity assessments were undertaken to determine the potential impact to the site water inventory for the following alternative scenarios:

- Increased groundwater inflows into the box cut and underground; and
- Decreased groundwater inflows into the box cut and underground.

4.2 OVERALL WATER BALANCE

Table 4.1 shows a summary of the BP33 site water balance results for a range of climatic conditions over the BP33 Start-up and Production phases. Note that this table does not include the BP33 sediment dams, as it has been assumed that they will not interact with the BP33 mine water management system. The following is of note with respect to the BP33 water balance:

- The BP33 mine water balance will be net positive. That is, water inflow sources will be greater than water losses and usage. This is mainly due to the significant amount of predicted groundwater inflows (6,359 ML) into the BP33 WMS being greater than BP33 losses and usage (3,327 ML) during the operational period. Hence, additional water disposal methods will be required to manage excess groundwater;
- Most of the groundwater inflows received by the BP33 WMS would be transferred to the Grants WMS and stored in the finished Grants OC void;
- There would be no spills from the BP33 mine water storages (MSD and RWD) for any of the climatic conditions assessed.

Table 4.1 - BP33 mine water balance summary - May 2023 to November 2026

	Description	Average (ML/period)
Water Source (Inputs)	Surface water inflows	401
	Groundwater inflow	6,359
	Inflows from OHD	403
	Bore water inflows	0
	Total Input	7,164
Water Losses and Usage (Outputs)	Evaporation (from water storage)	288
	BP33 demands*	3,039
	Offsite overflows	0
	Total Output	3,327
Site water balance excluding water disposal measures	Total Input-Total Output	3,837
Water disposal measures	Transfers to Grants area	3,197
	Irrigation loss	176
	Controlled releases offsite	342
	Total Disposal	3,715
Site water balance including water disposal measures	Total Input-Total Output-Total Disposal	122

* Includes haul road dust suppression, underground demand and ablutions/surface facility demands

4.3 WATER BALANCE SIMULATION STATISTICS

4.3.1 Interpretation of model results

When interpreting the results of the water balance assessment, it should be noted that the **results provide a statistical analysis of the water management system's performance over 59 months**, based on 132 climatic sequences.

The model results are presented as a probability of exceedance. For example, the 10th percentile represents 10% probability of exceedance and the 90th percentile results represent 90% probability of exceedance. There is an 80% probability that the result will lie between the 10th and 90th percentile traces.

Whether a percentile trace corresponds to wet or dry conditions depends upon the parameter being considered. For site water storage, where the risk is that available storage capacity will be exceeded, the lower percentiles correspond to wet conditions. For example, there is only a small probability that the 1st percentile storage volume will be exceeded, which would correspond to very wet climatic conditions. For off-site water supply volumes (for example), where the risk is that insufficient water will be available, there is only a small chance that more than the 1st percentile water supply volume would be required. This would correspond to very dry climatic conditions.

It is important to note that a percentile trace shows the likelihood of a particular value on each day and does not represent continuous results from a single model realisation. For example, the 50th percentile (P50) trace does not represent the model time series for median climatic conditions.

4.3.2 Site storage behaviour

Figure 4.1 shows the predicted total BP33 WMS inventory for a range of climatic conditions. This figure shows the WMS inventory is not predicted to empty each dry season.

The following is of note regarding individual site storages:

- The mine water storage inventories are generally maintained below the site MOV;
- The site inventory would be maintained during the BP33 Start-up phase by undertaking irrigation;
- The site inventory would be maintained during the BP33 Production phase by dewatering excess water to the Grants OC; and
- The inundation risk to the UG is described in Section 4.3.4.

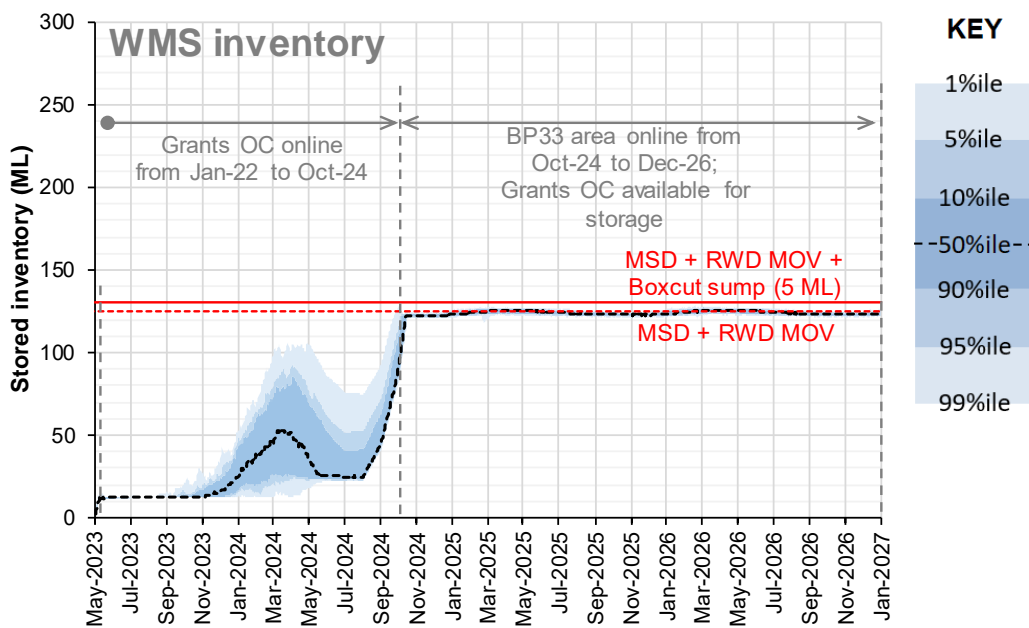


Figure 4.1 - Forecast total BP33 WMS inventory

4.3.3 Dam spill risk

The frequency of off-site spills from mine water storages (wet weather discharges) is shown in Table 4.2. This table shows that for the 132 years of climatic data simulated, no past climatic conditions were predicted to result in water storage discharge, with the exception of the BC sump in extreme wet (1%ile) conditions.

Table 4.2 - Frequency of offsite spills (wet weather discharges) for BP33

Storage	Median (50%ile) Result	Wet (90%ile) Result	Very Wet (99%ile) Result	Wettest (Maximum) Result
Box Cut	0 spills (0 ML)	0 spills (0 ML)	0 spills (0 ML)	1 spill (11 ML)
MSD	0 spills (0 ML)	0 spills (0 ML)	0 spills (0 ML)	0 spills (0 ML)
RWD	0 spills (0 ML)	0 spills (0 ML)	0 spills (0 ML)	0 spills (0 ML)

4.3.4 Underground inundation risk

The UG would not be inundated for any of the climatic conditions assessed. This is a result of the proposed excess water management strategies discussed in Section 4.3.6.

