stanmore

CHAPTER 6 - CLIMATE

STANMORE ID EXTENSION PTY LTD
ISAAC DOWNS EXTENSION PROJECT

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6. CLIMATE

6.1 Introduction

This chapter provides an assessment of the existing local and regional climatic conditions for the Isaac Downs Extension Project (Project) and its surrounding region, and includes aspects of the local and regional climate that are relevant for the management of the Project, in particular the propagation of noise; potential releases to air, water and land; floods; bushfires; and water supply during drought.

This chapter also provides an assessment of climate hazards and risks and the Project's operational vulnerabilities in relation to current climate change predictions. Adaptive strategies and/or activities to minimise the combined impacts of climate extremes and change on the Project are provided as a component of the assessment.

Chapter 14 details the Project's greenhouse gas emissions and abatement measures.

This chapter has been developed in accordance with the EIS Information Guideline – Climate (2026) as follows:

- Existing climate is described in Section 6.2.
- Climate change resilience, extremes of climate, and associated risks and management are described in Section 6.3 to Section 6.1.

6.2 Existing Climate

6.2.1 Overview

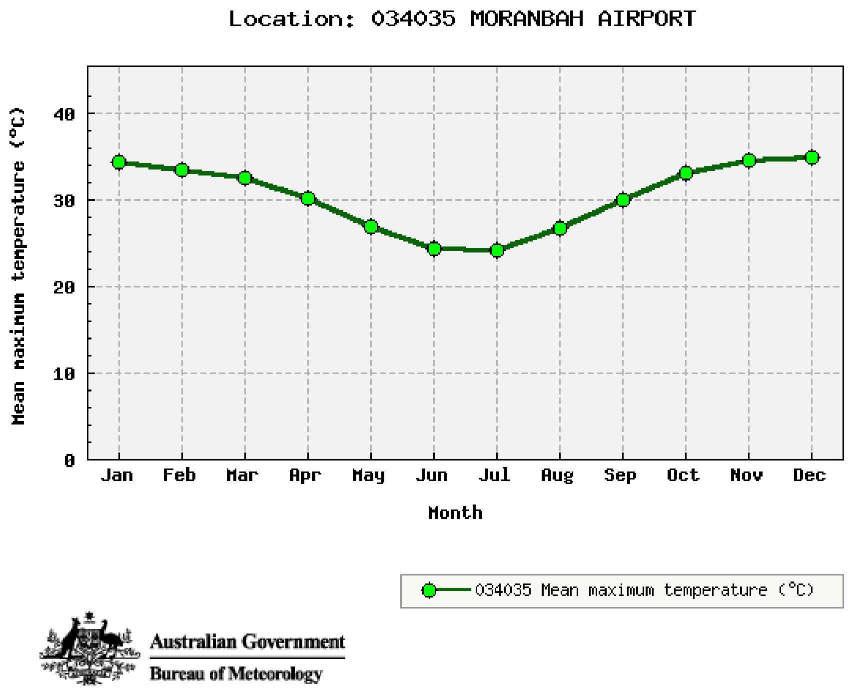
The climatic data used for assessment was collected from the Bureau of Meteorology (BoM) weather station at the Moranbah Airport (BoM station number 034035; Latitude: 22.064° S, Longitude: 148.076°; Elevation: 232.2 m)[1]. This BoM weather station is the closest to the Project, approximately 15 kilometres to the west-northwest, and has been in continuous operational since February 2012. The climatic data set used for assessment represents the period: February 2012 to September 2025.

The climatic data used for the assessment of wind was summarised from the Project's air quality assessment provided in **Appendix U**, which represents the period: 2020 to 2024. The climatic data used for the assessment of humidity was collected from the former Bureau of Meteorology (BoM) weather station at the Moranbah Water Treatment Plant (BoM station number 034038; Latitude: 21.99° S, Longitude: 148.03°; Elevation: 260 m), which represents the period: 1986 to 2010[2].

6.2.2 Temperature

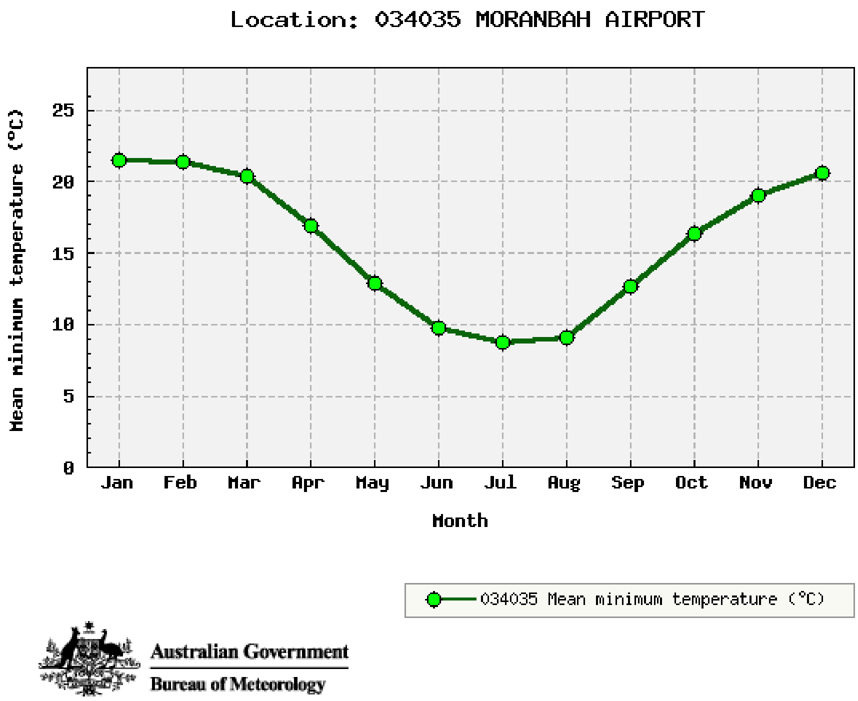
The average daily maximum air temperature for each month for February 2012 to September 2025 is provided in Figure 6-1. Based on the average daily maximum air temperatures, the hottest daytime period (>30.0°C) of the year is from September to April with a range of 30.1°C to 35.0°C. December has the highest average daily maximum air temperature at 35.0°C and July has the lowest average daily maximum air temperature at 24.3°C.

