RIO TINTO WINU PTY LTD

Winu Operational Surface Water Management Plan Update 2023

Winu Copper Gold Project

Document no. Rev 3: REP-HY-018

6 November 2024

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PROJECT 311012-01475- REP-HY-018: Winu Operational Surface Water Management Plan Update 2023 - Winu Copper Gold Project

Rev	Description	Originator	Reviewer	Worley Approver	Revision Date	Customer Approver	Approval Date
Rev A	Internal Review	Damon Hortle	Peter Crichton	Stuart Atkinson	23 February 2024		
Rev B	External Review	Damon Hortle	Peter Crichton	Stuart Atkinson	23 February 2024		
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Rev 1	Issued for Use	Damon Hortle	Peter Crichton	Stuart Atkinson	14/06/2024		
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Rev 3	Issued for Use	Digitally signed by Damon Hortle Date: 2024.11.06 13:06:28 +08'00' Damon Hortle	Peter Crichton	Stuart Atkinson	06/11/2024		

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Change management register

The following changes were made to previous revisions of this SWMP:

Section	Change	Revised Change
Executive summary	Included sediment laden water management strategy	Sediment laden water management: Unlined drains and perimeter bunds surrounding uncontaminated mine structures are positioned to capture and contain sediment laden water, minimising uncontrolled sediment laden discharge to the environment.
2	Included criteria and concepts outlined in the following documents:	Golder, 2021, Operational Surface Water Management Plan Rio Tinto, 2011, Pilbara Surface Water Management Strategy, RTIO-PDE-0053914 Rio Tinto, 2021, Civil and structural design criteria, DC-C001_5, RTIO-AM-0017814 Rio Tinto, 2021, Environmental design criteria – Permanent and temporary facilities, DC-N001_5, RTIO-AM-0032910 Rio Tinto, 2024, Acid and Metalliferous Drainage (AMD) Management Plan
2.2	Included guiding planning polices and guidelines	Department of Water and Environmental Regulation (DWER), 2017a, Decision Process for Stormwater Management in Western Australia Government of Western Australia, 2013, Western Australian water in mining guideline International Council on Mining and Metals (ICMM), 2015, A practical guide to catchment-based water management for the mining and metals industry
5.3	Included a duration of inundation graph and figure	The time-series flood depth data for six representative reporting locations have been analysed and interpolated to estimate duration of inundation at these locations.
6.3.1	Indicative toe drain capacity requirements	Included an indicative doe drain calculation to illustrate a possible conceptual approach to sizing a lined drain capturing run-off from a potentially contaminated stockpile.
6.4	Included generic landform internal bund geometry	Internal bunds should be a minimum 2 m wide at the crest and 1 m high. Stormwater accumulation along the outer edge can lead to water seepage and potential failure of the perimeter bunds causing a sudden release of stored water. The WRL design surface adjacent to perimeter bunds should be graded to drain toward the upslope batter at an angle of 10% (Golder, 2021).
6.5.1	Clarified WSP sizing assumptions	Volumes assume all contaminated runoff is to be stored in the WSP and leaves no allowance for the potential volume in drains, within the contaminated area perimeter bunds and void space in the stockpile.

7.3	Potentially contaminated stockpile basal layer pad	Potentially Acid Forming (PAF) mineral stockpiles will be placed on top of a low permeability Non-Acid Forming (NAF) basal layer (Rio Tinto, 2024).
7.3	Potentially contaminated Primary Sulfides stockpile management modification	Primary sulfide ore stockpiles can contain Potentially Acid Forming (PAF) material. However, kinetic tests have revealed an 8-year delayed acidification due to neutralising minerals (Rio Tinto, 2024). If these stockpiles are removed within this 8-year window they can be treated as sediment laden.
Table 6-1	Required WSP containment volumes m^3	Recalculated required containment volumes for each WSP for 1 in 2000 AEP to 63.2% AEP events.
Table 7-1 and Table 7-2	Primary Sulfide stockpile treatment	Created a distinction between Primary Sulfide stockpiles with a proposed lifetime of less and more than 8-years. Updated sediment laden or potentially contaminated definitions to match.
SWMP Layout	Reduced potentially contaminated catchment sizes	Contaminated Catchments reduced to bunded areas around potentially contaminated stockpiles only: ANFO, Low Grade Primary Sulfides, Primary Sulfides and Secondary Sulfides and their respective WSP.
	Incorporated Lycopodium managed drainage area	Added current proposed drainage area and future expansion area. Removed bunds around the processing plant and moved WSP 2 West.
	Secondary Sulfides drainage alignment	Splitting the Secondary Sulfides catchment so the southeastern stockpile drains with grade to WSP 3.

Executive summary

This conceptual Surface Water Management Plan (SWMP) for the Winu Copper-Gold Project (WCGP) details the operational surface water management strategy developed for the site.

Classification of water

A fundamental aspect of the plan involves the classification of surface water runoff areas into clean, sediment laden and potentially contaminated water. Clean water originates from natural ground areas and requires only to be segregated from potentially contaminated water or sediment laden. Sediment Laden water is runoff from non-acid forming (NAF) stockpiles such as topsoil stockpiles and oxides. Conversely, potentially contaminated water is used to classify runoff from potentially-acid forming (PAF) stockpiles or operational zones such as the ROM pad, and the process plant which contain potential contaminants, necessitating stricter management measures.

Management strategies

Different management strategies are proposed for clean and potentially contaminated water:

Clean water management: Flood protection bunds are utilised to manage clean water runoff, allowing for potential reuse or safe discharge into the environment.

Sediment laden water management: Unlined drains and perimeter bunds surrounding uncontaminated mine structures are positioned to capture and contain sediment laden water, minimising uncontrolled sediment laden discharge to the environment.

Potentially contaminated water management: Lined drains, flood bunds and ponds are positioned to capture and contain potentially contaminated water, minimising the risk of environmental contamination. Additionally, operational flood protection bunds limit surface water runoff into the mine pit.

Acronyms

Acronym/Abbreviation	Definition
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
ANFO	Ammonium Nitrate Fuel Oil
AMD	Acid and Metalliferous Drainage (also can be referred to as Acid Rock Drainage (ARD) or Acid Mine Drainage
ARF	Aerial Reduction Factors
ARR	Australian Rainfall and Runoff
BoM	Bureau of Meteorology
CL	Continuing Loss
DEM	Digital Elevation Model
DMIRS	Department of Mines, Industry Regulation and Safety
DPIRD	Department of Primary Industries and Regional Development
DWER	Department of Water and Environmental Regulation
GTSMR	Revised Generalised Tropical Storm Method
HQ	Water Level Head versus Flow (TUFLOW Boundary Condition)
IFD	Intensity Frequency Duration
IEAust	Institution of Engineers Australia
IL	Initial Loss
ILb	Burst Initial Loss
ILs	Storm Initial Loss
LiDAR	Light Detection and Ranging
LoM	Life-of-Mine
NAF	Non-Acid Forming
PAF	Potentially-Acid Forming
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
RoM	Run-of-Mine
RTC Winu	Rio Tinto Company Winu
SGS	Sub-Grid Sampling
SWMP	Surface Water Management Plan
TP	Temporal Pattern
TS	Topsoil Stockpile
TSF	Tailings Storage Facility
WCGP	Winu Copper-Gold Project
WMO	World Meteorological Organization
WRL	Waste Rock Landform
WSP	Water Settling Ponds

1. Introduction

The Winu Copper-Gold Project, herein referred to as The Project, is located approximately 350 km east of Port Hedland in the arid interior of Western Australia (Figure 1-1). The Project involves the development of a below-water-table open cut mining operation with a mineral processing plant located adjacent to the mine and ore production directly from the pit or from stockpiles. Access to the mine site will be via the Nyangumarta Access Road (Mine Access Road) which extends 236 km from the Great Northern Highway to the mine (Figure 1-1).

The proposed infrastructure and site layout are presented in Figure 1-1, with the following key infrastructure:

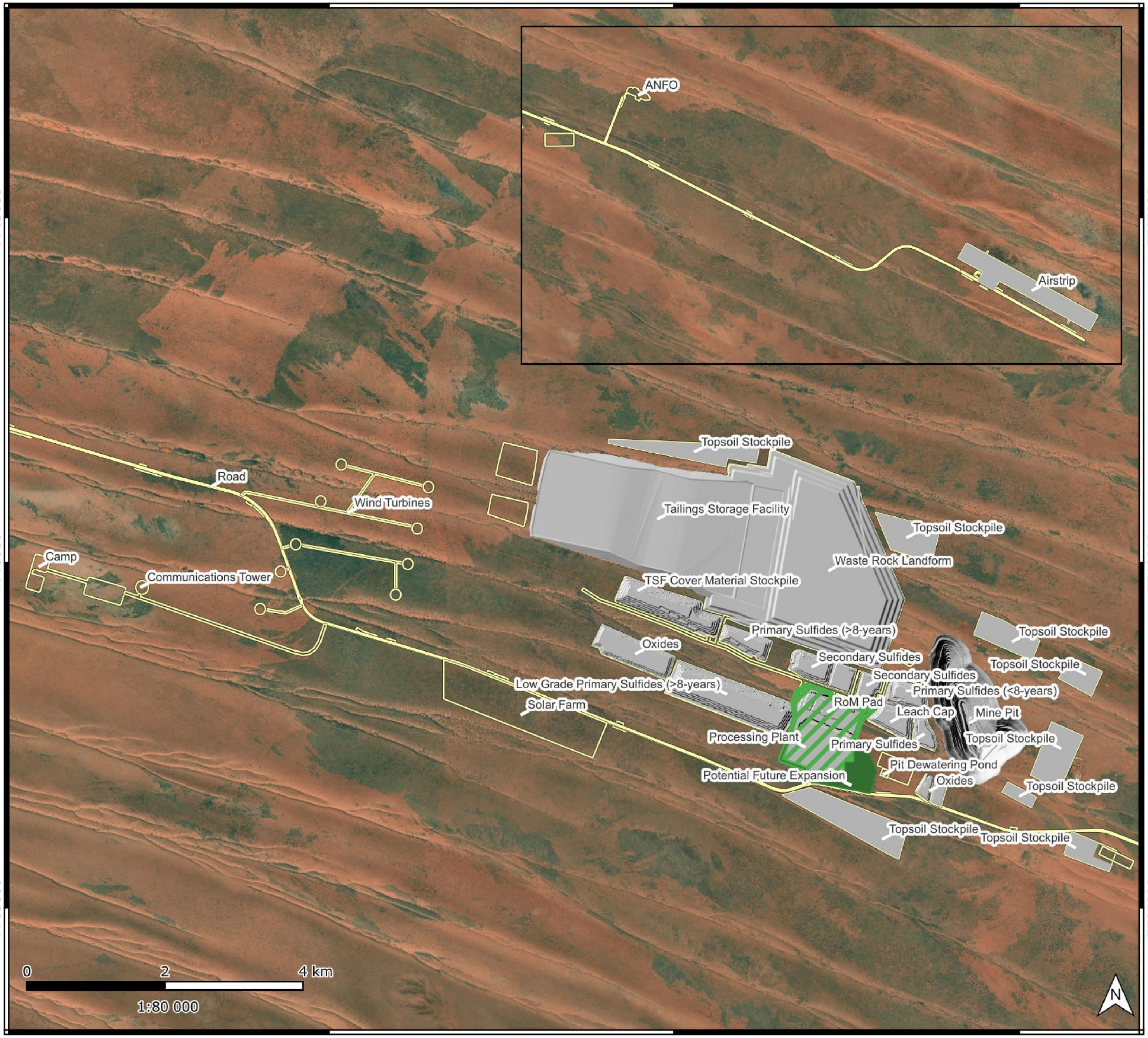
- Run-of-Mine (RoM) pad,
- Stockpiles,
- Processing plant,
- Mine Pit,
- Solar farm and wind turbines,
- Camp and communications tower,
- Ammonium Nitrate Fuel Oil (ANFO) facility,
- Tailings Storage Facility (TSF),
- Waste Rock Landform (WRL), and
- Water Settling Ponds (WSP)

This Surface Water Management Plan (SWMP) has been prepared as an update to the Golder Operational Surface Water Management Plan (2021). As the proposed infrastructure layout has been modified since this study took place, the purpose of this study is to update the infrastructure layout in the hydraulic model and investigate and update water management approaches on-site at the WCGP. Notably, the initial layout provided was further improved through collaboration with Rio Tinto to ensure better drainage outcomes. At the time of this study the Closure layout was not available for assessment.

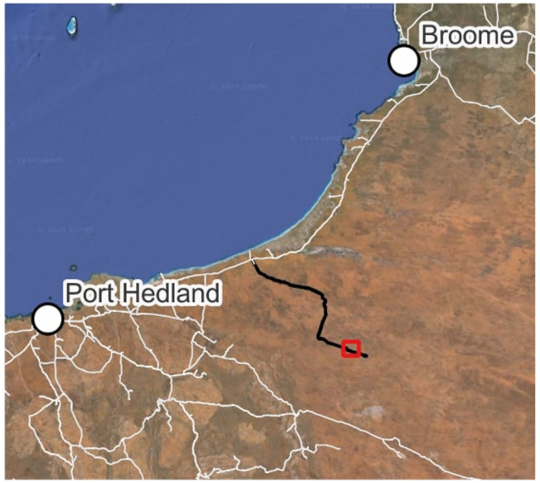
Winu Copper Gold Project
Surface Water Management Plan
Figure 1-1. Site layout

Project No. 311012-01475
Client Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Haidee.Bartle
Date:12/06/2024



Legend
- Towns
- Road Network
- Mine Access Road
- Proposed Mine Layout Feb 2024
- Landforms
- Lycopodium Managed Drainage
- Potential Future Processing Plant Expansion



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1.1 Data Sources

Table 1-1 lists the sources of information received from Rio Tinto that were used in this study.