4.3.5 Supplementary external water demands

Figure 4.2 shows the monthly external water requirement from OHD. OHD water would be used to supply ablution and surface facility demands and deliver make-up water to supply other BP33 demands, if required. This figure shows that the highest monthly volumes of OHD water would be required in the first month of operations, while the groundwater inflows rates are still ramping up. During this period up to 4 ML/month would be required from OHD during median climatic conditions to meet ablutions/surface facility demands. An initial 90 ML would be required in the first month to supply dust suppression and underground demands (via MSD) as the groundwater and surface runoff at BP33 would not be sufficient to meet demands.

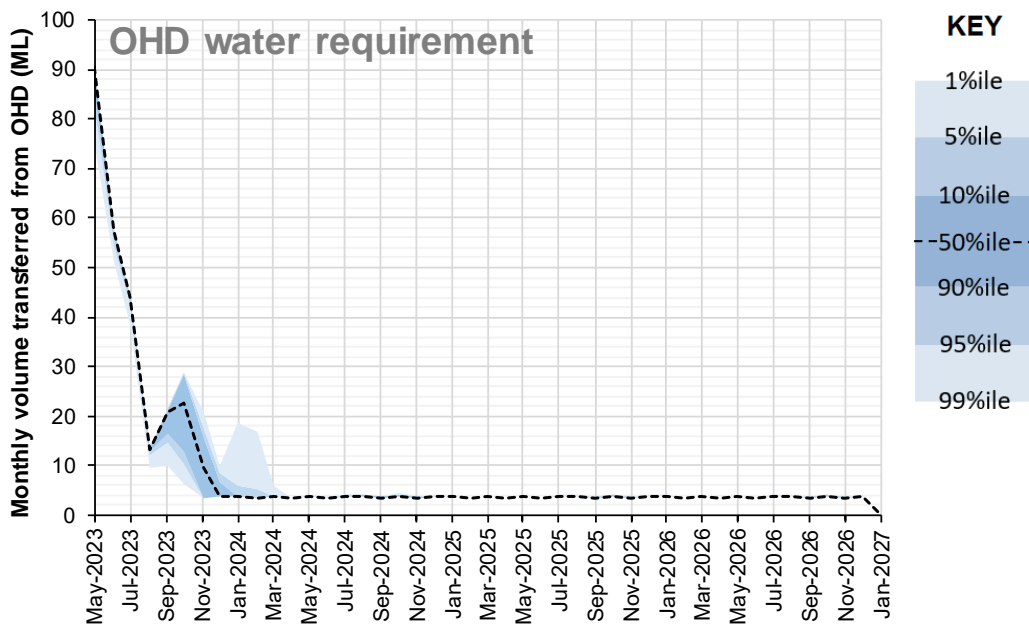


Figure 4.2 - Monthly OHD water requirements

No bore water would be required for any of the climatic conditions assessed.

4.3.6 Management of excess BP33 mine water

4.3.6.1 Transfer to Grants OC

Figure 4.3 shows the monthly volumes that would need to be transferred to the Grants OC to keep the UG dry during the Production phase. This figure shows that between approximately 60 ML/month to 180 ML/month would need to be transferred to Grants OC void to fully dewater the BP33 UG. The Grants void is predicted to accumulate up to approximately 4.7 GL by January 2027 during median climatic conditions, which is approximately half of the total Grants void capacity (as shown in Figure 4.4). This assumes that controlled releases to the receiving environment occur from the Grants pit during this period.