[1] https://www.bom.gov.au/climate/averages/tables/cw_034035_All.shtml
[2] https://www.bom.gov.au/climate/averages/tables/cw_034038_All.shtml



Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean maximum temp. (°C)	34.5	33.7	32.8	30.2	26.9	24.5	24.3	26.8	30.1	33.2	34.6	35.0	30.6

Figure 6-1 Average Monthly Maximum Temperatures (February 2012 to September 2025)



Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean minimum temp. (°C)	21.5	21.4	20.4	16.9	12.8	9.8	8.7	9.1	12.7	16.3	19.0	20.6	15.8

Figure 6-2 Average Monthly Minimum Temperatures (February 2012 to September 2025)

The average daily minimum air temperature for each month for February 2012 to September 2025 is provided in Figure 6-2. Based on the average daily minimum air temperature, the coolest nighttime period (<15.0°C) of the year is from May to September with a range of 8.7°C to 12.7°C. July has the lowest average daily minimum air temperature of 8.7°C and January has the highest average daily minimum air temperature of 21.5°C.

The seasonal temperature averages are summarised as follows.

- Summer days are hot with an average daily maximum air temperature for December to February of 34.3°C.
- Summer nights are warm with an average daily minimum air temperature for December to February of 21.2°C.
- Autumn days are hot to warm with an average daily maximum air temperature for March to May of 29.9°C.
- Autumn nights are mild to cool with an average daily minimum air temperature for March to May of 16.7°C.
- Winter days are warm with an average daily maximum air temperature for June to August of 25.2°C.
- Winter nights are cool with an average daily minimum air temperature for June to August of 9.2°C.
- Spring days are hot with an average daily maximum air temperature for September to November of 32.6°C.
- Spring nights are cool to mild with an average daily minimum air temperature for September to November of 16.0°C.

Table 6-1 details the highest and lowest maximum air temperatures recorded from February 2012 to September 2025. The highest recorded maximum air temperature was 43.3°C during December 2019 and the lowest recorded maximum air temperature was 11.5°C during July 2022.

Table 6-2 details the highest and lowest minimum air temperatures recorded from February 2012 to September 2025. The highest recorded minimum air temperature was 27.2°C during January 2014 and the lowest recorded minimum air temperature was -1.5°C during July 2014.

Table 6-1 Highest and Lowest Recorded – Maximum Air Temperature (Feb. 2012 – Sept. 2025)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Highest Recorded	42.4	42.8	42.1	37.2	34.6	31.7	31.8	33.5	39.5	41.4	42.3	**43.3**
Lowest Recorded	21.8	22.4	22.2	19.7	11.6	14.2	**11.5**	18.2	18.5	20.3	24.4	24.3

Table 6-2 Highest and Lowest Recorded – Minimum Air Temperature (Feb. 2012 – Sept. 2025)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Highest Recorded	**27.2**	26.5	26.4	23.6	21.5	18.8	18.8	18.4	21.7	23.5	25.7	25.5
Lowest Recorded	16.6	15.4	14.2	4.5	1.4	-0.7	**-1.5**	-0.6	2.9	5.5	10.1	14.7

6.2.3 Rainfall

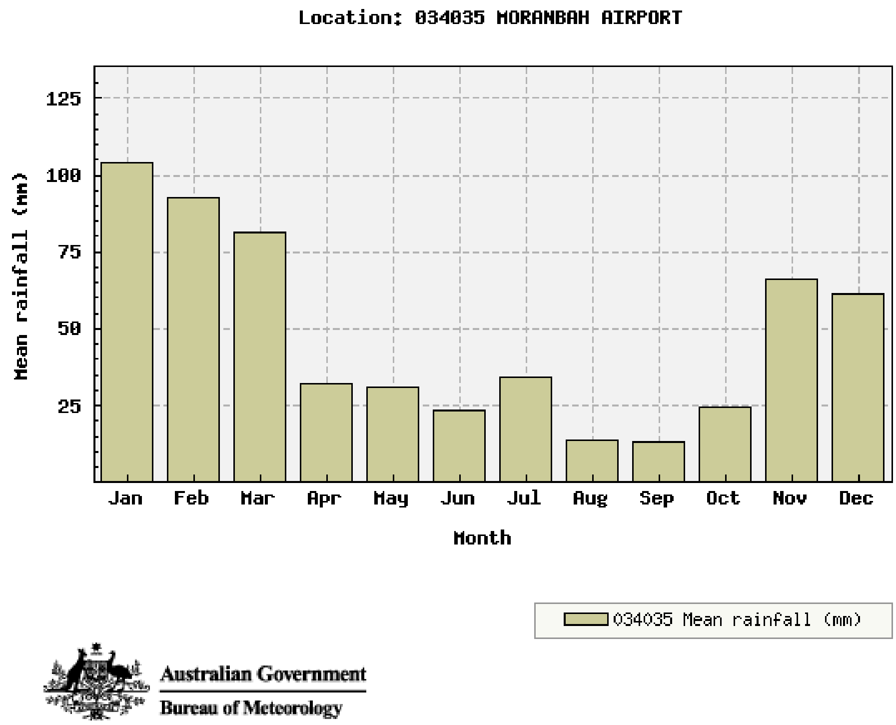
The average, median, highest recorded and lowest recorded monthly rainfall for February 2012 to September 2025 are presented in Figure 6-3, Figure 6-4, Figure 6-5 and Figure 6-6, respectively.

BoM advises from a meteorological point of view the median is usually the preferred measure of 'average' or 'typical' rainfall. BoM's preferred use of the median is because of the high variability of daily rainfall, that is, one extreme rainfall event, such as a slowly moving, severe thunderstorm, will have less effect on the median than it will have on the arithmetic mean.

The wettest period of the year is from November to March based on the average and median monthly rainfall. January is the wettest month with an average and median monthly rainfall of 104.1 mm and 100.2 mm, respectively. The highest monthly rainfall from February 2012 to September 2025 was 260.6 mm recorded for February 2016.