Table 1-1. Data sources

Data Type	Filename(s)	Description	Source	Date Supplied
Elevation data	1m_DEM_RT_MERGE_EPSG28351.tiff	LiDAR data	RTIO	17/06/2022
Proposed Mine layout	Mine_Layout_20240202_ar.shp Mine_Layout_20240202_pl.shp	Operations layout	RTIO	2/02/2024
Lycopodium Managed Drainage Catchment	240424 - X2262_W_PL_CATCHMENT.dxf	Delineation of catchment boundaries between Worley and Lycopodium	Lycopodium	24/04/2024

2. Surface water management overview

The proposed surface water management infrastructure at the mine site consists of a network of ponds, drains (lined and unlined) and flood protection bunds to manage design exceedance events. This design approach adheres to the criteria and concepts outlined in the following documents;

- Golder, 2021, Operational Surface Water Management Plan
- Rio Tinto , 2011, Pilbara Surface Water Management Strategy , RTIO-PDE-0053914
- Rio Tinto, 2021, Civil and structural design criteria, DC-C001_5, RTIO-AM-0017814
- Rio Tinto, 2021, Environmental design criteria – Permanent and temporary facilities, DC-N001_5, RTIO-AM-0032910
- Rio Tinto, 2024, Acid and Metalliferous Drainage (AMD) Management Plan

2.1 Key design principles

2.1.1 Contamination classification

2.1.1.1 Clean water

Runoff from natural areas is categorised as clean water and separated from potentially contaminated water using bunds, drains, and ponds. Clean water does not require treatment.

2.1.1.2 Sediment laden water

Sediment-laden: runoff from Primary Sulfides (<8-year lifetime), Oxide, Leach Cap, Topsoil stockpiles (TS), Waste Rock Landforms (WRLs), and Tailings Storage Facility (TSF) embankments generate sediment-laden runoff, which is considered potentially contaminated with sediment but does not exceed water quality guidelines. This water is retained on landforms by perimeter bunds or is collected at the base of landforms by unlined toe drains. This water can then evaporate/infiltrate in situ before infiltrating and evaporating.

2.1.1.3 Potentially contaminated water

Potentially contaminated: runoff from Secondary Sulfides, Primary Sulfides (>8-year lifetime, ANFO, the Mine Pit, the RoM Pad and Processing Plant, is considered potentially contaminated due to oils, chemicals, or metals. Ore stockpiles with potential AMD will have a lined or low permeability base layer to minimise infiltration. Water is collected at the base of landforms by lined toe drains which is conveyed to lined sumps/Water Settling Ponds (WSP). This water is therefore not discharged under normal operating conditions.

2.2 Principles and objectives

The principles for water management are outlined in this section. Guiding planning polices and guidelines include;

- Department of Water and Environmental Regulation (DWER), 2017a, Decision Process for Stormwater Management in Western Australia.
- Government of Western Australia, 2013, Western Australian water in mining guideline
- International Council on Mining and Metals (ICMM), 2015, A practical guide to catchment-based water management for the mining and metals industry

The objective of this SWMP is to:

- assess the existing stormwater management concepts,
- assess resource protection of downstream environments, and
- act as a baseline document for future site/mine planning updates

2.3 Design criteria

Table 2-1 outlines the key design criteria for stormwater management on the site based on operation requirements with respect to project risk. The design criteria are based on the Rio Tinto Civil and structural design criteria (2021): DC-C001_5 (RTIO-AM-0017814).

Table 2-1. Design criteria

Design element	Criteria
Flood/perimeter bunds	Design event: 1% AEP Freeboard: 0.5 m Batter slopes: 3H:1V
Drains/toe drains	Design event: 1% AEP Freeboard: 0.3 m Batter slopes: 3H:1V
Water settling ponds (WSP)	Design event: 1% AEP Freeboard: 0.5 m Sediment reserve: 0.5 m

3. Project setting

3.1 Climate

3.1.1 Rainfall

The Site is located within an arid environment within the Great Sandy Desert bioregion of Western Australia. The Site can experience high intensity rainfall events often associated with cyclonic activity, typically between the months of December and April.

The nearest BoM rainfall station Telfer Aero (ID: 13030) is located 100 km south of the Site. This rainfall station has recorded daily rainfall data from January 1974 to the current day. Hence only a short overall period of record is available from which to draw climatic conclusions. Figure 3-1 presents the annual rainfall by water year (period between October to September) and monthly rainfall totals over the total period of record. The average annual rainfall (by water year) over the period of record is 362.4 mm. Considering the most recent period of record since the year 2000, this average has increased to 392.6 mm, suggesting a wetter period in the overall gauge record, however a trend back to drier conditions is evident over the last 5 years.

The plot highlights the high variability in annual rainfall experienced in the region, with some years annual totals made up from one or two months.

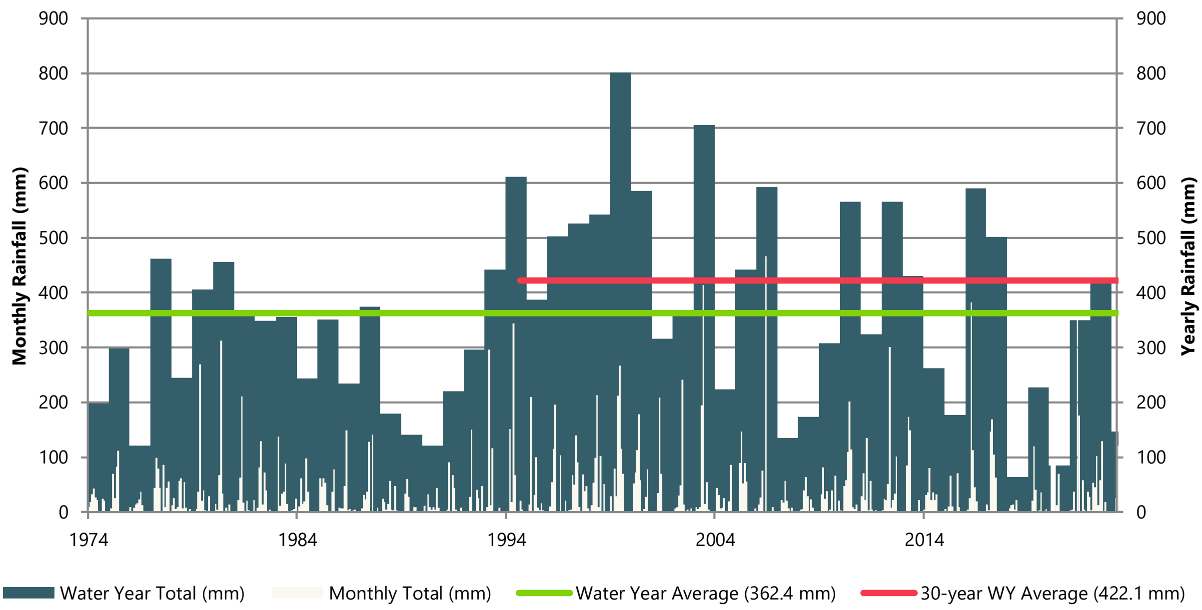


Figure 3-1. Average monthly and annual rainfall (by water year) recorded at Telfer Aero (Bureau of Meteorology identification no. 13030) (BoM, 2021)

3.1.2 Evaporation

Daily evaporation was recorded at the Telfer Aero weather station between 1974 to 1995 The average annual evaporation over the 20 years of complete record is 4,125 mm. The average daily evaporation rate per month is presented in Figure 3-2. The daily evaporation over averaged over the course of the year is 9 mm/day.

Average evaporation clearly exceeds rainfall throughout the water year and hence the project is situated in a water limited environment.

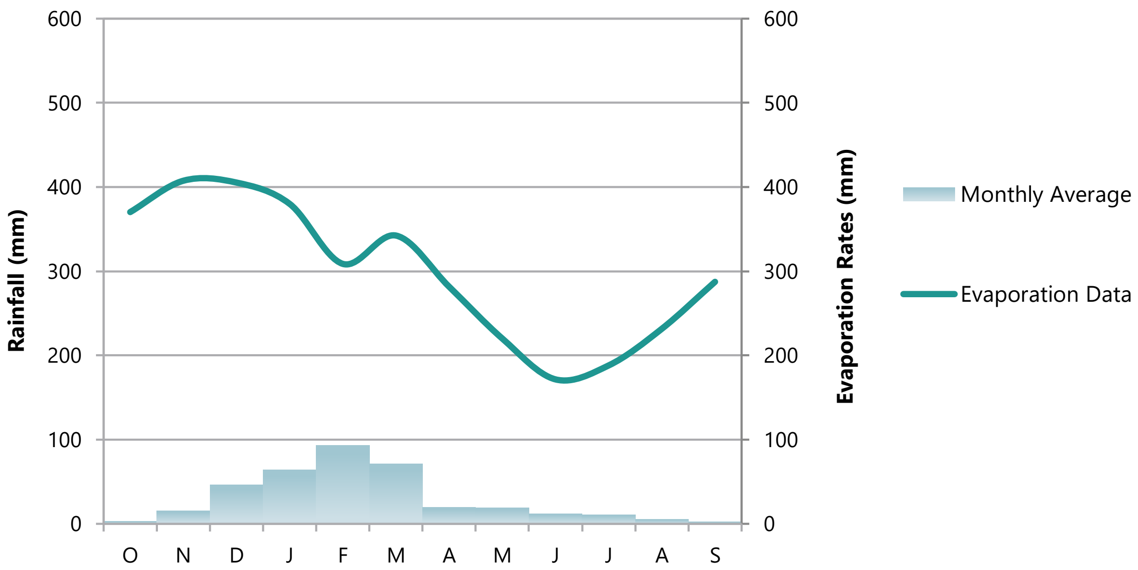


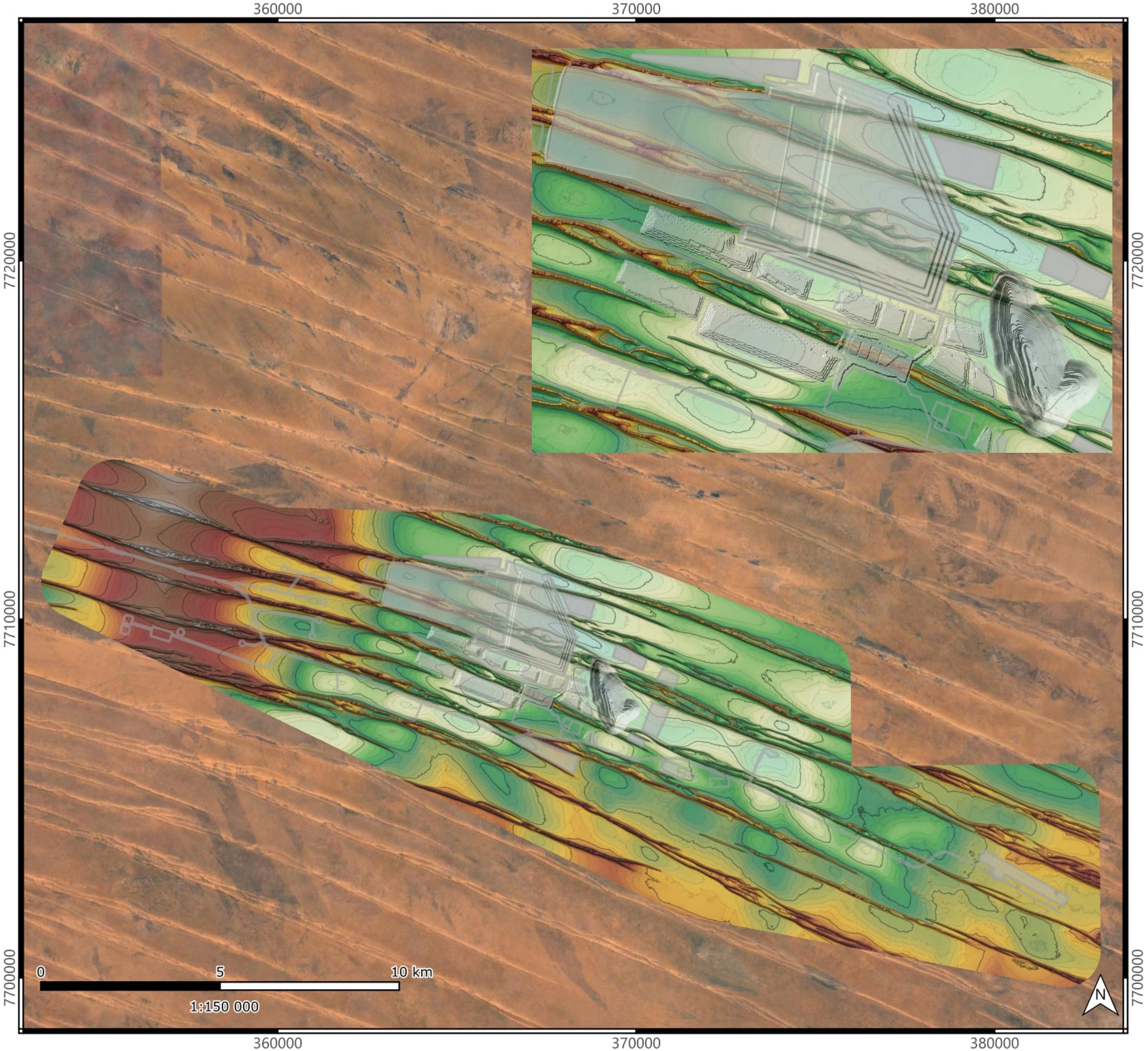
Figure 3-2. Average monthly rainfall and evaporation over the period 1974 to 1995

3.1.3 Topography

A Digital Elevation Model (DEM) was developed for the study site using the provided topographic survey data described in Section 1.1. The DEM presented in Figure 3-3 shows ground elevations varying from 245 mAHD to 300 mAHD.

The topography within the study site is characterised by northwest-southeast orientated longitudinal aeolian sand dunes separated by interdunal corridors and endorheic basins. Flood risk is, accordingly, typically controlled by the infiltrative capacity of the underlying geomaterials.

The height of dunes in the Winu mine area typically range from 5 m to 15 m above the adjacent endorheic basin floor.



Winu Copper Gold Project
Surface Water Management Plan
Figure 3-3. Digital Elevation Model

Project No.
311012-01475

Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Damon.Hortle
Date:20/03/2024

Legend

Mine Layout and Landforms

LiDAR Contours (m)

1

5

LiDAR (mAHD)

300

245

4. Hydraulic modelling

4.1 Modelling approach

4.1.1 Design events

A hydraulic model of the study site was developed using the modelling program TUFLOW (version 2023-03-AC-iSP – HPC GPU). A direct rainfall modelling approach was undertaken, where design rainfall was applied directly to the model topography to simulate surface water runoff flows.

As agreed with Rio Tinto, the 5% AEP and 1% AEP events were assessed for derivation of flood risk and operational flood risk management. An 'ensemble' approach was used to determine the critical storm duration and temporal pattern at locations of interest, as described in Australian Rainfall and Runoff (Ball *et al.,* 2019). and conceptualised in Figure 4-1.