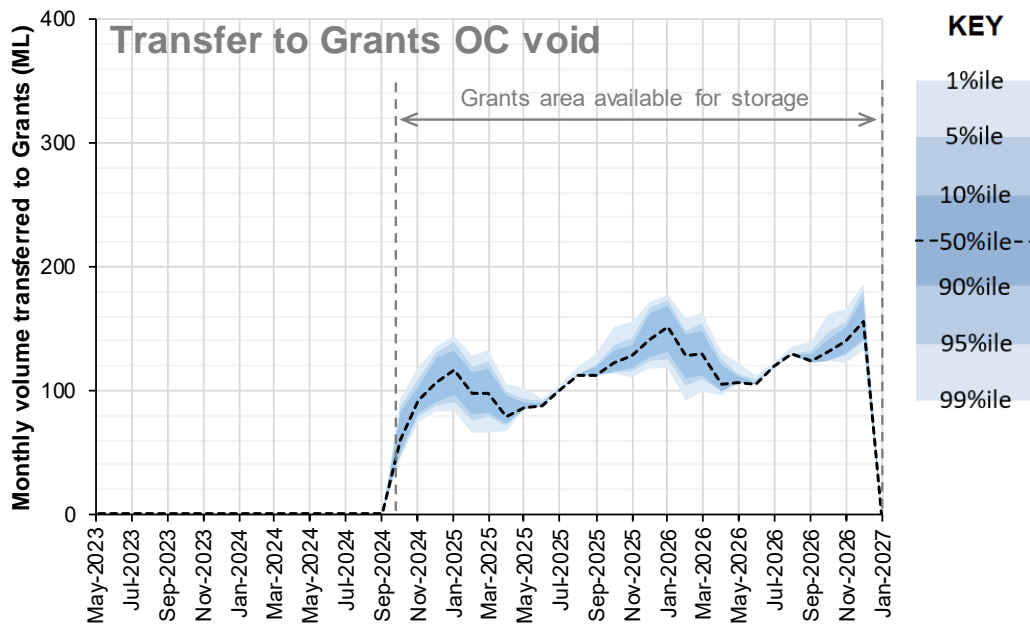


Figure 4.3 - Monthly volume of water transferred to Grants area

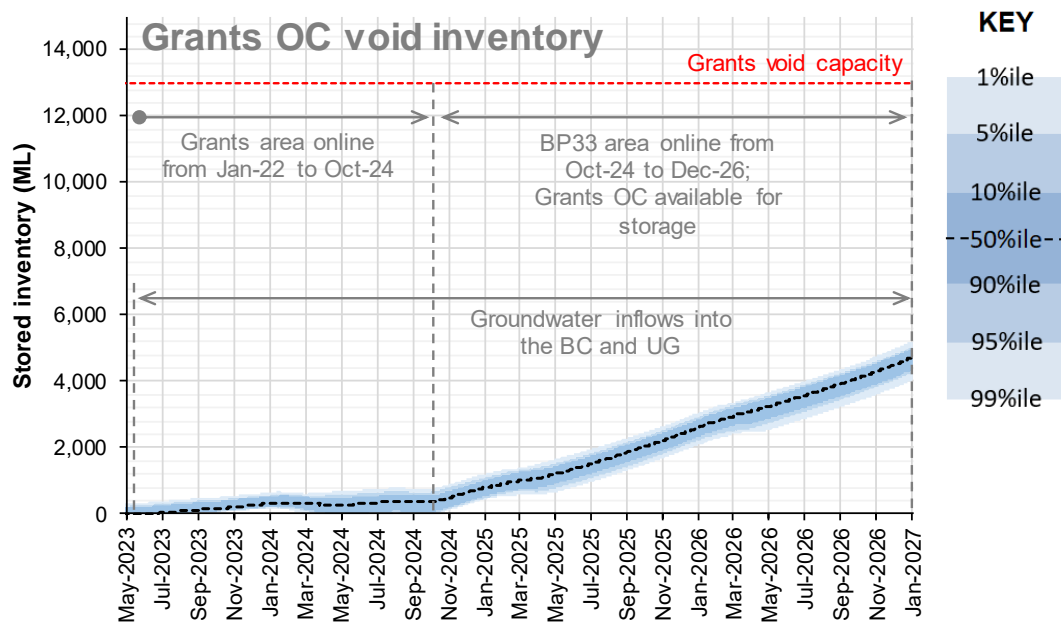


Figure 4.4 - Grants open cut inventory

4.3.6.2 Controlled releases

Figure 4.5 shows the modelled controlled release volumes from MSD to the receiving environment. It has been assumed that controlled releases are undertaken according to the rules outlined in Section 3.9. This figure shows that in very wet (1%ile) climatic conditions, site could release up to 150 ML/month in the peak of the wet season. In median (50%ile) climatic conditions, site could release up to 25 ML/month. The target dilution ratio is predicted to fluctuate generally between 1:17 and 1:12 parts MSD water to parts receiving water depending on the amount of dilution from rainfall runoff.

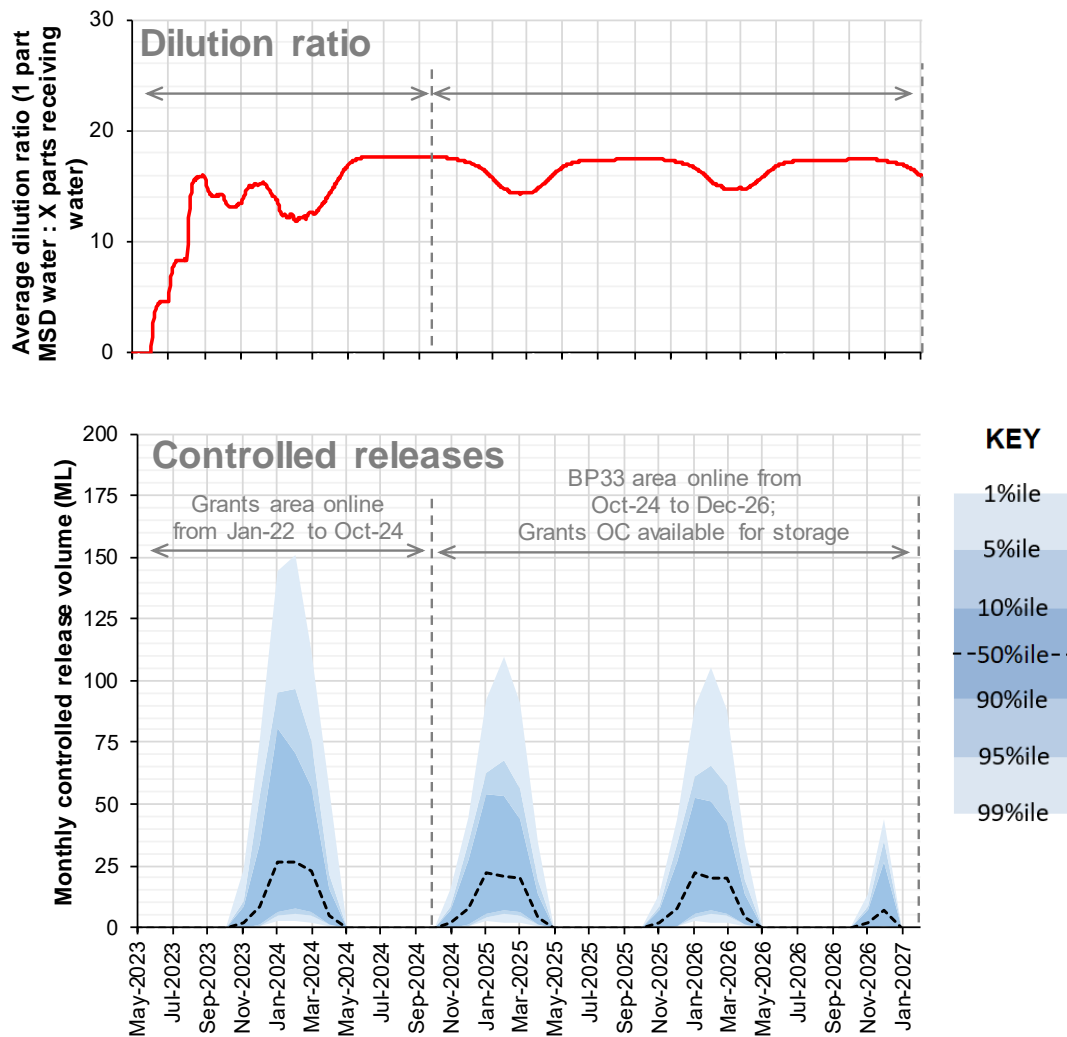


Figure 4.5 - Controlled release volumes

4.3.6.3 Irrigation area

Figure 4.6 shows the cumulative irrigation volume during the BP33 Start-up phase. Based on modelling outcomes, it was found that an irrigation area of 20 ha would be sufficient to manage the BP33 BC and UG groundwater inflows during most climatic conditions. Figure 4.6 shows that, during the BP33 Start-up phase, between 120 ML and 210 ML of water would be required to be irrigated during the 16-month period.

Note that limited assessment has been done into the actual irrigation loss potential in the area, the potential area available to irrigate and the impact of alternative disposal measures (e.g., controlled releases offsite). If the irrigation loss, available area or controlled release volume are lower than what has been assumed for this assessment, it is likely that there would be a greater risk of UG inundation during the Start-up phase unless additional water disposal measures (e.g., water treatment coupled with dry season controlled discharges) and/or additional water storage capacity is provided. A sensitivity assessment of the controlled release rate showed that the required irrigation area is quite sensitive to the adopted dilution requirements and runoff characteristics in the receiving waters.

For the purpose of this assessment, it was assumed that the daily fluctuations in water volumes due to increased groundwater inflows and/or no irrigation days due to wet days will be managed in MSD. A modelled 120 ML operational storage within MSD was required to manage this daily fluctuation in stored water volumes until Grants void is available to receive BP33 mine water transfers.