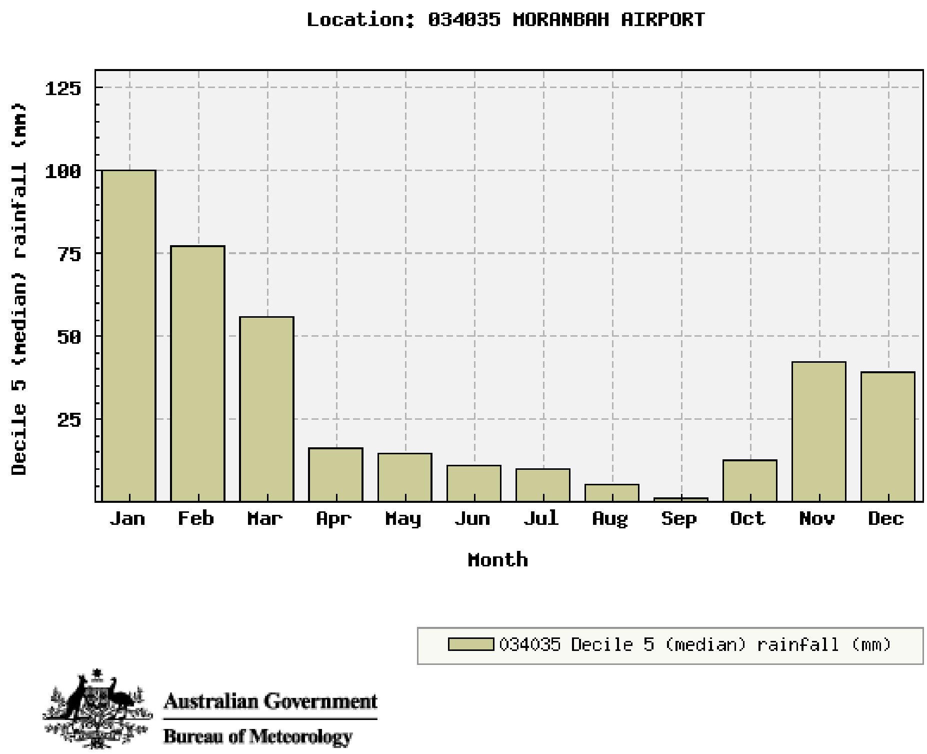
The driest period of the year is from April to October based on the average and median monthly rainfall. September is the driest month with an average and median monthly rainfall of 13.3 mm and 1.2 mm, respectively. The lowest monthly rainfall from February 2012 to September 2025 was 0.0 mm recorded for April 2017, June 2017, May 2023, August 2023, October 2023 and September 2024.

The average annual rainfall from February 2012 to September 2025 is 583.4 mm. The highest and lowest recorded average annual rainfall from February 2012 to September 2025 were 833.0 mm (2016) and 324.8 mm (2019), respectively.



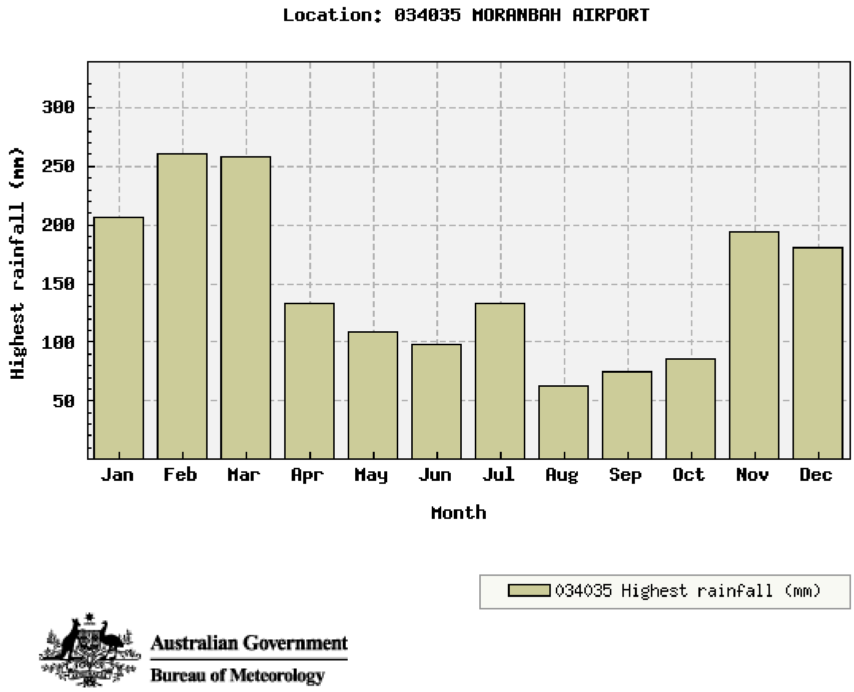
Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean rainfall (mm)	104.1	92.9	80.7	32.0	30.6	23.1	35.9	13.9	13.3	24.6	66.2	61.4	583.4

Figure 6-3 Average Monthly Rainfall (February 2012 – September 2025)



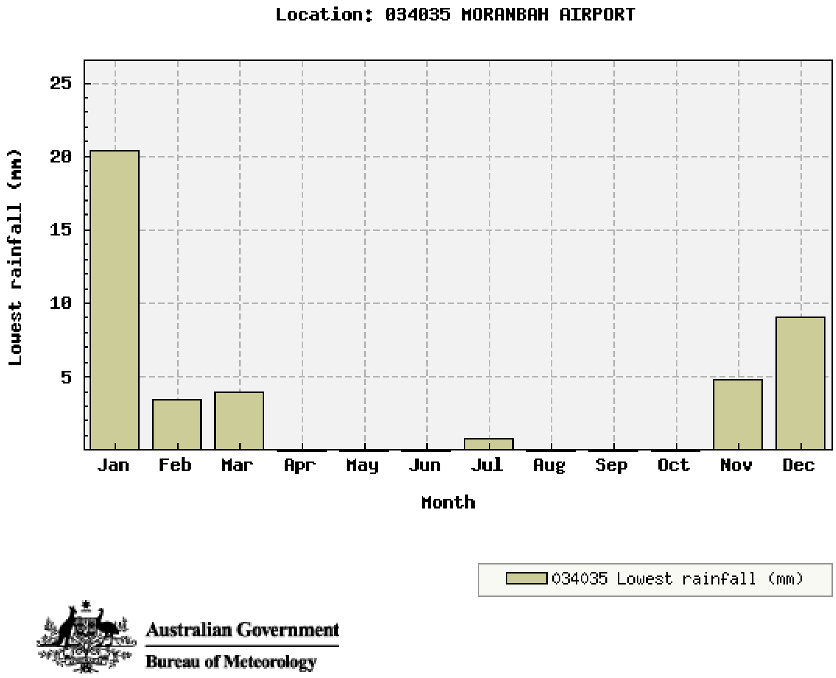
Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Median rainfall (mm)	100.2	77.0	55.8	16.4	13.0	10.4	11.6	5.4	1.2	12.4	42.2	39.4