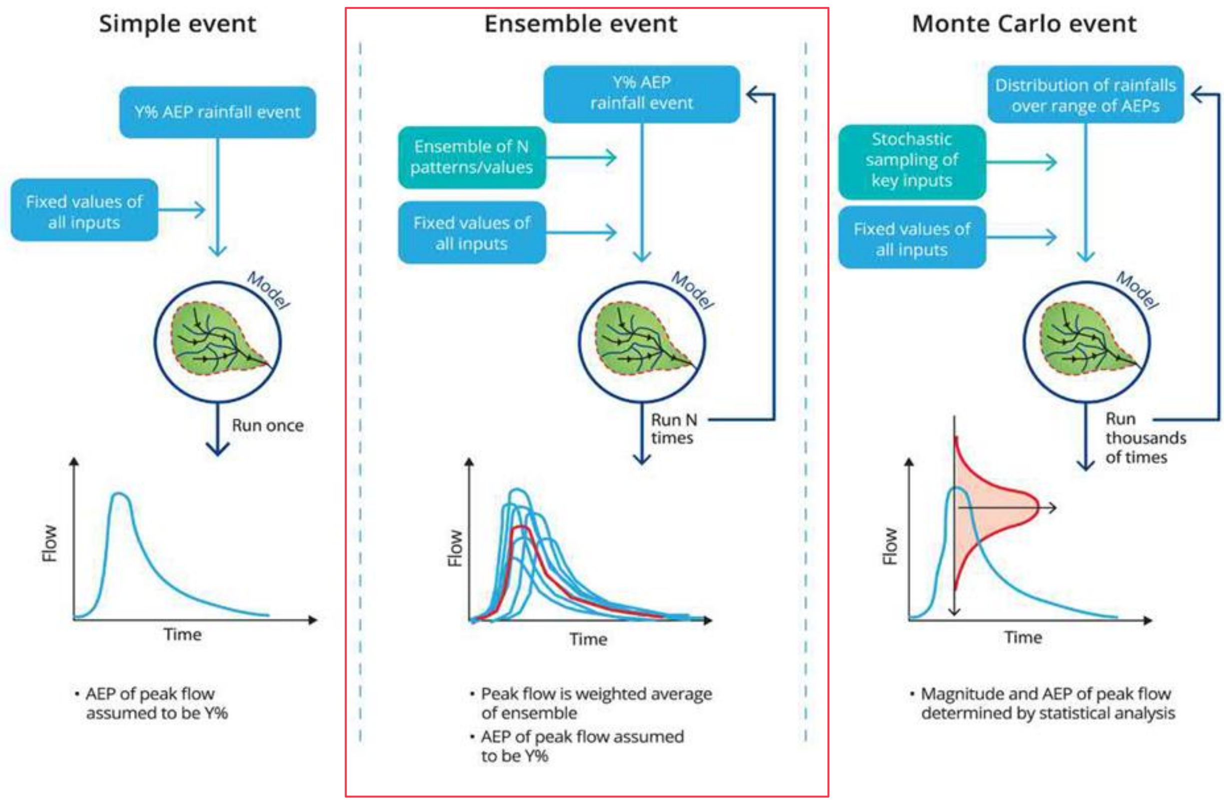


Figure 4-1. Ensemble simulation approach (Ball et al., 2019)

4.1.1.1 Model setup

The TUFLOW model setup for the 1% and 5% AEP events is described in the following sections and summarised in Table 4-1. The setup for the TUFLOW model shown in Figure 4-2.

Table 4-1. TUFLOW model setup parameters

Parameter	Adopted	
Grid Size	5 m: Sub-Grid Sampling (SGS) distance: 1 m	
Manning's 'n' roughness	General Grass/Pilbara Landscape natural catchment: 0.04	
Rainfall	BoM IFD rainfall depths (BoM, 2016)	
Temporal Pattern Region	Rangelands (Ball *et al.,* 2019)	
Rainfall Infiltration Losses (mm)	Initial Loss	80
	Continuing Loss	10
Outflow Boundary Conditions	Normal depth (HQ in TUFLOW)	

Winu Copper Gold Project
Surface Water Management Plan
Figure 4-2. TUFLOW model setup

Project No.	Client
311012-01475	Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
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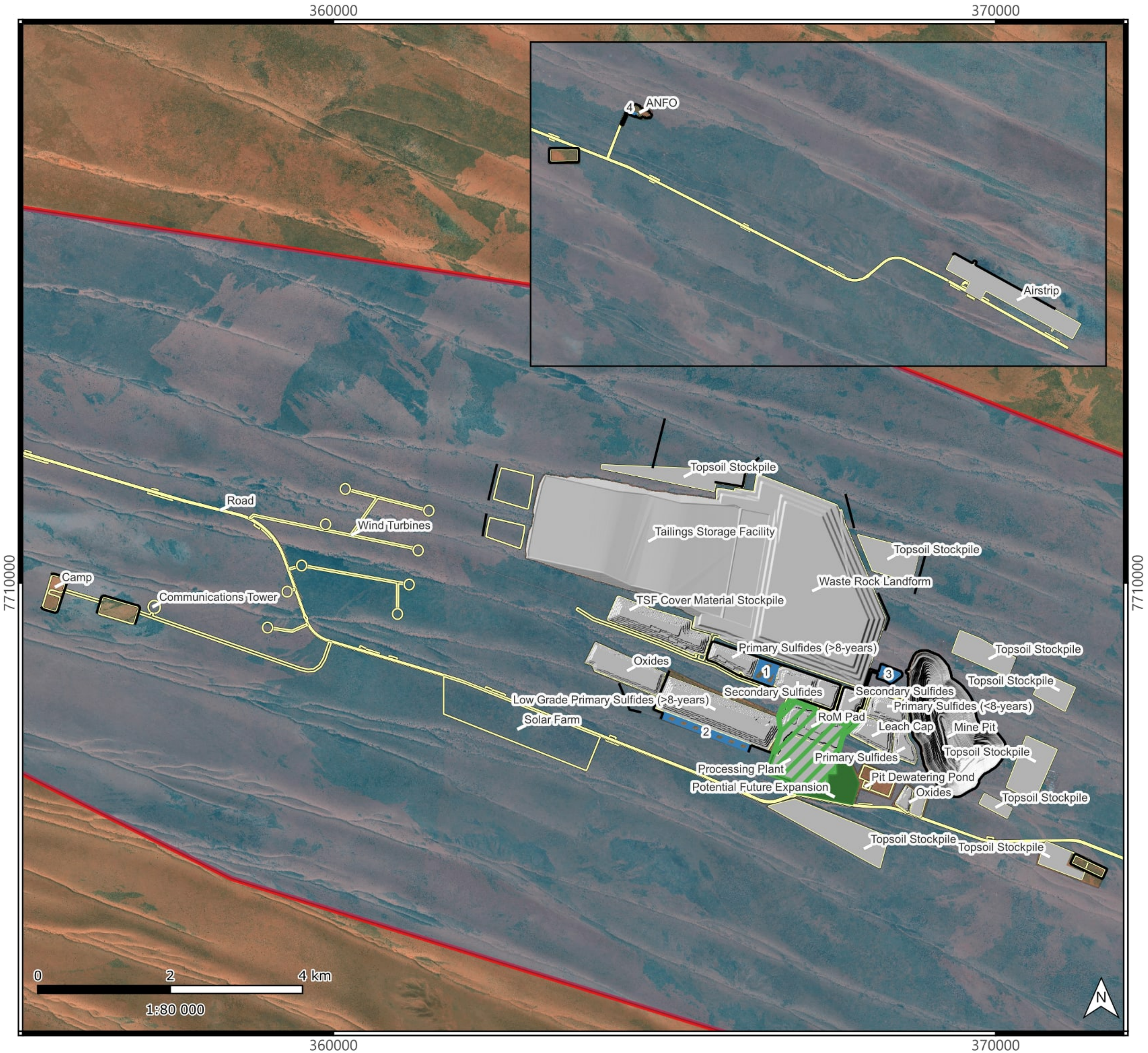

Legend

- Bunds
- Proposed Mine Layout Feb 2024
- Model Boundary
- Water Settling Ponds
- Direct Rainfall
- Landforms
- Lycopodium Managed Drainage
- Potential Future Processing Plant Expansion

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4.1.2 Cell size

The ensemble simulations were run using a 5 m cell size, which was sufficient to represent the main waterways and floodplains for the purpose of determining critical storm durations and temporal patterns. TUFLOW's Sub-Grid Sampling functionality was also enabled, with the sampling distance set to 1 m, which allowed for the finer topographic features of the LiDAR DEM to be used to better define inter-cell hydrologic routing.

4.1.3 Rainfall

Rainfall inputs for the 1% and 5% AEP events were prepared using IFD data obtained from BoM (2016) and additional parameters from the ARR Datahub (Babister *et al.,* 2016). No ARF was applied for local rainfall around the mine area as the endorheic basin catchment areas are generally less than 1 - 5 km^2.

The rainfall depths were distributed temporally using the Rangelands Point Temporal Pattern dataset from the ARR Datahub (Babister *et al.,* 2016). Inspection of the design IFD grids overlaid on the region revealed that there is little to no spatial variation in rainfall over the catchments and therefore, spatial distribution of rainfall was not applied. The ensemble simulations were run for storm durations between 1 hour and 72 hours to determine the critical durations.

For design case assessments, direct rainfall was turned off over potentially contaminated-producing landforms to simulate the landform toe-drain capture and storage for events up to the 1% AEP.

4.1.3.1 Design rainfall data

The BoM (2016) intensity, frequency, and duration (IFD) data for the mine site (Latitude: -20.7313, Longitude: 121.78) is presented in Figure 4-3.

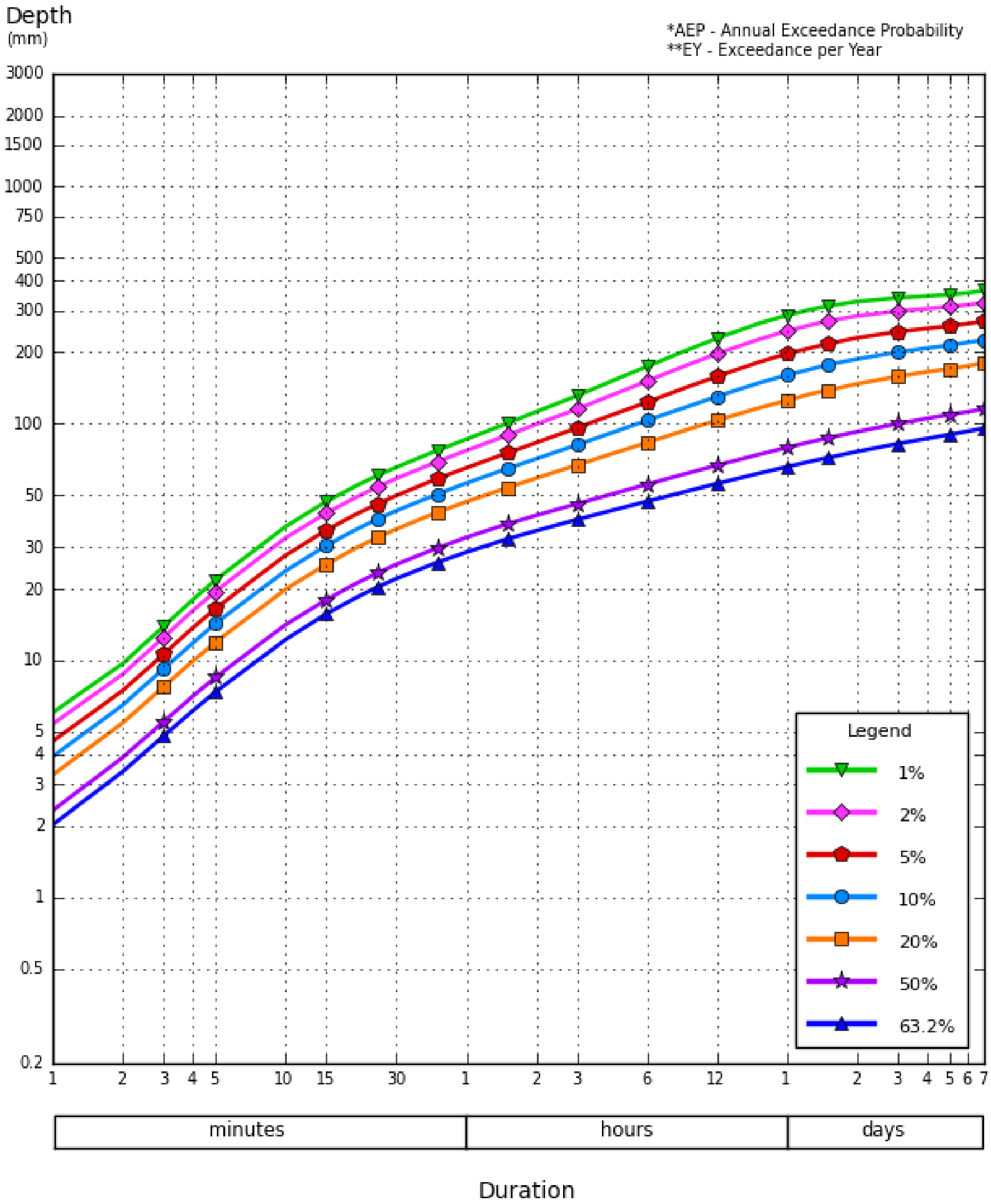


Figure 4-3. Intensity, frequency, and duration data for the mine site (BoM, 2021b)

4.1.4 Loss parameters

Design event loss parameters were selected based on the losses estimated from the ARR Datahub (Babister *et al.*, 2016) (Table 4-2). Consideration was given to infiltrometer tests undertaken by Golder (2020). However, the Golder (2020) losses are significantly higher than the losses recommended by the ARR Datahub (Babister *et al.*, 2016) and standard infiltrometer testing is not applicable to design event modelling of flood risk. Worley decided to utilise a constant infiltration loss model approach which is more representative of the site's response to rainfall given that most natural landforms are not free draining, and hence infiltration capacity of the surface geomaterials is the dominant flood control. This approach differed from the rainfall excess model used in Golder (2021) in which the continuing loss rates are subtracted from the rainfall dataset and no physical infiltration is modelled.