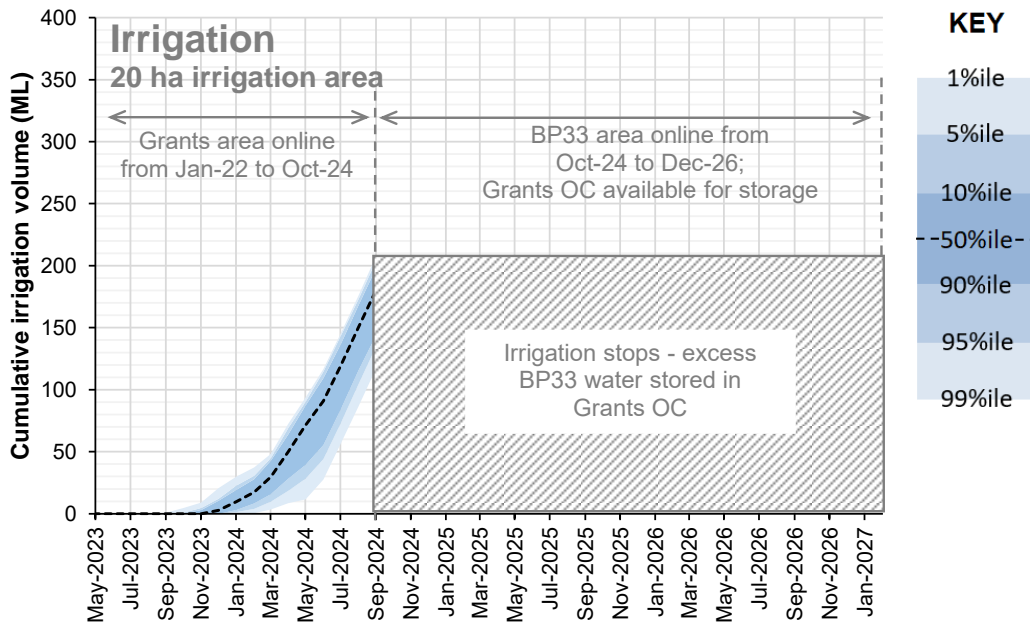


Figure 4.6 - Cumulative irrigation volumes

4.4 GROUNDWATER SENSITIVITY ASSESSMENT

A groundwater sensitivity assessment was undertaken to determine the potential impact on the BP33 WMS. Specifically, the impact on the volume of water that would require management.

CloudGMS provided an uncertainty assessment for the BP33 groundwater model (CloudGMS, 2021a). The lowest and the highest groundwater rates were adopted as part of this sensitivity assessment and are presented in Figure 4.7.

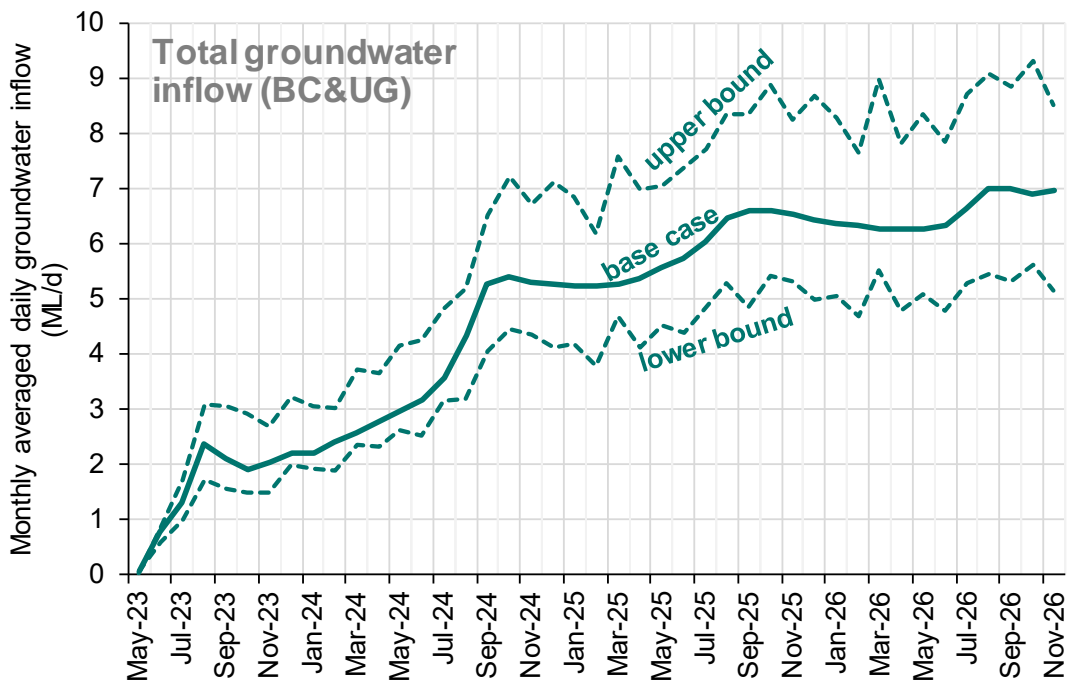


Figure 4.7 - Groundwater inflow rate - Sensitivity assessment

4.4.1 Lower bound groundwater inflows

Figure 4.8 shows the monthly volumes that would need to be transferred to the Grants OC, for the lower bound groundwater case. This figure shows that the monthly volume of water transferred to the Grants OC would be decreased by up to approximately 57 to 90 ML/month, compared to the base case.

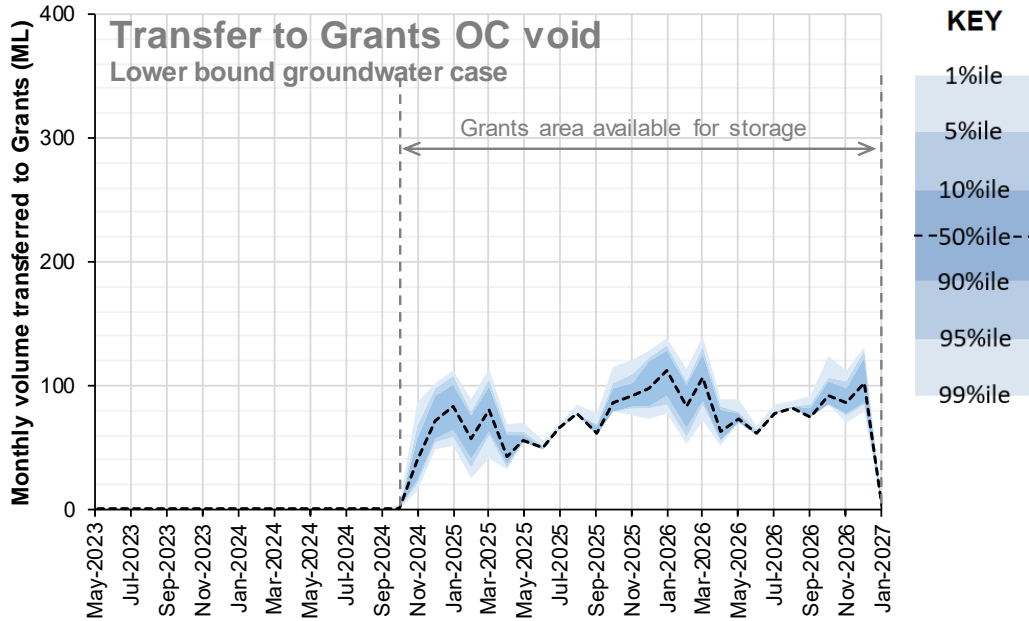


Figure 4.8 - Monthly volume of water transferred to Grants area, lower bound groundwater

Similar to the base case, the proposed excess water management strategies (i.e. irrigation and transfer to the Grants OC) would be sufficient to manage the BP33 WMS.