Figure 6-4 Median Monthly Rainfall (February 2012 – September 2025)



Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Highest rainfall (mm)	206.6	260.6	257.8	133.4	108.6	98.4	133.2	62.0	75.4	86.0	193.8	180.8	833.0

Figure 6-5 Highest Recorded Monthly Rainfall (February 2012 – September 2025)



Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Lowest rainfall (mm)	20.4	3.4	4.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	4.8	9.0	324.8

Figure 6-6 Lowest Recorded Monthly Rainfall (February 2012 – September 2025)

6.2.4 Evaporation

The average annual and seasonal pan evaporation rates and corresponding rainfall totals are provided in Table 6-3 (i.e. as interpreted from BoM mapping[3]). The annual and seasonal pan evaporation rates significantly exceed their corresponding rainfall totals. The evaporation rate is influenced by temperature, humidity, wind speed, and cloud cover, and is highest during hot, dry, and windy conditions.

Table 6-3 Average Evaporation Rate

Period	Average Evaporation Rate (mm)	Average Rainfall* (mm)	Median Rainfall* (mm)
Annual	2,000-2,400	583.4	-
Summer	700-800	258.4	216.6
Autumn	500-600	143.3	85.2
Winter	300-400	72.9	27.4
Spring	600-700	104.1	55.8

(* = Seasonal rainfall totals are based on adding the monthly rainfall totals for the corresponding months.)

6.2.5 Wind Speed and Direction

Information on wind speed and direction was taken from the air quality assessment (**Appendix U**), as summarised below. Winds across the region surrounding the Project area are predominantly light to moderate (up to around 5 m/s) and from the northeast through to southeast. Winds from the northwest and southwest sectors are much less frequent.

The seasonal breakdown of winds shows that the predominant southeast winds present throughout the year although Spring sees a slight shift in direction to greater easterlies.

The diurnal breakdown of winds shows that the lightest winds are predicted between midnight and 6am, mostly from the southeast. Between 6am and midday, winds maintain a generally southeasterly direction and slightly increase in speed. The strongest winds, also from the east-southeast, occur between midday and 6pm. During the evening (6pm – midnight) winds begin to slow again and shift to a greater number of north-easterly winds.

Figure 6-7 summarises the wind speed and direction experienced by the Project area between 2020 to 2024.