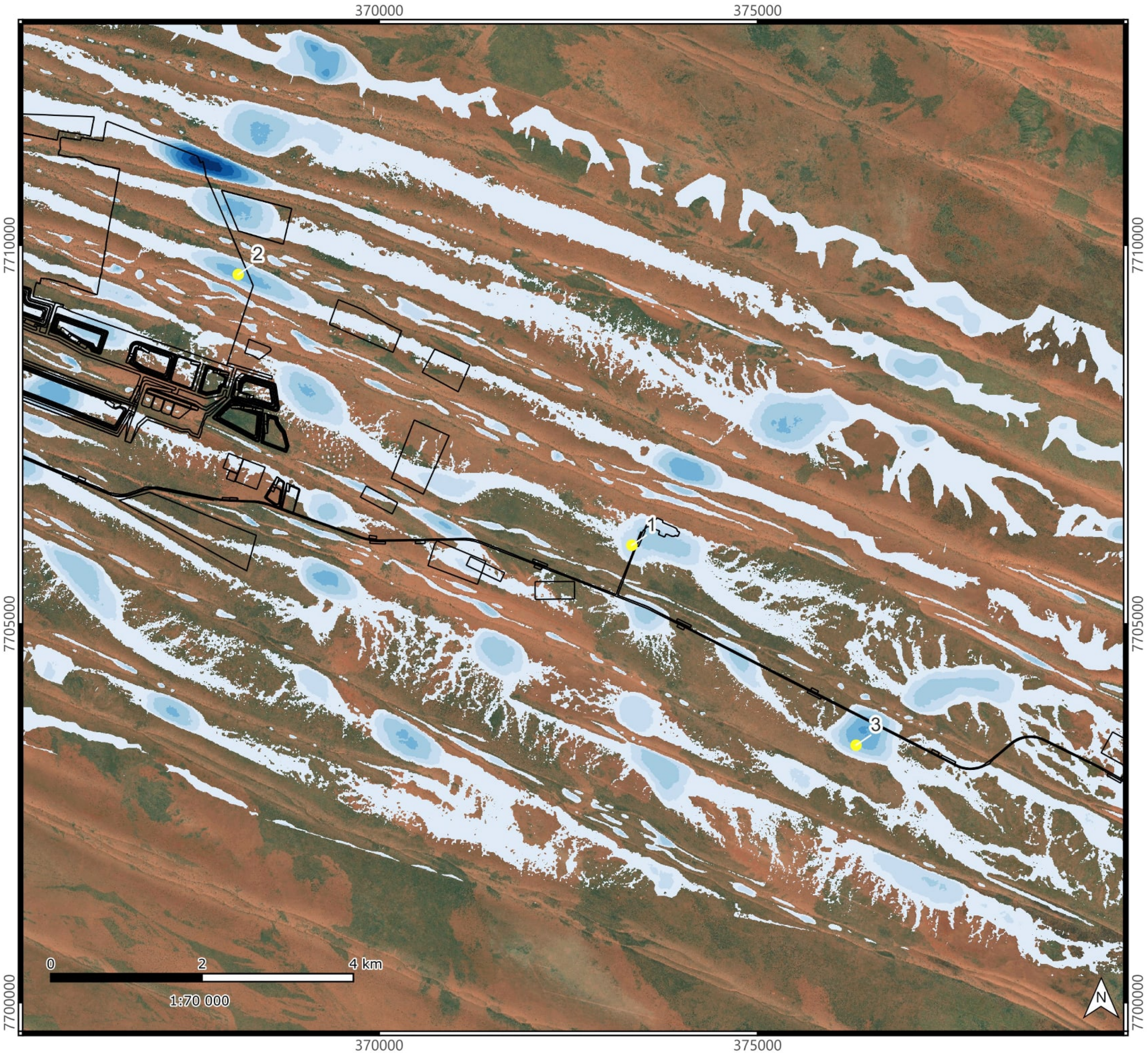
Without any other available supporting data, the ARR Datahub (Babister et al., 2016) values losses were adopted for the study [80 mm Storm Initial Loss (*IL_S*) and 10 mm/hr Continuing Loss (*CL*)], as they represent a referable source for loss estimation in a data scarce assessment area and also represents a potentially conservative approach for estimate of rainfall losses.

Table 4-2. Loss parameters and data sources

Data Source	Storm Initial Loss (mm)	Continuing Loss (mm/hr)
ARR Datahub (Babister *et al.*, 2016)	80	10
Golder (2020)	10% AEP: 98 5% AEP: 78 2% AEP: 40 1% AEP: 40	AB21: 39 AB22: 28 AB39: 34 AB40: 31
Golder (2021)	80	10
Adopted Loss Parameters	***80***	***10***

4.1.4.1 Surface water logging data

The time series data from three water level loggers situated 10 cm below the ground was supplied by RTIO. The location of the loggers are shown in Figure 4-4 overlaid over the pre-development 1% flood model depths. The pressure data was corrected for barometric pressure recorded by Worley Consulting staff onsite and converted into depths. A time series of this corrected depth data is included in Figure 4-5 below and portrays large infiltration rates when there is deep ponding, reducing to rates of 10-20 mm/hr when the ponding is shallow (<200 mm). This validates the use of 10 mm/hr as a conservative estimate of the mean infiltration rate to be expected.



Winu Copper Gold Project
Surface Water Management Plan
Figure 4-4. Surface water logger locations

Project No.	Client
311012-01475	Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Damon.Hortle
Date:22/05/2024

RioTinto worley consulting

Legend

- Surface Water Loggers
- Proposed Mine Layout Feb 2024

1% AEP Flood Depth (m)

- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50

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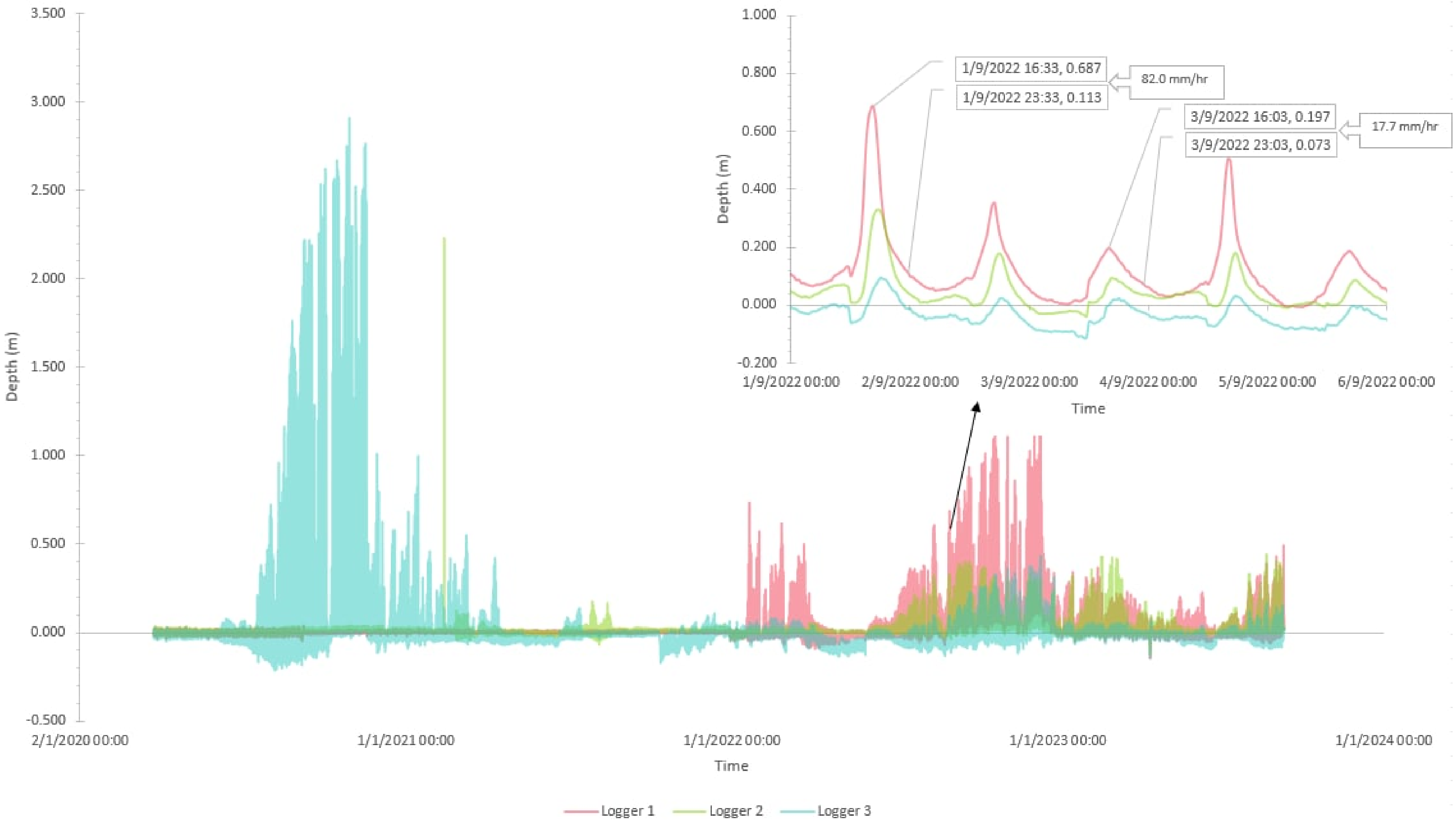


Figure 4-5. Surface water logger data

4.1.5 Pre-burst data

Median pre-burst rainfall depths were extracted from ARR Datahub (Babister *et al.*, 2016). Pre-burst rainfall was removed from the IL_S prior to simulation in the model to represent the Burst Initial Loss (IL_B). Pre-burst rainfall depths are dependent on storm location, duration, and intensity, as tabulated in Table 4-3.

Table 4-3. Storm pre-burst depths

Storm Duration (hours)	Pre-burst Depth (mm)	
	5% AEP	1% AEP
1	1.4	7.1
1.5	2.2	12.1
2	4.1	16.2
3	8.7	30.9
4.5	16	37.7
6	23.4	44.5
9	19.7	36.8
12	16	29.1
18	10.6	22.5
24	5	11.5
30	2.6	6.7
36	0.2	1.9
48	0	0.4
72	0	0

4.1.6 Roughness

The Manning's 'n' roughness coefficient is applied in the TUFLOW model as an input to hydraulic calculations and modelling. Manning's 'n' roughness was adopted based on analysis of aerial imagery and site observations and consideration of surface geomaterials. The adopted Manning's 'n' roughness value was 0.04 which is representative of grassy dunes in the Pilbara landscape.

4.1.7 Boundary conditions

A 'HQ' (water level vs. flow) boundary condition was set at the model boundary. This approach allows the model to calculate outflows based on the water level, channel geometry, roughness, and a specified water surface elevation slope at the outlet locations. A representative channel slope was specified, assuming a normal depth at the outlets. The full extent of the LiDAR was modelled therefore the locations of these outflow boundary conditions were in separate catchments or sufficiently downstream of the mine infrastructure to eliminate any potential boundary condition errors affecting the areas of interest.

5. Model results

5.1 Ensemble results

The 1% AEP and 5% AEP peak flood elevations were derived by extracting the upper median peak flood elevation for each design storm duration (from the ensemble of 10 temporal patterns), before calculating the maximum of these median results from all storm durations for each AEP event to determine the critical design flood surface (i.e., maximum envelope). This approach to determine design flood levels is consistent with that recommended by Australian Rainfall and Runoff (Ball *et al.,* 2019). The resulting critical durations and temporal patterns for the area are presented in Table 5-1. Ensemble analysis results per ARR2019 guidance showed that the same critical design storm was evident across the study area, likely due to the internally draining nature of the landforms and similar catchment sizes.

Table 5-1. Ensemble simulation results

Rainfall Event	Critical Duration	Temporal Pattern	Point Rainfall Depth
1% AEP	12 hours	TP07	231 mm
5% AEP	12 hours	TP07	160 mm

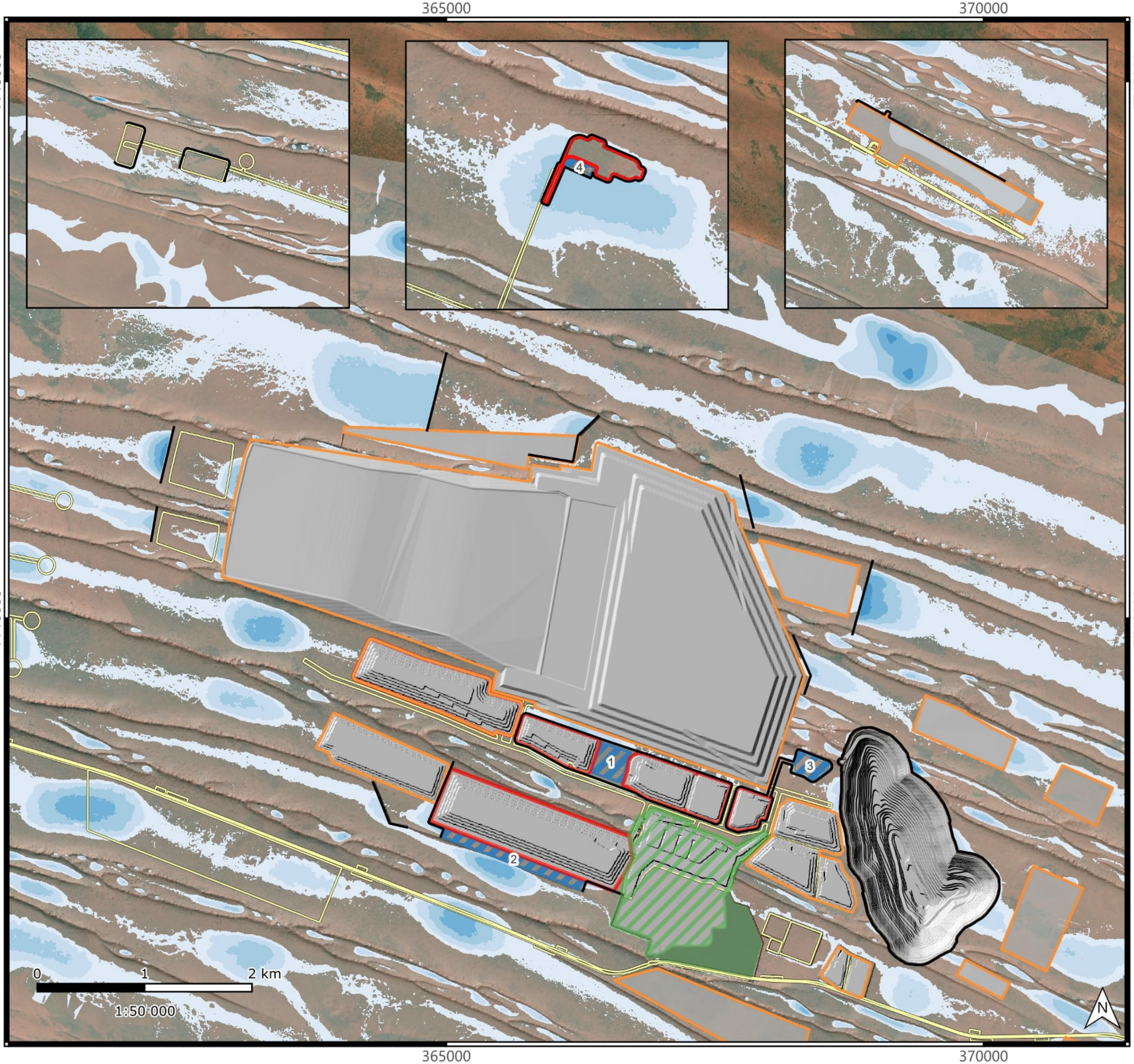
5.2 Flood mapping

The peak flood depth maps concentrated on critical infrastructure from the TUFLOW model for the 1% and 5% AEP events are presented Figure 5-1, Figure 5-2 and Appendix A. The flood mapping of the 1% AEP shows floodwater of approximately 0.2 m depth in free-draining inter-dune areas and ponding depths in the basin inverts of between 1.5 m and 3.5 m, depending on the size of the upstream catchment. The flood mapping of the 5% AEP shows the peak depths in the basin inverts of 1 m to 2 m.