4.4.2 Upper bound groundwater inflows

Figure 4.9 shows the monthly volumes that would need to be transferred to the Grants OC, for the upper bound groundwater case. This figure shows that the monthly volume of water transferred to the Grants OC would be increased by up to approximately 290-315 ML/month, compared to the base case.

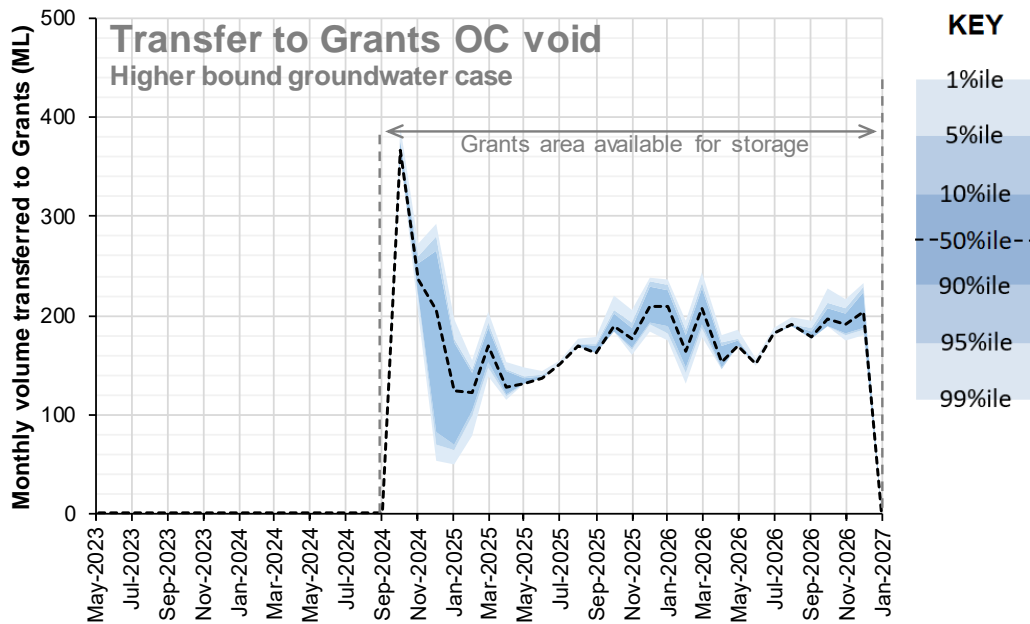


Figure 4.9 - Monthly volume of water transferred to Grants area, upper bound groundwater

Figure 4.10 shows the BP33 UG inventory for the upper bound groundwater case (including a 20 ha of irrigation). This figure shows that, for the increased groundwater inflows, the UG would be inundated by up to 250 ML by the end of September 2024 for median conditions and up to 320 ML for the wettest conditions. In order to manage this water, the following strategies could be implemented (but are not limited to):

- Additional mine water storage: This may include constructing an additional 320 ML storage;
- Evaporator fans at Grants Pit: This would increase water disposal opportunities; and/or
- Water treatment for arsenic removal: This could increase controlled release opportunities and water transfer options to clean water storages such as OHD.

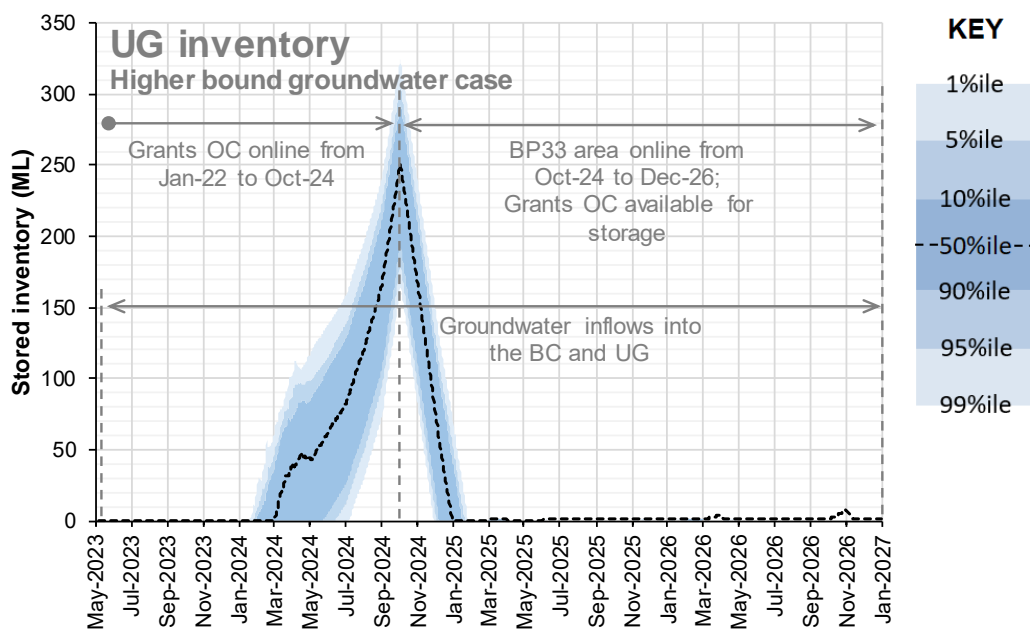


Figure 4.10 - BP33 UG inventory, upper bound groundwater

5 Conclusions and recommendations for further assessment

A GoldSim water balance model was developed to predict the behaviour of the BP33 WMS under a variety of climate conditions for Start-up (month 17 to month 32) and Production phases (month 33 to month 59).