[3] https://www.bom.gov.au/climate/maps/averages/evaporation/

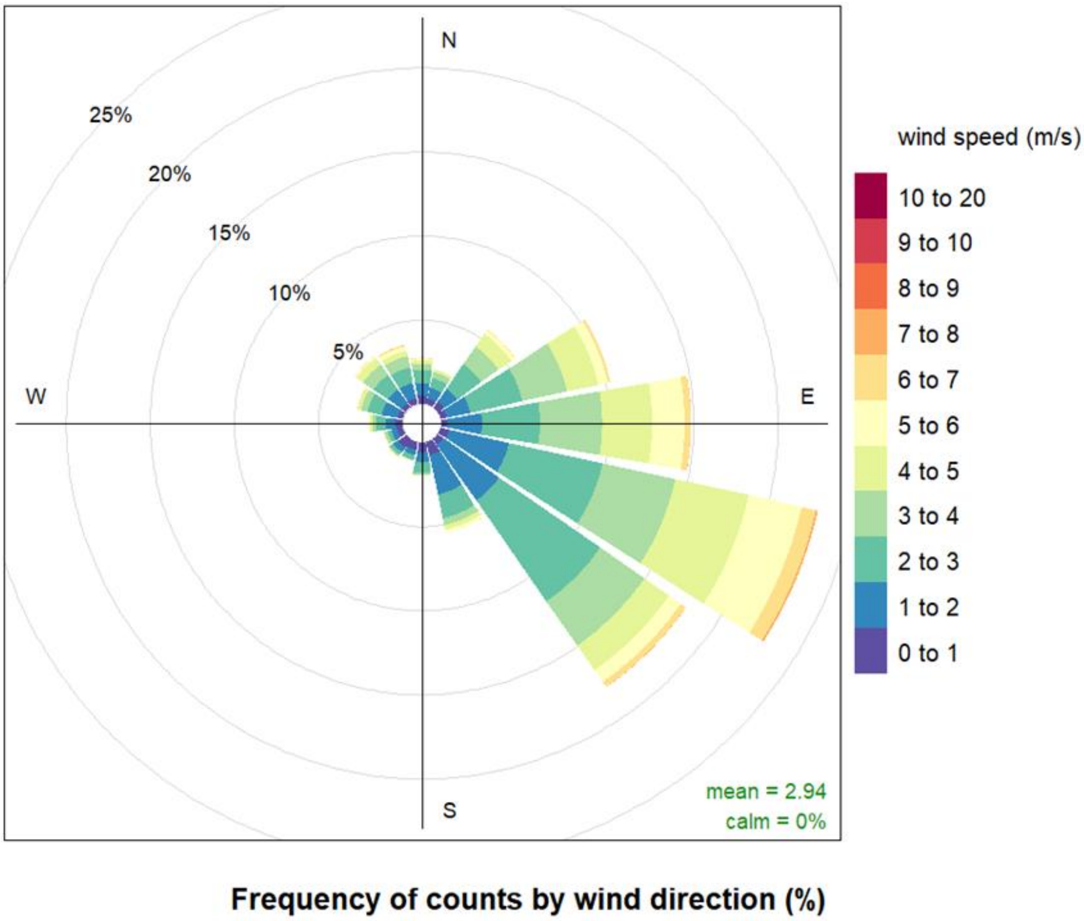


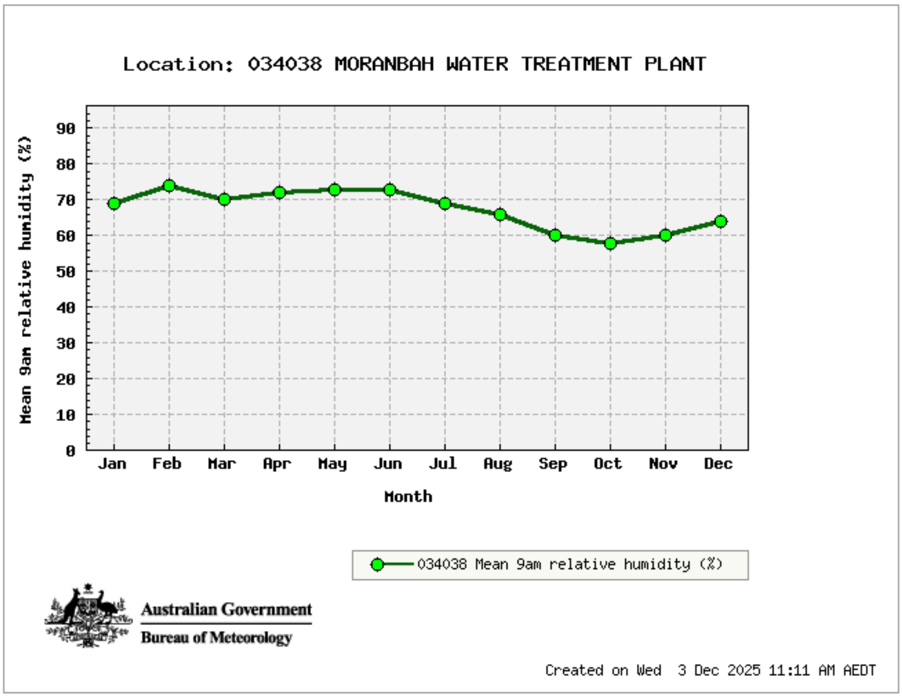
Figure 6-7 Summary of Wind Direction and Speed (2020 – 2024)

6.2.6 Humidity

Relative humidity was selected for assessment purposes because it is the traditional indicator of the air's moisture content, and is defined as the amount of moisture in the air expressed as a percentage of the amount of moisture present if the air was saturated at that temperature.

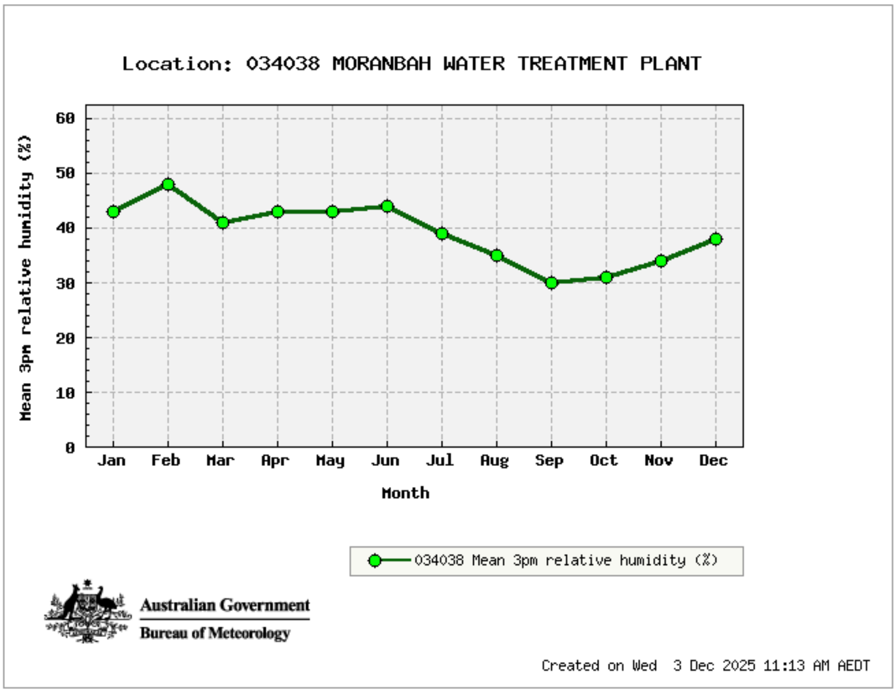
The average monthly relative humidity (%) for 9am and 3pm during the period, 1986 to 2010, is provided in Figure 6-8 and Figure 6-9, respectively. Based on the average monthly relative humidity (%), February had the highest average humidity for 9am (74%) and 3pm (48%), October had the lowest average humidity for 9am (58%), and September had the lowest average humidity for 3pm (30%).

The yearly range of the average monthly relative humidity (%) for 9am and 3pm was 58-74% and 30-48%, respectively. The average monthly relative humidity (%) for 3pm is consistently lower than for 9am over the year. September to November (Spring) experiences the lowest average monthly relative humidity (%) for 9am (58-60%) and 3pm (30-34%).



Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Mean 9am relative humidity (%) for years 1986 to 2010	69	74	70	72	73	73	69	66	60	58	60	64	67	24

Figure 6-8 Average Monthly Relative Humidity (%) for 9am (1986 – 2010)



Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Mean 3pm relative humidity (%) for years 1986 to 2010	43	48	41	43	43	44	39	35	30	31	34	38	39	24

Figure 6-9 Average Monthly Relative Humidity (%) for 3pm (1986 – 2010)

6.2.7 Extreme Climatic Conditions

6.2.7.1 Heatwaves

In terms of past extreme temperature (heatwave) conditions, the Moranbah area experienced record-breaking hot temperatures during the September 2013 heatwave, which included its hottest September day on record (39.5°C). Other notable heatwave events experienced by the region, include the 2009 August heatwave, with exceptionally high minimum temperatures recorded across inland Queensland, and the 2018 November heatwave which affected central and north tropical Queensland[45].

Table 6-4 highlights the average number of days of extreme temperature experienced on a monthly and annual basis from February 2012 to September 2025. January and December are the months at highest risk of experiencing extreme temperature conditions.