The following infrastructure are located within natural depressions and consequently exhibit deep ponding in the 1% AEP Event:

- ANFO: 1.4 m deep ponding along the southern bund
- Solar Farm: 1.8 m deep ponding along the western edge of the layout

It is noted that the potential future expansion area adjacent to the proposed processing plant has been included in the flood modelling assessment.



Winu Copper Gold Project
Surface Water Management Plan
Figure 5-1. 1% AEP Flood Depth

Project No. 311012-01475

Client Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Damon.Hortle
Date:23/05/2024

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worley consulting

Legend

- Bunds
- Lined Toe Drains
- Unlined Toe Drains/Bunds
- Proposed Mine Layout Feb 2024
- Landforms
- Water Settling Ponds
- Lycopodium Managed Drainage
- Potential Future Processing Plant Expansion

1% AEP Flood Depth (m)

- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50

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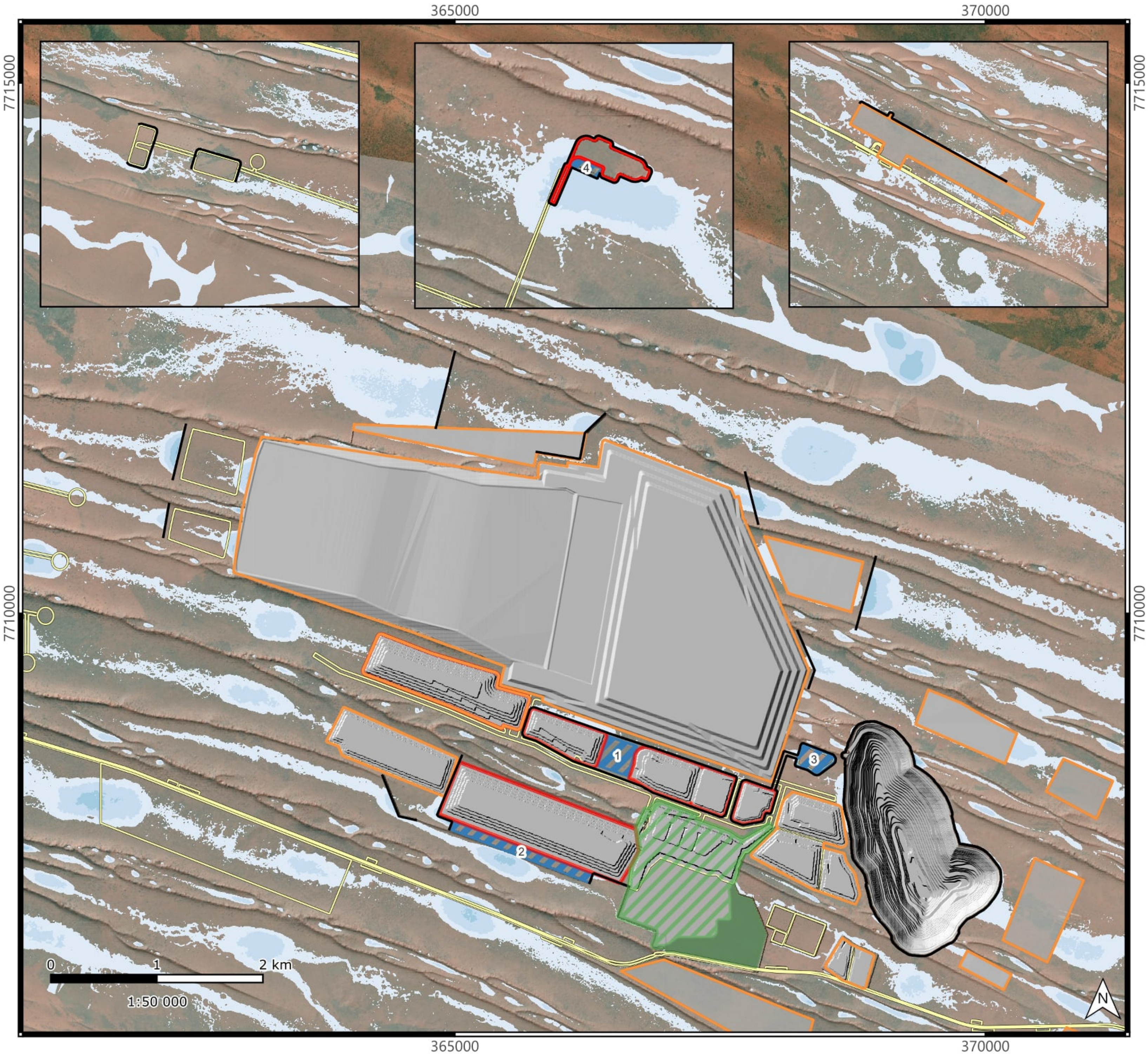

Winu Copper Gold Project
Surface Water Management Plan
Figure 5-2. 5% AEP Flood Depth

Project No.	Client
311012-01475	Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
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Rio Tinto worley consulting

Legend

- Bunds
- Lined Toe Drains
- Unlined Toe Drains/Bunds
- Proposed Mine Layout Feb 2024
- Landforms
- Water Settling Ponds
- Lycopodium Managed Drainage
- Potential Future Processing Plant Expansion

5% AEP Flood Depth (m)

- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50

File Path: I:\Projects\311012-01475_Rio Tinto Winu Hydrogeology and Hydrology Study\5_Engineering\HY-Hydrology\B055\1_GIS\1_Projects\Winu_SWMP_DMH_240516.qgz

5.3 Duration of inundation

The time-series flood depth data for six representative reporting locations have been analysed and interpolated to estimate duration of inundation in the low points of some endorheic basins with infrastructure proposed in the vicinity. Figure 5-3 depicts the linear decrease in ponding depths due to the applied evaporation and infiltration. The chosen locations represent the deepest ponding nearby to the ANFO, Solar Farm and Northeast and South of the WRL and the Mine Pit as shown in Figure 5-4.

The depth time series has been interpolated post-model simulation and assumes 10 mm/hr infiltration and 9 mm/day after the design storm event ceases. The infiltration rate was based on the continuing loss flood parameter described in section 4.1.4. Furthermore, this value aligns with the static water infiltration rates for flood plains listed in RTIO-PDE-0053914 - Pilbara Surface Water Management Strategy (RTIO, 2011). The evaporation rate is based on the mean daily evaporation rate recorded at Telfer Aero detailed in Section 3.1.2.

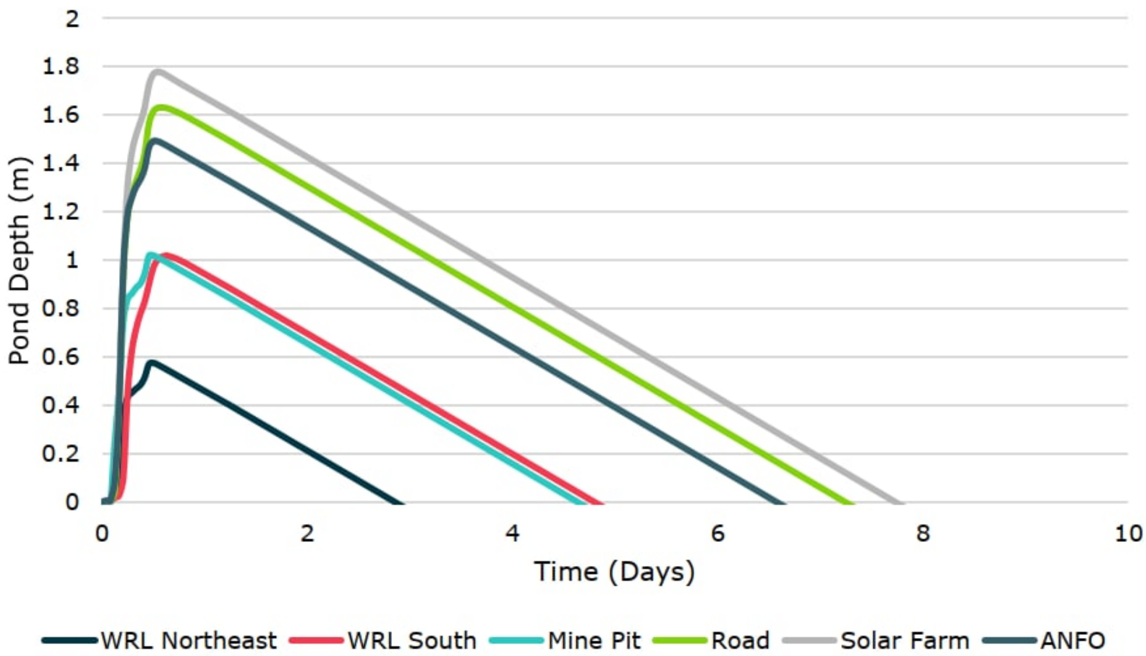
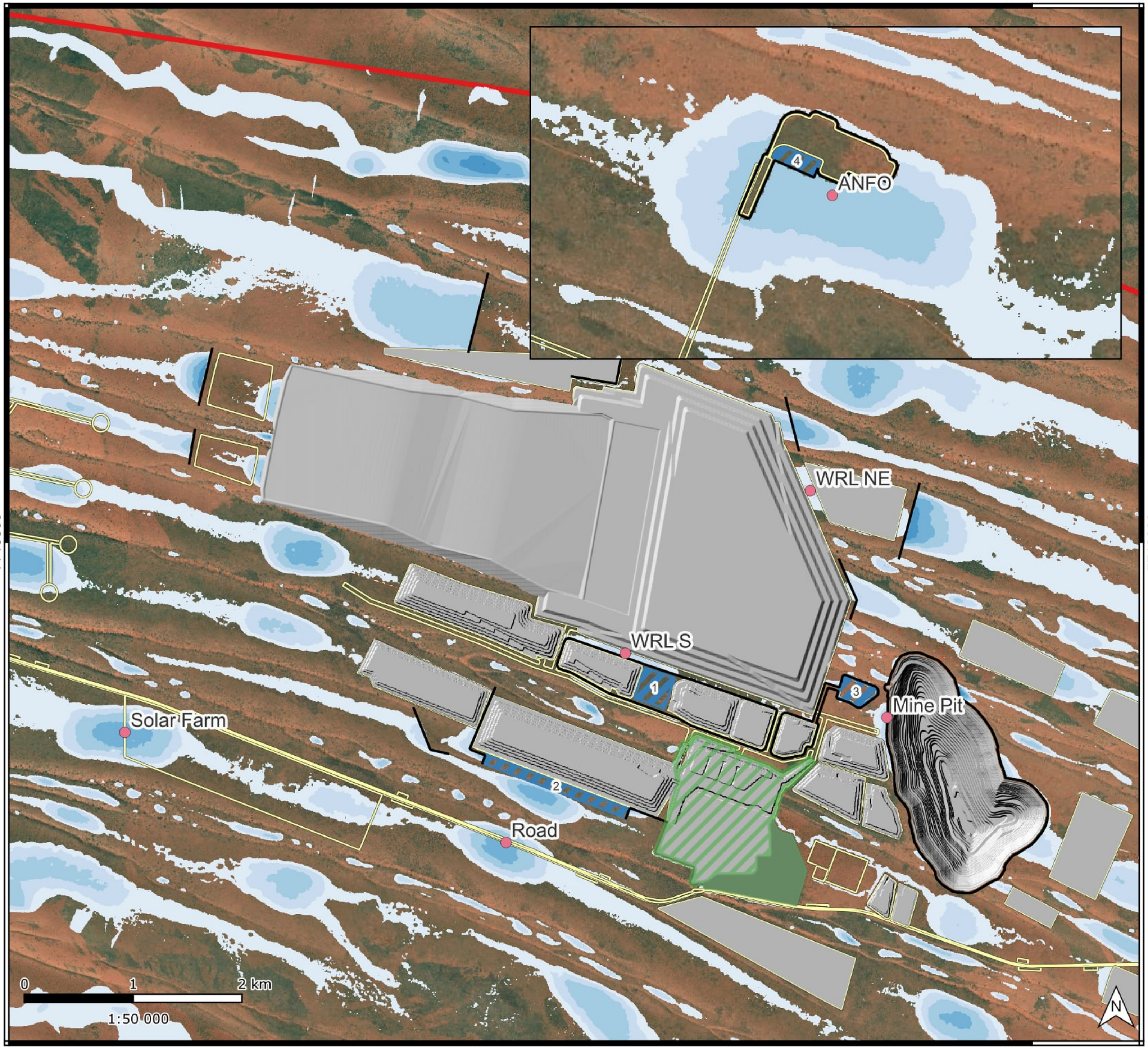


Figure 5-3. 1% AEP pond depth duration



Winu Copper Gold Project
Surface Water Management Plan
Figure 5-4. Reporting Locations

Project No. 311012-01475

Client Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
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Date:14/06/2024

Legend

- Reporting Locations
- Bunds
- Proposed Mine Layout Feb 2024
- Model Boundary
- Water Settling Ponds
- Landforms
- Lycopodium Managed Drainage
- Potential Future Processing Plant Expansion

File Path: I:\Projects\311012-01475_Rio Tinto Winu Hydrogeology and Hydrology Study\5_Engineering\HY-Hydrology\B055\1_GIS\1_Projects\Winu_SWMP_DMH_240530_HB.qgz

6. Surface water management infrastructure

The recommended surface water management measures presented in this report include flood bunds, perimeter bunds, toe drains, internal bunds and WSPs. These are to be designed to protect mining operations from flooding, while minimising impacts on quantity and quality of streamflow within the surrounding natural environment. An indicative cross section of a nominal drain and bund geometry is presented in Figure 6-1 for a contaminated catchment. The lined toe drain is necessary to capture the contaminated runoff, and the bund segregates the contaminated and clean floodwaters from mixing.