Key conclusions for the BP33 WMS are:

- The predicted groundwater inflows to the BP33 WMS are significantly greater than expected water use requirements for the project. It is critical that the predicted BP33 groundwater inflows are managed to prevent interruption to operation. Options for management that have been put forward in this assessment include irrigation, additional water storage and transfer to the Grants OC, once it is complete.
 - Irrigation is proposed for the 16-month Start-up phase of BP33, when the Grants OC is not available for excess water storage. The base case water balance assessment found that an irrigation area of 20 ha would be sufficient to manage the BP33 BC and UG groundwater inflows during most climatic conditions. Sensitivity assessments showed that the required irrigation area is quite sensitive to a number of factors including the amount of groundwater volume to be managed, the wet season severity and the ability to undertake controlled releases. It is recommended that the achievable irrigation rates at BP33 as well as the area that may be available to irrigate are investigated to confirm the suitability of this as a water disposal method for the project.
 - Transfer of excess BP33 water to the Grants OC is proposed for the 27-month Production phase of the BP33 project, after mining has ceased in the Grants area. Sensitivity assessments showed that the Grants OC would have sufficient storage capacity to manage a number of uncertainties in the water balance such as the amount of groundwater volume to be managed, the wet season severity and the ability to undertake controlled releases.
- Controlled releases from BP33 via MSD were also investigated as a method to mitigate the BP33 underground inundation risk. It was found that, due to the predicted high arsenic concentrations in the BP33 groundwater, controlled releases from site would need to be significantly diluted by the receiving waters to meet the SSTVs. Hence, the volume available for controlled release would be restricted. This assessment found that the target dilution ratio (1 part MSD water to X parts receiving water) would fluctuate between 1:12 and 1:17 depending on the level of dilution from surface runoff.
- It is recommended that alternative methods for disposal of excess water are investigated. Such alternative methods may include water treatment to increase the opportunity for controlled release or the use of MSD water for haul road dust suppression (instead of RWD water).

6 References

- Allen *et al.*, 1998 ***'Crop evapotranspiration - Guidelines for computing crop water requirements - FAO Irrigation and drainage paper 56'***, Allen *et al.*, 1998
- CloudGMS, 2021 ***'Finniss Lithium Project BP33 Groundwater Modelling Report'***, CloudGMS, June 2021
- CloudGMS, 2021a ***'Predictive uncertainty Finniss Lithium BP33 groundwater flow model (v1.0)'***, CloudGMS, July 2021
- Core, 2019 ***'Grants Lithium Project - Environmental Impact Statement - Supplement'***, Core Lithium, 2019
- Core, 2019a ***'Mining Management Plan - Grants Lithium Project Mining Operations'***, Core Lithium, June 2019
- WRM, 2021 ***'Finniss Lithium Project - Grants Open Cut and Underground, Water Balance Modelling Report'***, WRM Water & Environment, no date (still in development)

Appendix A - Stage storage curves

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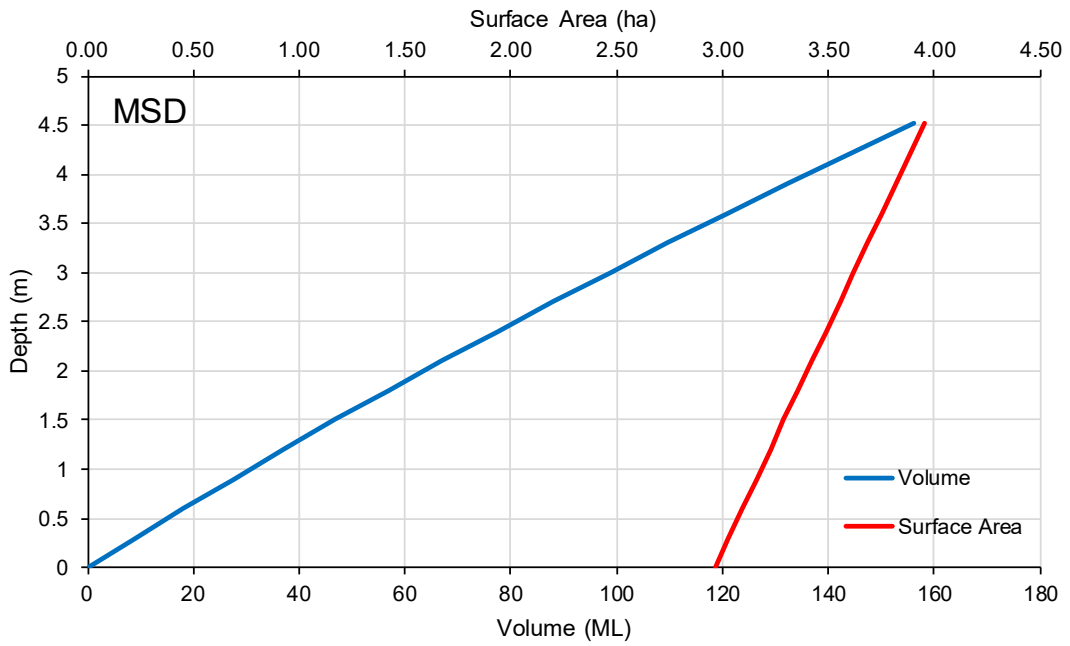