Based on past records, the Project is likely to experience heatwave conditions over its 15 year mine life and subsequent period of decommissioning and rehabilitation (estimated 10-20 years).

Table 6-4 Extreme Temperatures – Average No. of Days above 35° and 40°C (Feb. 2012 – Sept. 2024)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean number of days ≥ 35°C	14.5	9.2	6.6	1.2	0	0	0	0	1.8	8.9	13.9	16.5	72.6
Mean number of days ≥ 40°C	1.5	0.9	0.8	0	0	0	0	0	0	0.2	0.7	1.6	5.7

6.2.7.2 Drought

Since 2007, the Isaac region has experienced several droughts, the "Long Drought" (2007-2010), the widespread 2013-2017 drought (88% of Queensland was drought declared), and the 2017-2019 "Tinderbox Drought"[6]. DPI (2024) reports that the Isaac region has been drought declared 30-40% of the time since 1964. In addition, rainfall records dating back to 1889 demonstrate that the Isaac region has periodically experienced periods of drought[7].

Section 6.2.3 summaries recent periods of low or no rainfall in the Project area from February 2012 to September 2025.

Based on past records, the Project is likely to experience drought conditions over its 15 year mine life and subsequent period of decommissioning and rehabilitation (estimated 10-20 years).

6.2.7.3 Cyclones and Thunderstorms

Queensland cyclone season is officially from 1 November to 30 April. However, cyclones may be experienced at other times.

[4] https://www.bom.gov.au/climate/current/annual/qld/archive/2018.summary.shtml
[5] https://www.bom.gov.au/climate/current/month/qld/archive/200908.summary.shtml
[6] https://www.bom.gov.au/climate/drought/knowledge-centre/previous-droughts.shtml
[7] https://data.longpaddock.qld.gov.au/static/posters/WetDryDroughtPoster.pdf

The Isaac region, including Moranbah, was impacted by the periphery of Tropical Cyclone Debbie in 2017. While Tropical Cyclone Debbie's eye crossed the coast near Airlie Beach, Moranbah was in the warning zone and experienced impacts, including flight grounding and damage to infrastructure and agriculture (IGEM, 2017). In addition, Moranbah experienced a severe supercell (thunderstorm event) with 156 km/h wind gusts in December 2015, leading to overturned aircraft at the local airport.

In general, the Project is less likely to directly experience a severe cyclone because as a cyclone crosses the coast and travels across dry land it fades rapidly in strength due to a lack of moisture. However, under these circumstances, the cyclone is likely to become a rain-bearing depression that may cause flooding.

Figure 6-10 displays the current modelled predictions for the average recurrence intervals (ARIs) for cyclones interacting with the Isaac region[8]. These current modelled conditions also demonstrate that the Project is more likely to experience a tropical depression than a severe cyclone during Queensland's cyclone season.

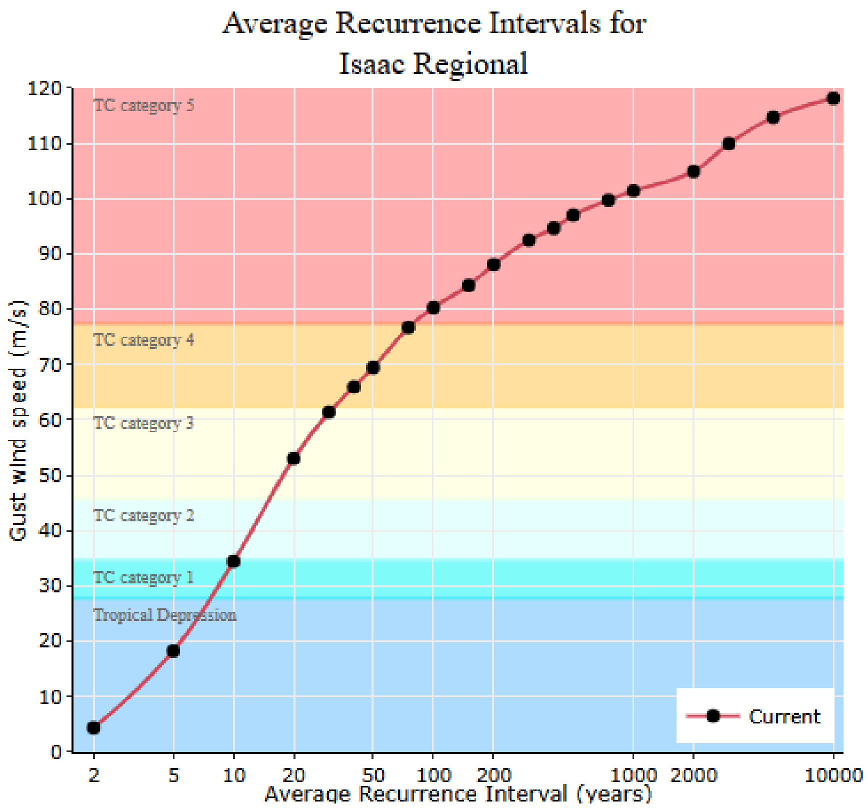


Figure 6-10 Isaac Region – Current Average Recurrence Intervals for Cyclones

6.2.7.4 Heavy Rainfall Events

The surface water impact assessment (**Appendix I**) describes stream flows in regional watercourses for a range of rainfall events. The Isaac River is ephemeral with flows recorded only on 27% of days at Deverill gauging station downstream of the Project. Flows above 100 ML/d occur for less than 10% of days at Deverill. A flow of 100 ML/d would not fully inundate the bed of the Isaac River at Deverill. The mean daily flow (all days) is 430 ML/d at Deverill. The highest recorded flow at the Deverill gauge occurred in March 1988 where the river reached a gauge height of 11.4 m.

[8] https://longpaddock.qld.gov.au/qld-future-climate/tropical-cyclone/

A statistical analysis of the long-term rainfall data is presented in Figure 6-11, as used in water balance modelling for the Project (**Appendix I**). This figure shows that rainfall can vary significantly at the Project area, with the highest rainfall generally occurring in January and February before reaching a typical low in August and September.