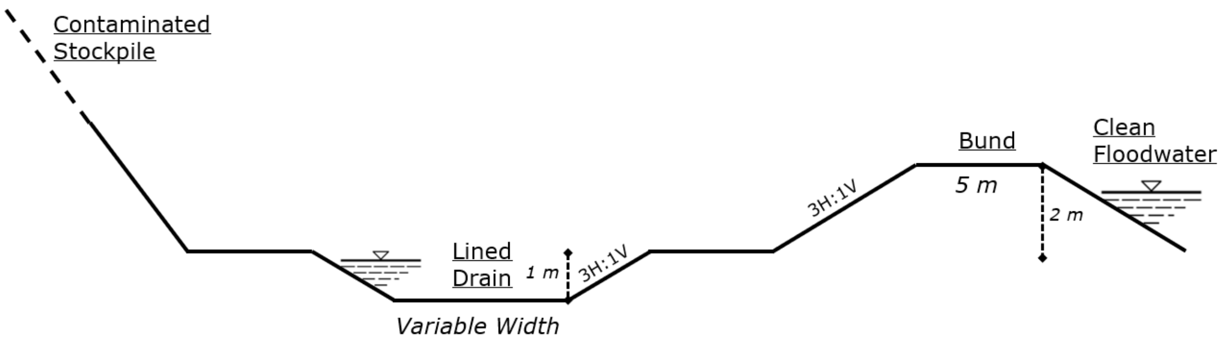

Figure 6-1. Nominal drain and bund cross section

The following design concepts have been developed, which will form the basis of design for the detailed design of flood management features in future project phases.

6.1 Flood bunds

Flood bunds are an engineered bund built to retain floodwaters and based on geotechnical and drainage specifications outlined Civil and structural design criteria and Environmental design criteria – Permanent and temporary facilities (Rio Tinto, 2021).

Flood bunds are sized to provide 0.5 m freeboard from the top of crest to the 1% AEP design event flood level. The batter slopes and crest widths are nominal and dependent on available locally sources material properties and construction methods. Flood bunds are to be placed upstream of potentially contaminated areas of the mine to demarcate clean catchment extents to allow for clean water to infiltrate/evaporate and limit the potential mixing with potentially contaminated catchment runoff.

Austroads (2019) suggests rock protection is not required when peak velocities are less than 2 m/s. Therefore, rock protection on bund batters has not been considered due to the low velocities predicted by the hydraulic model.

6.2 Perimeter bunds

Perimeter or environmental bunds are distinct to flood bunds in that they are not built around potentially contaminated catchments but are to be utilised at a nominal offset from sediment laden stockpiles in conjunction with unlined toe drains. The function of the perimeter bund is to segregate the sediment laden runoff with the clean floodwater outside the stockpiles and allow an area for infiltration in case of the drain height being exceeded. Perimeter bunds are also sized to provide 0.5 m freeboard from the top of crest to the 1% AEP design event flood level.

6.3 Toe drains

Toe drains are recommended around the perimeter of the following footprints to collect and convey runoff:

- WRL
- TSF
- Airstrip
- All Stockpiles
- Truck Washdown Areas
- ANFO Facility

The toe drains surrounding landforms considered contaminated with neutral sediment can be unlined and infiltrate/evaporate into the groundwater, however all other toe drains will need to be lined to minimise infiltration due to potential AMD contamination. This includes the Primary and Secondary Sulfides catchments as well as the ANFO facility.

All toe drains will require adjacent perimeter/flood bunds to prevent clean stormwater from external catchments from entering the toe drains. Given the available surface geomaterials at the study site, consideration may need to be given to adapting standard design sections to suit or alternatively import of suitable bund material. Typical cross sections of the toe drain is provided in Figure 6-1 and Figure 6-2.

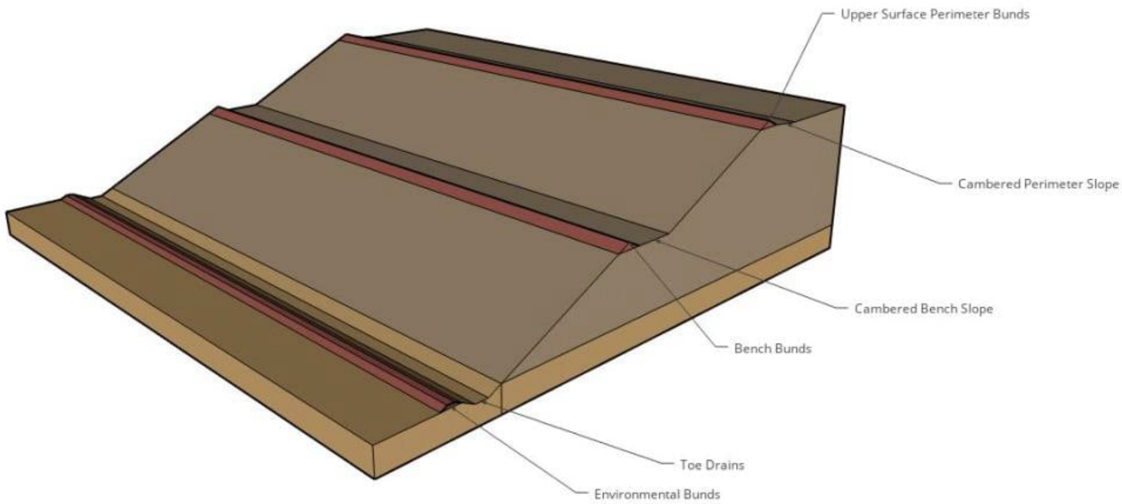

Figure 6-2. Landform stormwater management concept (Golder, 2021)

6.3.1 Indicative toe drain capacity requirements

An indicative calculation of the maximum required drain capacity was calculated for the northern toe drain adjacent to the Primary Sulfides stockpile as pictured in Figure 6-3.

Winu Copper Gold Project
Surface Water Management Plan
Figure 6-3. Primary Sulfides

Project No.	Client
311012-01475	Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
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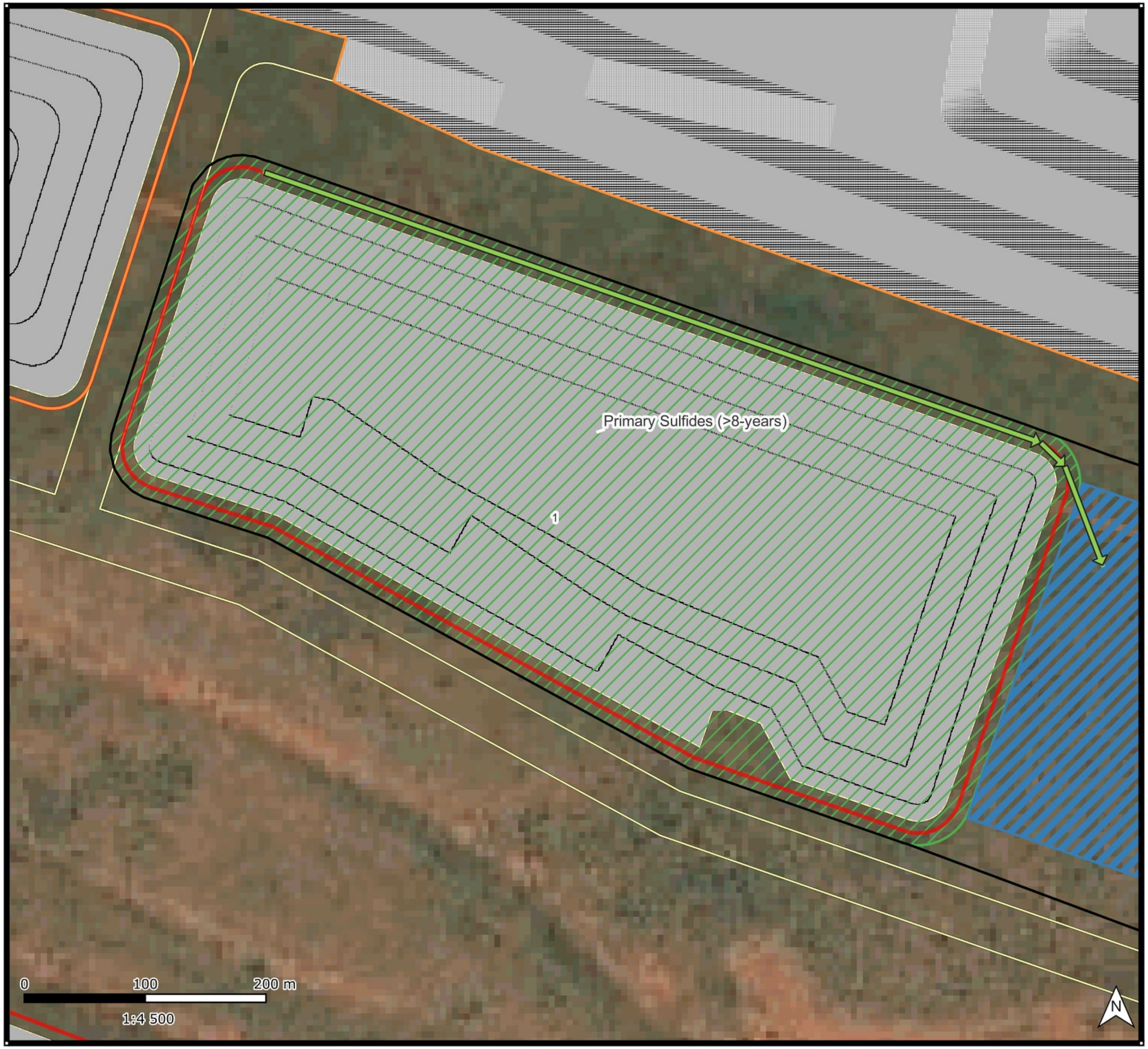

Legend

- Bunds
- Drainage
- Lined Toe Drains
- Unlined Toe Drains/Bunds
- Water Settling Ponds
- Landforms
- Primary Sulfides Catchment

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This example has been included to illustrate a possible conceptual approach but will need to be developed further in future project phases when mine layouts and landform designs are more mature. Inclusion in the site water balance for each contaminated catchment in future SWMP’s may also be advisable.

One consideration for drain sizing in the lifecycle development of the stockpiles is after the impermeable/semi-permeable pad is laid and shortly after the material is starting to be stockpiled. This situation would incur the greatest run-off coefficient (approaching 1), as little to no run-off would be able to infiltrate, whilst still containing some level of contaminated runoff. Based on discussions with Rio Tinto representatives, the expected duration of this scenario may be short as stockpiles are proposed to be erected quickly, limiting likelihood of this scenario. The full stockpile landform has therefore been assumed with a conservative RoC (0.88). This RoC was obtained from the disturbed mine catchment relevant to Pilbara Iron mine sites from Pilbara Surface Water Management Strategy - RTIO-PDE-0053914 (Rio Tinto, 2011)

These calculations are based on the Primary Sulfides catchment only as an example and conservatively assume:

- The stockpile pad is roughly 750 m long, 300 m wide, thus the northern drain is 750 m long and the contaminated catchment surface area including the drain and bunds is ~ 255,000 m^2
- The average slope of the natural terrain is 0.2%. This is the average grade of the natural terrain and is within the standard minimum gradient specified in Civil and structural design criteria, DC-C001_5, RTIO-AM-0017814 (Rio Tinto, 2021).
- The stockpile drains to the South and North drains equally from the crest of the stockpile, therefore half of the entire stockpile catchment reports to the northern drain.

Given a 3 m base width channel, with 3H:1V side slopes, the maximum flowrate in the channel would be 5 m^3/s and the maximum depth in the channel is approximated to 0.7 m (1 m total drain depth with 300 mm freeboard). This geometry results in 1.4 m/s maximum velocity which does not necessitate scour protection (>2 m/s) (AustRoads, 2019) and is above self-cleaning velocity stipulated in Civil and structural design criteria, DC-C001_5, RTIO-AM-0017814 (Rio Tinto, 2021).

6.4 Internal bunds

Internal perimeter bunds are proposed to be constructed along the perimeter of the upper surface and benches of the WRL to retain surface water where it will then infiltrate into the WRL or evaporate. Internal bunds should be a minimum 2 m wide at the crest and 1 m high. Stormwater accumulation along the outer edge can lead to water seepage and potential failure of the perimeter bunds causing a sudden release of stored water. The WRL design surface adjacent to perimeter bunds should be graded to drain toward the upslope batter at an angle of 10% (Golder, 2021). This will ensure runoff avoids the edge of the landform to reduce failure risk and provide stormwater storage. During operations, windrows of a similar design philosophy should be maintained along the perimeter of the working area to prevent runoff down the batter and encourage infiltration into the WRL. Figure 6-4 shows a conceptual cross-section of the WRL internal bund arrangement.

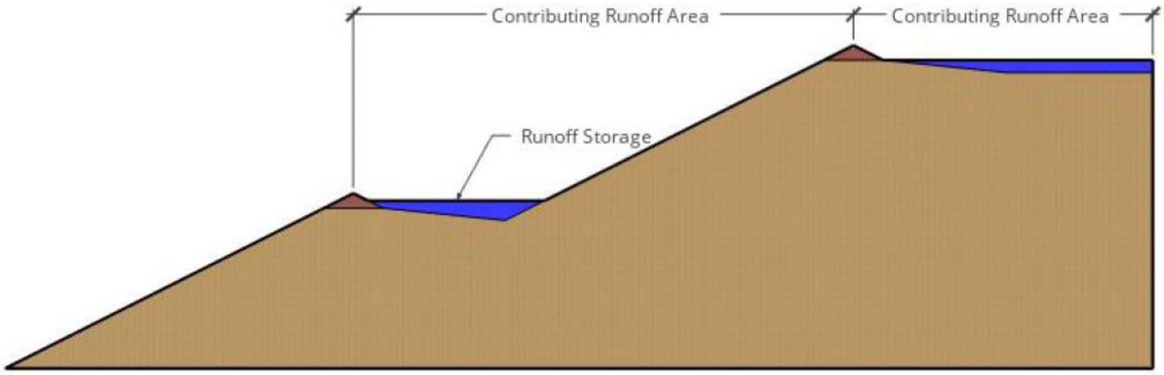

Figure 6-4. WRL internal bunds (Golder, 2021)

6.5 WSP

The following recommendations for the WSPs are based on volumetric analysis. A typical cross section of the sedimentation pond design has been included in Figure 6-5 detailing the common elements.