Figure A.1: MSD stage-storage and stage-area curves

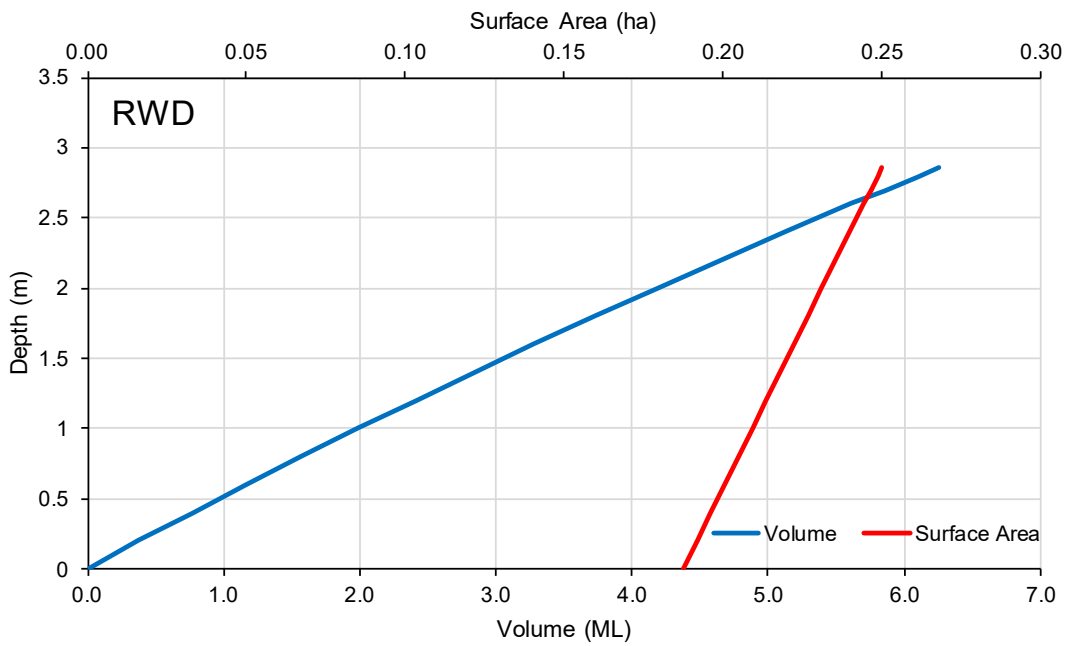


Figure A.2: RWD stage-storage and stage-area curves

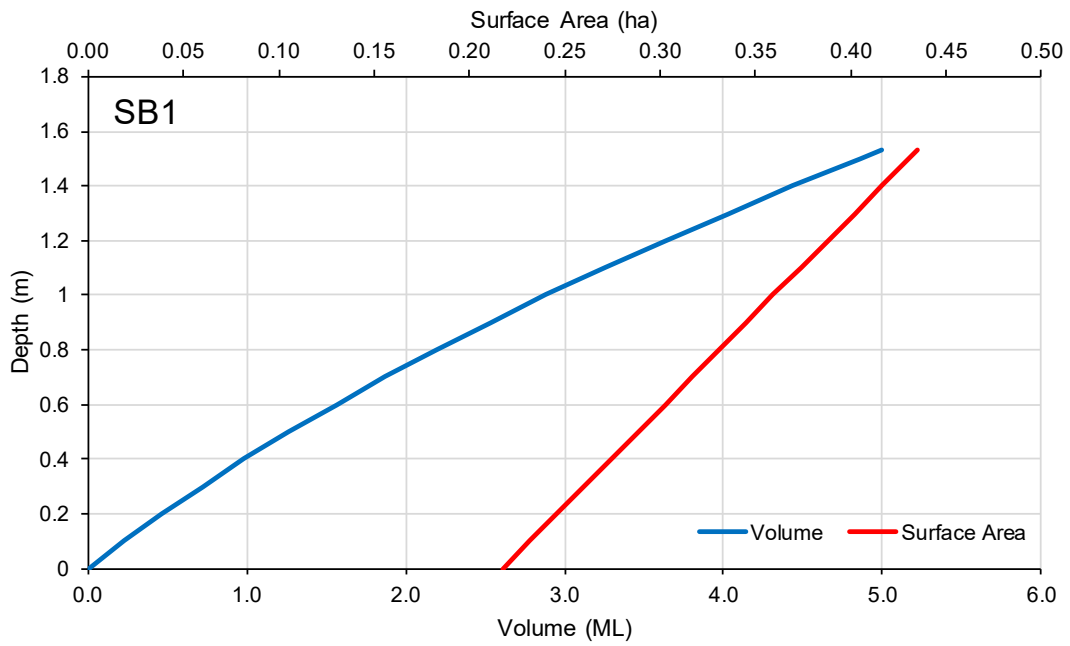


Figure A.3: SB1 stage-storage and stage-area curves

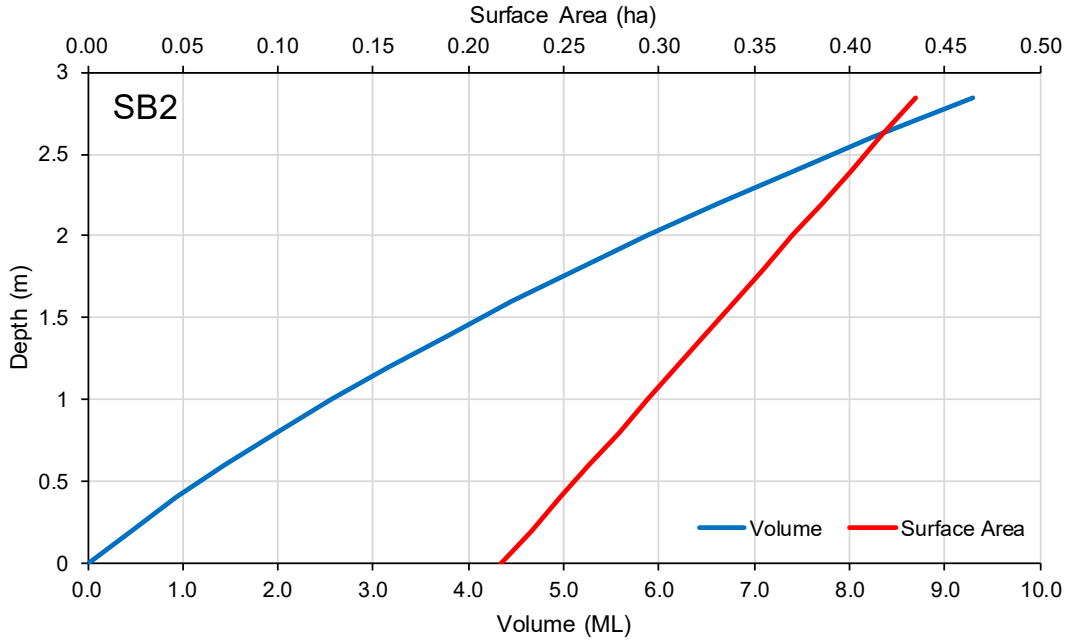


Figure A.4: SB2 stage-storage and stage-area curves

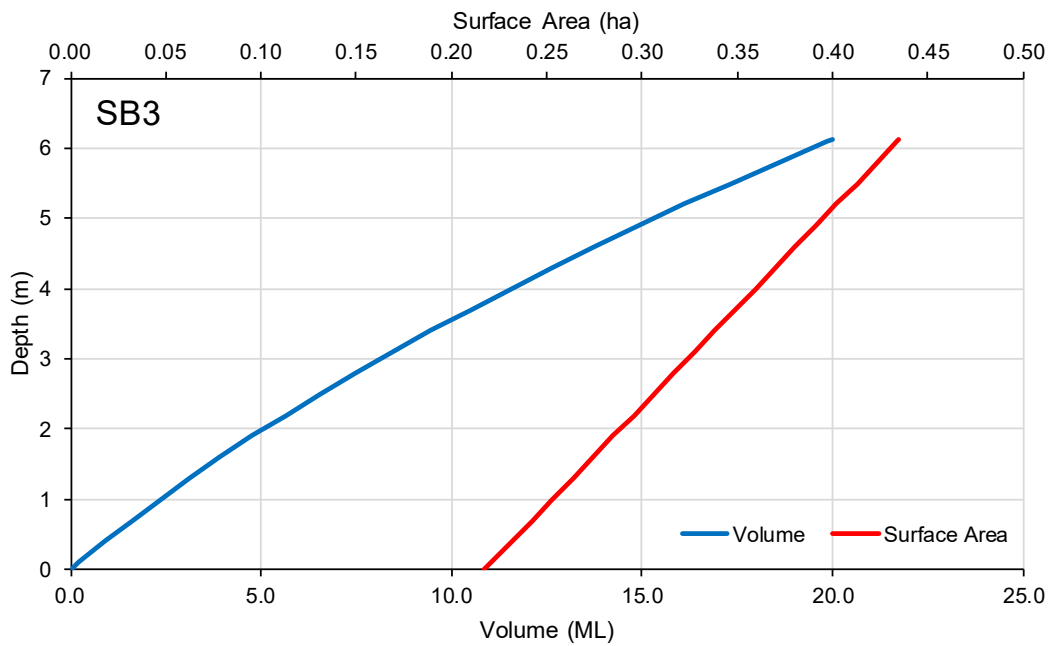


Figure A.5: SB3 stage-storage and stage-area curves

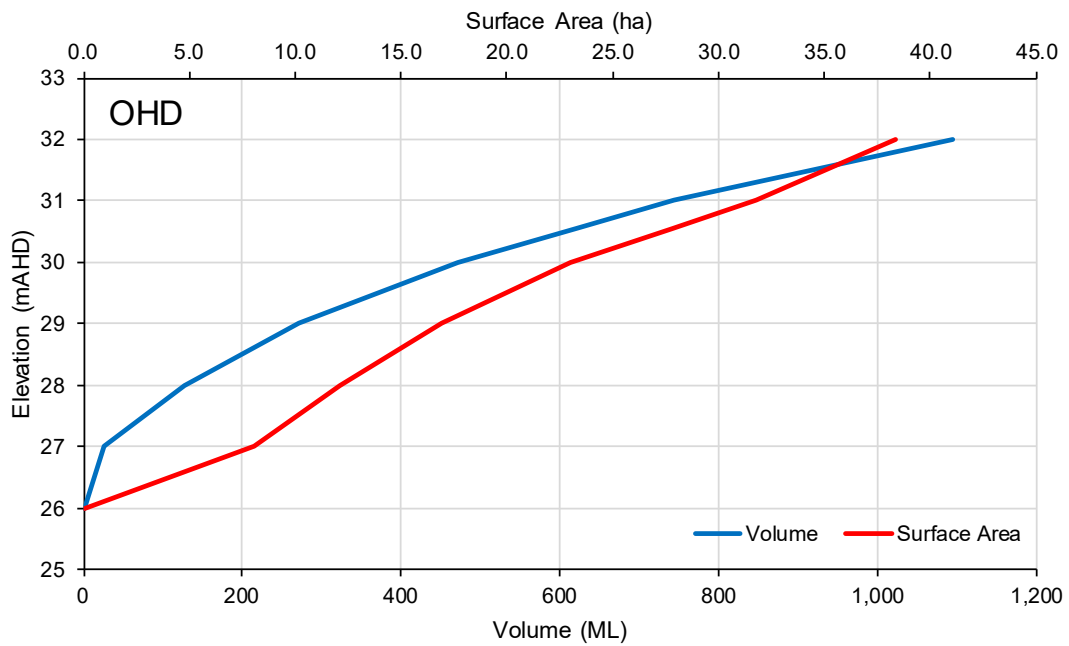


Figure A.6: OHD stage-storage and stage-area curves

Appendix B - AWBM Calibration

Streamflow data was obtained for the Carawarra Creek at Cox Peninsula Road gauging station (Station No. G8150096, catchment area approximately 53 km²), located approximately 21 km northwest of the Project Area, as shown in Figure 1.1. Data is available for the period between February 1965 and February 2012.