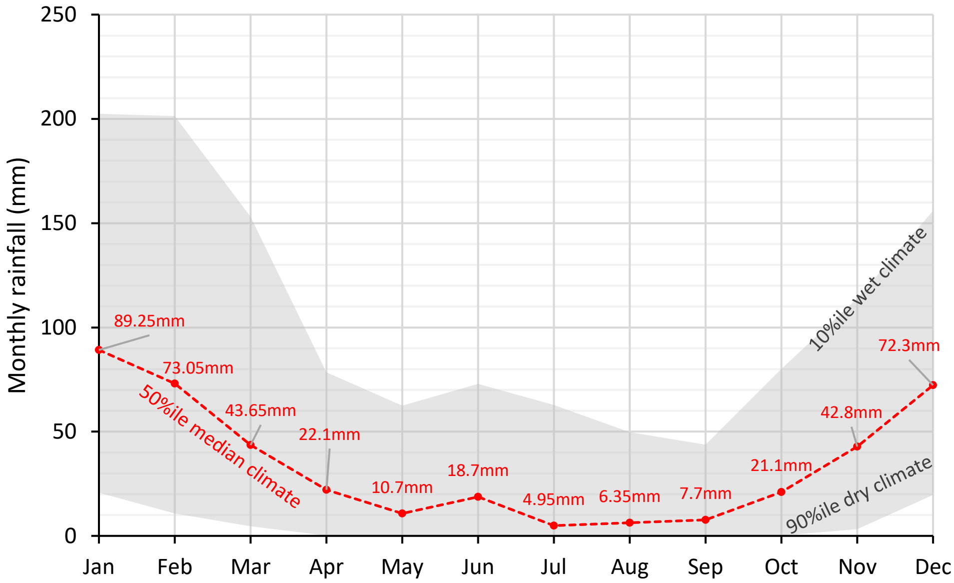


Figure 6-11 Long-term Rainfall Distribution at the Project

6.3 Climatic Patterns – Project Impact Assessment

6.3.1 Noise

Chapter 16 describes the Project's acoustic environment, based on the noise and vibration assessment (**Appendix V**). Acoustic modelling included climatic variability.

6.3.2 Air Quality

Chapter 15 describes the impact assessment completed for the Project's operational air quality environment and **Appendix U** provides the air quality assessment undertaken for the Project.

In summary, the Project's air quality assessment considered local meteorological conditions of paramount importance for modelling the dispersion of potential air pollutants generated by Project operations, which included the key features of wind speed, wind direction, atmospheric stability and boundary layer mixing height. Conditions in the local area, as derived from the meteorological modelling carried out for the Project's air quality assessment, are discussed in detail in **Appendix U**.

6.3.3 Water

The catchments and watercourses within and surrounding the project area are described in **Chapter 8**, including water quality, flows, hydrology and geomorphology under variable climatic conditions. Climate change has been considered in modelling flood behaviour (see **Chapter 9**), including changes in hydrology and geomorphology.

6.3.4 Rehabilitation

The Project's planned rehabilitation activities are provided in **Chapter 5**. A progressive rehabilitation and closure plan (PRCP) is provided in **Appendix AB** and is a statutory requirement that requires regulatory approval for the Project to commence. The PRCP outlines the management of progressive rehabilitation and closure activities over the life of the Project and will be subject to on-going compliance audits by the regulatory authority.

The Project will draw on valuable rehabilitation experience gained from existing activities at Isaac Plains Complex (IPC), including at Isaac Downs Mine (IDM) and nearby Isaac Plains Mine (IPM), which have been in operation under Stanmore Resources ownership since mid-2021 and early 2016, respectively.

The Project's rehabilitation will be conducted under similar climatic conditions as has been experienced at IDM and IPM (e.g. rainfall, temperature). Both these mine sites have achieved satisfactory levels of rehabilitation under the requirements of their own PRCPs and rehabilitation obligations prior to PRCP legislation coming into effect.

Climate extremes pose a risk to the Project's rehabilitation performance. For example, drought or periods of prolonged low rainfall and extreme rainfall events may adversely impact (damage) rehabilitation areas, particularly if they have been recently established and are lacking adequate protective vegetative groundcover. To manage these risks, the Project's planned rehabilitation activities will include a regular monitoring regime to confirm rehabilitation performance and maintenance actions to repair rehabilitation areas that are under performing or have been damaged by climate extremes. **Chapter 5** and **Appendix AB** provide additional detail on the Project's planned monitoring and maintenance routine for rehabilitation.

6.3.5 Water Supply

Chapter 4 and **Chapter 8** describe the water management systems for the project, including integration into IPC. Water balance modelling demonstrates that the Project's raw water demands, as integrated into the IPC water management system, will not exceed that existing raw water allocations with Sunwater. As such, the Project will have no impact on regional water availability. A computer-based operational simulation model (GoldSim) was used to assess the dynamics of the water balance under varying rainfall and catchment conditions throughout the operation of the Project, including for drought periods.

Therefore, the Project is not expected to experience water supply issues as a result of drought conditions or periods of diminished rainfall.

6.3.6 Bushfires

A bushfire management plan (BMP) has been prepared as part of the Project's hazard and safety assessment and is provided as an addendum in the Project's emergency response plan (**Appendix AJ**).

In general, fire intensity in the Project area follows the general bushfire principles and is determined by a combination of fuel load and moisture levels, weather conditions (wind speed, temperature, relative humidity and rainfall) and topography (slope).

Weather conditions significantly influence the likelihood of a bushfire occurring, in particular, high ambient temperatures, low relative humidities, periods of low rainfall, and high wind speeds. From the bushfire hazard analysis provided in the BMP, September was identified as the month with the greatest risk of a bushfire occurring in the vicinity of the Project. Sections 6.2.2, 6.2.3 and 6.2.5 also provide an assessment of the Project's temperature, rainfall and wind conditions, respectively.

Droughts create extreme bushfire conditions through extended periods of dryness with little or no rain, and therefore, represent the highest and most dangerous period of risk for bushfires. Section 6.2.7.2 summarises the history of droughts in the vicinity of the Project, which indicates that drought may occur over the life of the Project and will exacerbate the Project's bushfire risk.

Section 6.2.7.1 highlights that the Project area has experienced heatwave conditions in the past and is expected to experience heatwave conditions in the future, which will increase the Project's bushfire risk during these events.