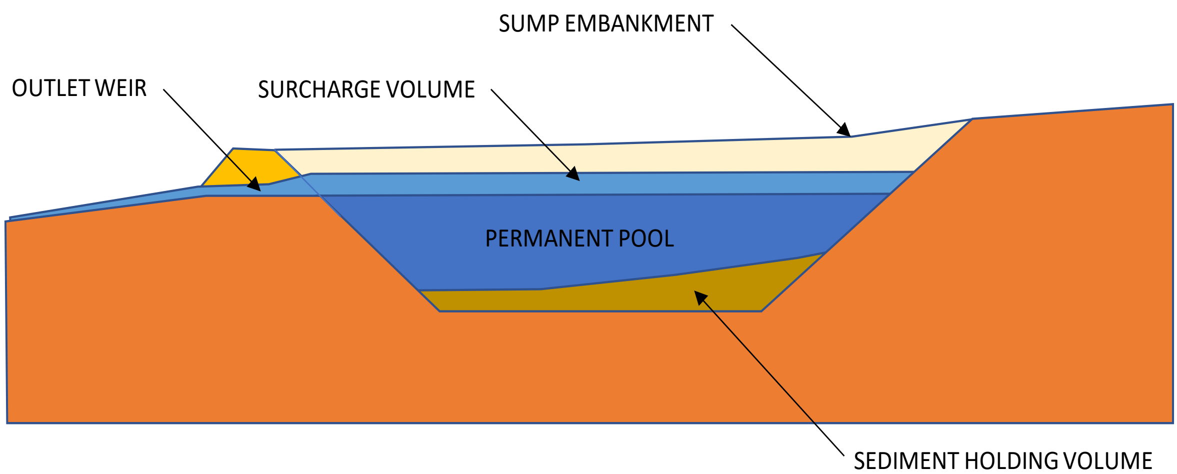

Figure 6-5. Sedimentation pond: typical section & terminology

6.5.1 Pond dimensions and floodwater capacity

Based on a catchment area volumetric analysis, each pond has been sized in order to safely contain runoff from the potentially contaminated catchments for the critical 24 and 72-hour design storms for a range of AEP events. The 24 and 72-hour storms are an industry standard for storage-based run-off calculations (Rio Tinto, 2011). Additionally, it represents a reasonable, if not slightly conservative estimate of the likely longest duration of an ex-tropical cyclone to persist in the area.

Runoff volumes have been estimated based on a conservative runoff coefficient of 1 (no infiltration) to represent the liner and low permeability pad material. Potential contaminated catchment areas were delineated from LiDAR topographic data and provided conceptual landforms from Rio Tinto. The catchments calculated include the entire area within the flood bunds, encapsulating both the drain, benches, batters, and pond surface areas.

The total required containment volume of each WSP is presented in Table 6-1 for a large range of design events from the 1% AEP to the 63.2% AEP. The required containment volumes are based on the 24 and 72-hour critical storm IFD depths (Figure 4-3).

Please note, the provided WSP outlines have been based off a conceptual pond with 3 m reserved for water, 0.5 m reversed for sediment and 0.5 m of freeboard (4 m total). The combined 1 m of freeboard and sediment reserve is not accounted for in Table 6-1, only the required volume necessary to contain the stormwater. In addition, these volumes assume all contaminated runoff is to be stored in the WSP and leaves no allowance for the potential volume in drains, within the contaminated area perimeter bunds and void space within the stockpile. Future SWMP updates will explore this opportunity.

Table 6-1. Required WSP containment volumes m^3

	Primary and Secondary Sulfides		**Secondary Sulfides East**		**Low Grade Primary Sulfides**		**ANFO**	
Event	24-hour	72-hour	24-hour	72-hour	24-hour	72-hour	24-hour	72-hour
1 in 2000 AEP	368,000	399,000	105,000	114,000	524,000	569,000	39,000	43,000
1 in 1000 AEP	330,000	365,000	94,000	105,000	470,000	521,000	35,000	39,000
1 in 500 AEP	294,000	332,000	84,000	95,000	419,000	473,000	31,000	36,000
1 in 200 AEP	250,000	290,000	72,000	83,000	357,000	413,000	27,000	31,000
1% AEP	221,000	258,000	63,000	74,000	315,000	368,000	24,000	28,000
2% AEP	190,000	227,000	54,000	65,000	270,000	323,000	20,000	24,000
5% AEP	152,000	186,000	43,000	53,000	216,000	265,000	16,000	20,000
10% AEP	123,000	152,000	35,000	44,000	175,000	217,000	13,000	16,000
20% AEP	96,000	120,000	28,000	34,000	137,000	171,000	10,000	13,000
50% AEP	61,000	76,000	17,000	22,000	87,000	108,000	7,000	8,000
63.2% AEP	50,000	63,000	14,000	18,000	72,000	89,000	5,000	7,000

6.5.2 Sediment management

The lowest 0.5 m depth of the pond is to be reserved for sediment. Monitoring of sediment levels must be undertaken to determine cleaning frequency to ensure sediment storage availability. The cleaning frequency will be based on the long-term rate of sediment inflow from stockpiles and will require operational monitoring plans to ensure sediment build-up and storage uptake is managed appropriately. In situ sediment depth analysis is recommended to determine the sediment inflow rate after rainfall events to optimise the sediment removal frequency schedule.

6.5.3 Pumping capacity

As the lined ponds aim to minimise potentially contaminated groundwater infiltration, the volumetric capacity for the entire 1% AEP stormwater runoff must be contained as per Civil and structural design criteria, DC-C001_5, RTIO-AM-0017814 (Rio Tinto, 2021). The WSP's have been sized assuming they are maintained in an empty state before a rainfall event. This is considered a reasonable assumption given the project setting in a water limited environment.

The PFS design has allowed for water from all potentially contaminated water ponds to be pumped to the Processing Plant. This would aim to avoid contaminate overflow into the natural environment in the situation that flood events within the design criteria occur in succession. Sizing of these pumping systems is outside the scope of this SWMP.

6.5.4 Bund design

External bunds will be designed to a suitable elevation to prevent ingress of the 1% AEP event from clean water external catchments into the potentially contaminated water pond and include 0.5 m freeboard.

Detailed bund design will need to consider the proposed location, both external natural catchment floodwater and hydraulic behaviours as well as internal ponding depths and available construction geomaterial quality.

6.5.5 Liner

The appropriate liner material should be selected based on its compatibility with the severe site climatic conditions, required service life and suitability/resilience to the chosen sediment removal method. Additionally, ease of replacement may also need to be considered of the service life of the product does not achieve the project life.

7. Surface water management measures

Table 7-1, adapted from Operational Surface Water Management Plan (Golder, 2021), outlines different strategies for handling water runoff depending on the level of contamination present and where the runoff originates.

Table 7-1. Water management definitions

Water Type	Description	Treatment Type	Water Management Method	Runoff Areas Included
Clean	Non-contaminated surface water runoff generated in uncleared/natural ground areas.	No treatment required.	Water is retained by flood protection bunds and infiltrate/evaporate in situ.	Natural and undisturbed catchment areas.
Sediment Laden	Surface water runoff that may contain entrained natural sediment but is chemically clean.	Primary treatment required (sediment removed by gravity).	Water is retained on landforms by perimeter bunds OR is collected at the base of landforms by unlined toe drains and perimeter bunds. This water can then infiltrate/evaporate in situ.	Primary Sulfides (<8-year lifetime), Oxide, Leach Cap & Topsoil Stockpiles. Waste Rock Landform embankments, and Tailings Storage Facility embankments
Potentially Contaminated	Surface water runoff which may potentially contain oils, chemicals, metals etc.	Secondary and/or tertiary treatment.	Water is collected at the base of landforms by lined toe drains. Contaminated floodwater is to be conveyed to lined WSP's to evaporate. If necessary, this water can be sent to the Processing Plant to empty ponds. This water is not discharged to the environment under normal operating conditions.	Primary Sulfides (>8-year lifetime) and Secondary Sulfides Stockpiles. ANFO, Mine Pit, RoM Pad, Process Plant and Washdown Areas.

7.1 Clean water

Clean surface water will gather in low-lying areas around the mine infrastructure. To prevent geotechnical or operational risks relating to this ponding, flood/perimeter bunds will be constructed around key facilities as per section 6.1. Additionally, the bunds will be positioned nominally 10 m away from the infrastructure perimeter. This space will serve as a buffer for potential future potentially contaminated water drains and allow for light vehicle access. It will also prevent water from ponding directly against the infrastructure.

7.2 Sediment laden water

Water is retained on landforms by internal bunds or is collected at the base of landforms by unlined toe drains and perimeter bunds (Figure 6-2). Unlined drains and perimeter bunds surrounding uncontaminated mine structures are positioned to capture and contain sediment laden water to minimise the potential environmental outflows.

7.3 Potentially contaminated water

Potentially contaminated water is to be collected at the base of landforms and stockpiles by lined toe drains which is to be conveyed along gravity fed lined drains to lined sediment ponds. This AMD runoff can be tested for hydrocarbon content and then transported to the Processing Plant if required for lime adjustment. This runoff is therefore not discharged under normal operating conditions. Future project phases will require consideration of potential overflow areas in the case of a design event exceedance event (i.e., a 1 in 500 AEP event occurring). PAF mineral stockpiles will be placed on top of a low permeability NAF basal layer (Rio Tinto, 2024). The internal PAF runoff from the centre of the WRL and TSF is to be contained within the structure. The outer layers of the WRL are planned to be comprised of NAF material which encapsulates the PAF minerals in the centre as depicted in Figure 7-1. Hence runoff water from the WRL is not expected to contact PAF material. This approach is planned to be executed throughout operations thus embankment run-off should be comprised entirely of NAF material throughout the lifecycle (Rio Tinto, 2024).

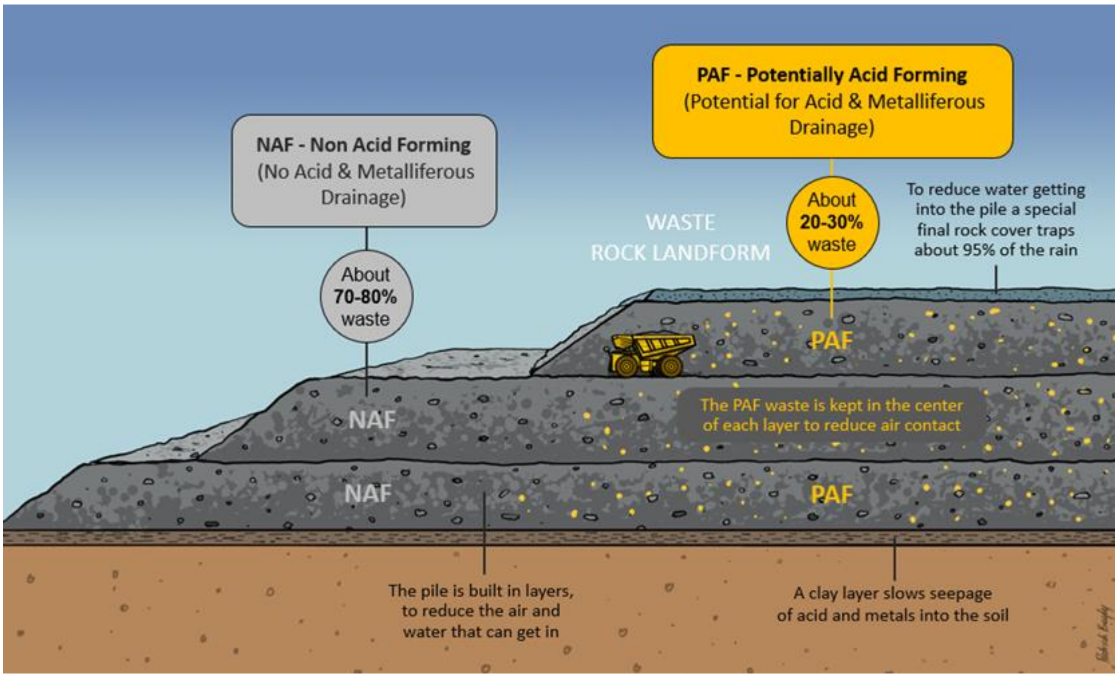

Figure 7-1. WRL operations design cross-section (Rio Tinto, 2024)

Primary sulfide ore stockpiles can contain PAF material. However, kinetic tests have revealed an 8-year delayed acidification due to neutralising minerals (Rio Tinto, 2024). If these stockpiles are removed within this 8-year window they can be treated as sediment laden. Rio Tinto have advised that the Primary Sulfide stockpiles adjacent to the mine pit will be placed and processed within this time frame, hence this stockpile is to be treated as sediment laden with unlined drains and perimeter bunds.

Oxide and leach cap stockpiles have significantly lower AMD risk than the mafic and ore stockpiles. The toe drains for these stockpiles have been revised to be considered unlined and don't require prevention of groundwater contamination if correctly monitored. The detailed design phase will explore groundwater monitoring schedules for these catchments.

Figure 7-2 depicts the conceptual drainage system and recommended repositioning of infrastructure to ensure improved drainage outcomes and/or a reduction in flood risk. The internal potentially contaminated drainage systems of the TSF and Processing Plant are being designed by others as part of separate scope items and hence are not detailed in this report (refer Doc: MEM-C0007-B013-WWL-MEM-00004.00-127-032 and Doc: 2262-GREP-002)

Winu Copper Gold Project
Surface Water Management Plan
Figure 7-2. Surface Water Management Plan

Project No.	Client
311012-01475	Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
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Legend

- Bunds
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- Landforms
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- Contaminated Catchments
- Lycopodium Managed Drainage
- Potential Future Processing Plant Expansion

File Path: I:\Projects\311012-01475_Rio Tinto Winu Hydrogeology and Hydrology Study\5_Engineering\HY-Hydrology\B055\1_GIS\1_Projects\Winu_SWMP_DMH_240530_HB.qgz

7.4 Operational flood protection and surface water management

Table 7-2 summarises the surface water management measures that are recommended for mine site infrastructure during operations, based on the 1% AEP flood modelling results, surface water management design philosophy and discussions with Rio Tinto on potentially contaminated runoff producing landforms.