Flows for Carawarra Creek at Cox Peninsula road were simulated (predicted) by applying the SILO rainfall and evaporation data to the **'natural' area AWBM model. The model was then calibrated to the observed flows recorded at the Cox Peninsula road stream gauge.** Figure B.1 shows a comparison of the flow duration relationship for the recorded and simulated discharges.

The model calibration results indicate that a single set of AWBM parameters can provide a realistic representation of the rainfall runoff characteristics of the Carawarra Creek catchment, and hence the rainfall runoff characteristics in the vicinity of the site.

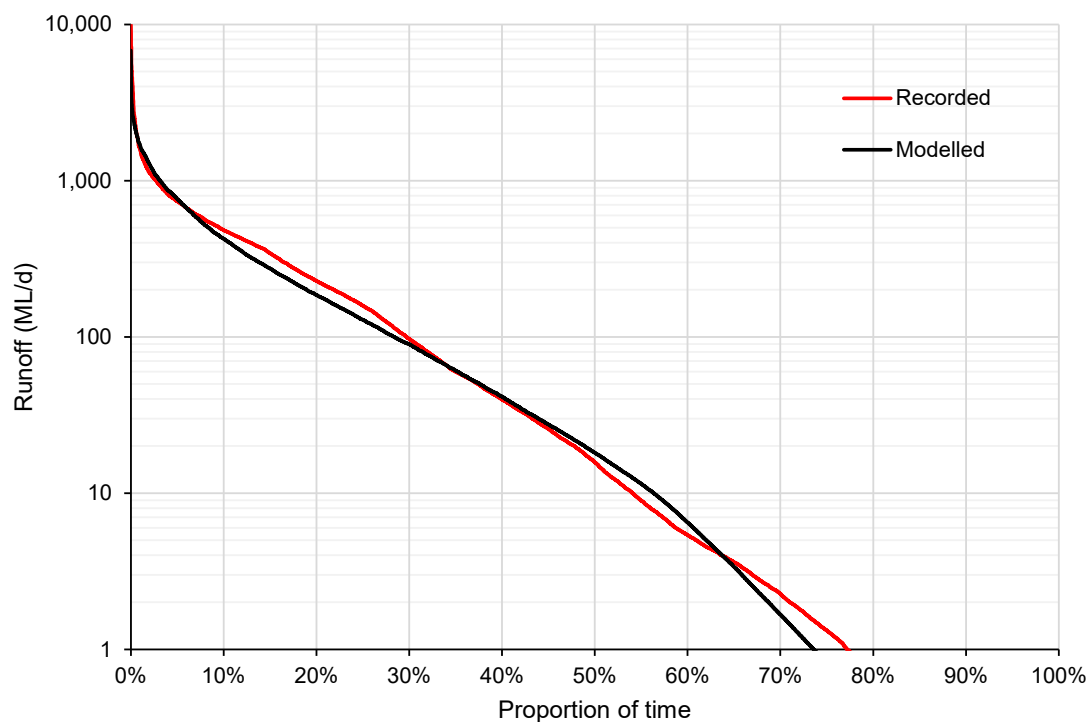


Figure B.1: Carawarra Creek at Cox Peninsula road AWBM calibration simulated vs. recorded flow duration curve