Table 7-2. Operational flood protection and surface water management

Infrastructure/ Stockpile	Easting	Northing	Maximum Flood Depth* (m)	Duration of Inundation (days)	Minimum Bund Height (m)	Contamination level within bunds	Reporting to WSP	Treatment/ Recommendations
Airstrip	381376.04	7702694.60	0.30	1.4	0.9	Sediment Laden/Potentially Contaminated		Create a small, lined area around fuel storage and airplane parking location. Elsewhere use unlined toe drains
ANFO	373720.31	7706104.60	1.41	6.3	2.0	Potentially Contaminated	4	Move all infrastructure 1 km to the West or 1.2 km to the East to relocate out of localised depression. Lined toe drain to collect runoff, conveyed to WSP 4
Camp	355861.72	7709639.60	0.39	1.8	0.9	Clean		Bunds on the upstream sides of the camp perimeters
Leach Cap	367818.85	7707749.97	0.59	2.6	1.1	Sediment Laden		Unlined toe drain to collect runoff and infiltrate/evaporate in situ
Oxides	363821.52	7708912.10	0.56	2.5	1.1	Sediment Laden		Unlined toe drain to collect runoff, infiltrate/evaporate in situ
Primary Sulfides (<8-years)	368389.44	7708080.67	0.96	4.3	1.5	Sediment Laden		Unlined toe drain to collect runoff, infiltrate/evaporate in situ
Primary Sulfides (>8-years)	366121.58	7708881.37	1.18	5.3	1.7	Potentially Contaminated	1	Lined toe drains to collect runoff, conveyed to WSP 1

Low Grade Primary Sulfides (>8-years)	364944.86	7708028.47	1.63	7.3	2.2	Potentially Contaminated	2	Lined toe drains to collect runoff, conveyed to WSP 2
Processing Plant	367247.49	7707352.38	0.16	0.7	0.7	Potentially Contaminated		Drainage managed by Lycopodium
Road	365149.10	7707255.32	1.55	7.0	2.1	Clean		Build Road at grade, or align to avoid basin inverts where possible
ROM Pad	367232.87	7707841.76	0.15	0.7	0.7	Potentially Contaminated		Drainage managed by Lycopodium
Secondary Sulfides	366698.73	7708698.21	0.11	0.5	0.7	Potentially Contaminated	1, 3	Lined toe drain to collect runoff, conveyed to WSP 1 and 3
Solar Farm	361591.27	7708228.97	1.80	8.1	2.3	Clean		Move Solar Farm South-East 700m to relocate out of local depression
TSF Embankments	363047.92	7711305.87	1.55	7.0	2.1	Sediment Laden as outer layers are planned to be NAF		Unlined toe drain to collect NAF runoff from embankments infiltrate/evaporate in situ
WRL Embankments	368326.49	7709550.77	1.01	4.5	1.6	Sediment Laden as outer layers are planned to be NAF		Install internal bunds and unlined toe drains to collect, evaporate and infiltrate/evaporate NAF water in situ
Wind Turbines	360724.27	7709817.16	1.89	8.5	2.4	Clean		Position Turbines outside of natural depressions

**Maximum Flood Depth refers to the deepest ponding adjacent to the bunded area*

8. Conclusions

The 2023 SWMP update has followed planning policies and guidelines, within the Rio Tinto specifications, to develop the conceptual Surface Water Management Plan for the Winu Mine Site.

Assessment of flooding at the site has shown that flood risk can be adequately managed for the design events assessed using flood bunds to keep ponded water away from landforms, as well as minimising interaction between clean and potentially contaminated catchments. Some infrastructure was shown to be conceptually located in natural depressions and hence recommendations in the following sections detail potential changes to these locations to minimise flood risk.

The current approach classifies surface water runoff areas into clean water, sediment laden and potentially contaminated water. These areas are segregated by flood bunds to minimise cross contamination. Sediment laden areas are contained by unlined drains and perimeter bunds, while potentially contaminated areas are managed with lined drains, flood bunds and WSP’s.

9. Recommendations

The following recommendations are advised based on the results

- In conjunction with other design constraints and considerations;
  - the ANFO should be moved either approximately 1 km to the west or 1.2 km to the east out of the localised depression
  - the Solar Farm infrastructure should be moved out of the natural depression approximately 700 m to the east
- Utilise flood bunds or proposed linear infrastructure such as access roads upstream of infrastructure to minimise floodwater volume reporting to potentially contaminated toe drains/landforms
- Geotechnical input on sources at site for suitable bund materials should be undertaken in future project phases
- Indicative calculations and geometries for catchment areas, water storage volumes and drains have been included in this update, but they must be developed and adapted to any changes in basis of design and as future mine plan updates become available

The following maintenance procedures are advised to maintain functionality and operability of the site SWMP:

- Pumps, pipes, and tanks that may form part of the stormwater management system (to manage design exceedance events) should be maintained in accordance with manufacturer's requirements
- Existing bunding associated with toe drain bunds, flood bunds or WSP bunding will be inspected annually or after a 50 mm or greater rainfall event in a 24-hour period and maintained as required
- Bunded areas and WSP's will be maintained to remove sediment to meet the designed volume requirements through monitoring of sediment accumulation and removed as required

The following inspections should also be undertaken to identify any maintenance priorities:

- Visual inspection and maintenance to ensure efficient operation of the pump and pipe high flow drainage relief network
- Inspection of stormwater infrastructure (pump/pit/pipe network, stormwater dam, stormwater pond, perimeter drain), following rainfall events of 50 mm in 24 hours or greater

Where the inspections identify any blockages, sediment buildup or significant erosion, maintenance will be undertaken to ensure the system is functioning correctly

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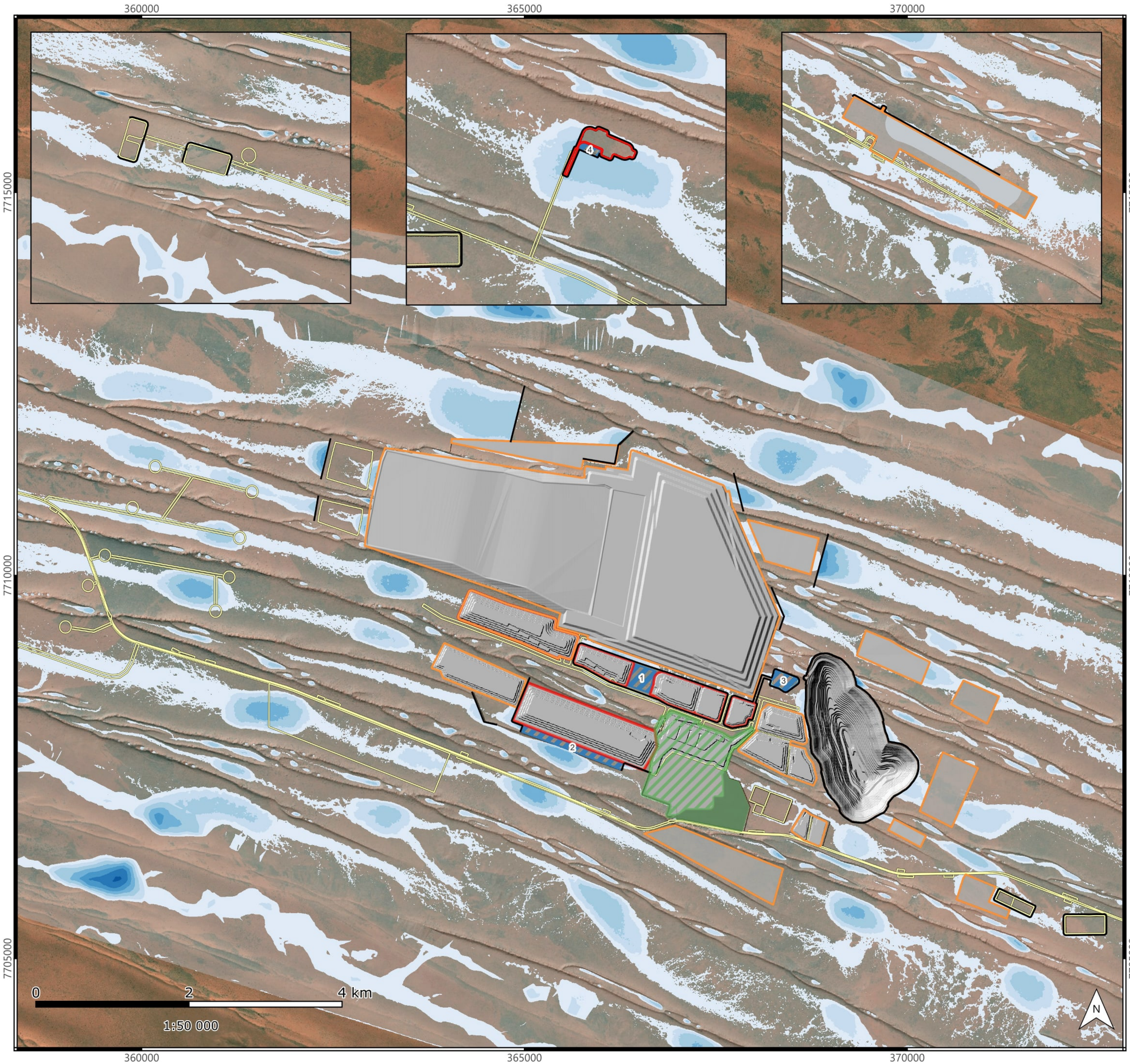
Appendix A. Flood Maps

1% and 5% AEP Events



Wino Copper Gold Project
Surface Water Management Plan

Project No. 311012-01475

Client Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Damon.Hortle
Date:23/05/2024

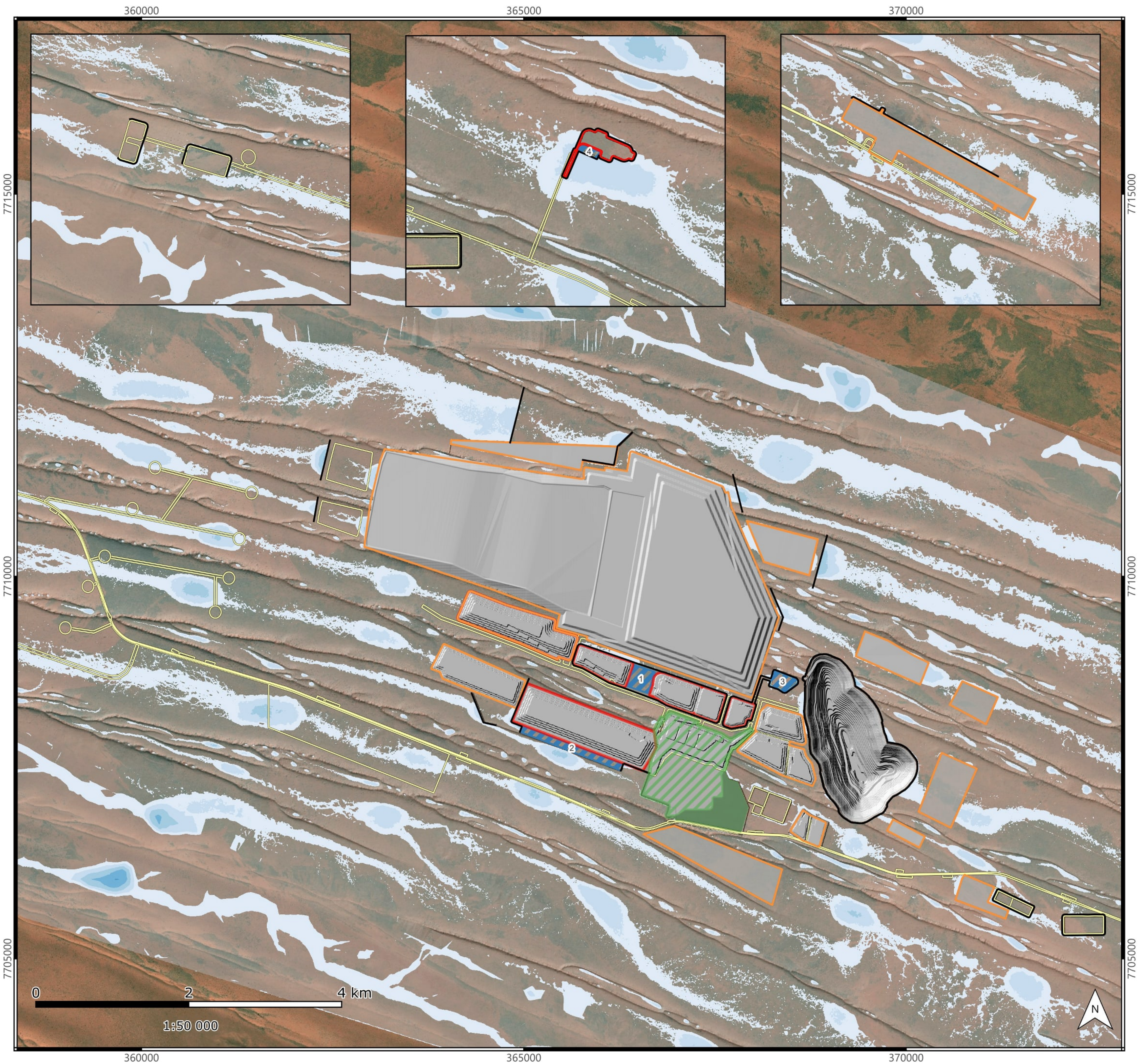
Legend

- Bunds
- Lined Toe Drains
- Unlined Toe Drains/Bunds
- Proposed Mine Layout February 2024
- Landforms
- Water Settling Ponds
- Lycopodium Managed Drainage
- Potential Future Processing Plant Expansion

1% AEP Flood Depth (m)

- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50

File Path: I:\Projects\311012-01475_Rio Tinto Winu Hydrogeology and Hydrology Study\5_Engineering\HY-Hydrology\B055\1_GIS\1_Projects\Winu_SWMP_DMH_240516.qgz



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5% AEP Flood Depth (m)

- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50

File Path: I:\Projects\311012-01475_Rio Tinto Winu Hydrogeology and Hydrology Study\5_Engineering\HY-Hydrology\B055\1_GIS\1_Projects\Winu_SWMP_DMH_240516.qgz