6.4 Climate Change Predictions – Project

6.4.1 Climate Change Predictions – Assessment Criteria

The assessment of predicted climate change over the life of the Project was undertaken using the latest generation of climate models, CMIP6. This model and its predictions were developed as part of the Queensland Government's climate adaption strategy (Trancoso et al., 2024). An associated resource summarising climate change in the Mackay, Isaac and Whitsunday region was also used during the assessment process (DEC, 2024).

Because future emissions of greenhouse gases are uncertain, climate scientists have developed different plausible pathways for future greenhouse gas concentrations using a range of social and economic conditions called 'Shared Socioeconomic Pathways' (SSPs). The Queensland government provides climate projection data for three of these SSPs, representing successively greater climate change impacts:

- SSP1-2.6 Low emissions future with sustainable development
- SSP2-4.5 Medium emissions future with socioeconomic trends similar to historical patterns
- SSP3-7.0 High emissions future driven by a 'regional rivalry' narrative that sees emissions continuing to grow out to 2100 (DEC, 2024)

The SSP3-7.0 predictions of climate change for the Isaac region were adopted to ensure the most conservative approach was used for assessment of the Project's vulnerabilities to climate change. Based on current planning, the Project's mining operations will commence during 2028 and continue until 2043, decommissioning and rehabilitation are then expected to continue until at least 2053. As a result, the SSP3-7.0 predictions of climate change for 2030, representing the period 2020-2039, and 2050, representing the period 2040-2059, were specifically used as the best available data over the Project's life.

6.4.2 Climate Change Predictions – Temperature

Table 6-5 provides the predicted climate change scenarios for 2030 and 2050 on an annual and seasonal basis for average (mean), maximum and minimum temperatures for the Isaac region. Using the SSP3-7.0 climate change predictions for average temperature on annual and seasonal basis for:

- 2030, highlights a possible increase in average temperature ranging from 0.6°C to 0.7°C depending on the season (i.e. using the mean value)
- 2050, highlights a possible increase in average temperature ranging from 1.3°C to 1.6°C depending on the season (i.e. using the mean value).

Table 6-5 Predicted Annual and Seasonal Changes in Temperature for 2030 and 2050 (Trancoso et al., 2024).

Variable	Season	Reference Period 1995-2014	2030			2050		
			SSP1-2.6	SSP2-4.5	**SSP3-7.0**	SSP1-2.6	SSP2-4.5	**SSP3-7.0**
Mean Temperature (°C)	**Annual**	21.9	0.7	0.7	**0.7**	1.0	1.3	**1.5**
	Summer	26.0	0.6	0.6	**0.6**	0.9	1.2	**1.4**
	Winter	16.8	0.8	0.8	**0.7**	1.1	1.4	**1.6**
	Autumn	21.9	0.7	0.8	**0.7**	1.1	1.4	**1.6**

Variable	Season	Reference Period 1995-2014	2030			2050		
			SSP1-2.6	SSP2-4.5	**SSP3-7.0**	SSP1-2.6	SSP2-4.5	**SSP3-7.0**
	Spring	22.9	0.7	0.7	**0.6**	0.9	1.2	**1.3**
	Wet	25.0	0.6	0.7	**0.6**	1.0	1.3	**1.4**
	Dry	18.8	0.7	0.8	**0.7**	1.0	1.3	**1.5**
Maximum Temperature (°C)	**Annual**	28.6	0.7	0.8	**0.7**	1.2	1.4	**1.5**
	Summer	32.6	0.6	0.7	**0.6**	1	1.4	**1.5**
	Winter	23.2	0.8	0.9	**0.8**	1.2	1.4	**1.6**
	Autumn	28	0.8	1	**0.7**	1.4	1.6	**1.8**
	Spring	30.9	0.7	0.7	**0.6**	1.0	1.2	**1.2**
	Wet	31.7	0.7	0.8	**0.6**	1.2	1.4	**1.6**
	Dry	25.7	0.8	0.8	**0.7**	1.1	1.3	**1.5**
Minimum Temperature (°C)	**Annual**	16.7	0.7	0.7	**0.7**	0.9	1.2	**1.5**
	Summer	21.2	0.6	0.6	**0.7**	0.8	1.1	**1.4**
	Winter	11.8	0.7	0.8	**0.7**	1.0	1.4	**1.7**
	Autumn	17.3	0.6	0.7	**0.7**	0.9	1.2	**1.5**
	Spring	16.6	0.7	0.7	**0.7**	0.9	1.2	**1.4**
	Wet	20	0.6	0.6	**0.6**	0.9	1.2	**1.4**
	Dry	13.4	0.7	0.8	**0.7**	1.0	1.3	**1.6**

Using the SSP3-7.0 climate change predictions for maximum temperature on annual and seasonal basis for:

- 2030, highlights a possible increase in maximum temperature ranging from 0.6°C to 0.8°C depending on the season (i.e. using the mean value)
- 2050, highlights a possible increase in maximum temperature ranging from 1.2°C to 1.8°C depending on the season (i.e. using the mean value).

Using the SSP3-7.0 climate change predictions for minimum temperature on annual and seasonal basis for:

- 2030, highlights a possible increase in minimum temperature ranging from 0.6°C to 0.7°C depending on the season (i.e. using the mean value)
- 2050, highlights a possible increase in minimum temperature ranging from 1.4°C to 1.7°C depending on the season (i.e. using the mean value).

In summary, over the life of the Project, average, maximum and minimum temperatures on an annual and seasonal basis are all predicted to increase for 2030 and further increase for 2050. When you compare the changes in average, maximum and minimum temperatures on an annual and seasonal basis, the 2030 predicted temperature increases show slightly less variation than the 2050 predicted temperature increases, and there is approximately a doubling in the predicted temperature increases from 2030 to 2050.

Table 6-6 provides the predicted annual change in the number of hot days, hot nights and very hot days for 2030 and 2050 and is considered an indicator of change in extreme temperature conditions (Trancoso et al., 2024). The SSP3-7.0 climate change predictions highlight an increase in the hot days (8.7), hot nights

(16.3) and very hot days (1.9) for 2030 and an even greater increase in the hot days (24.2), hot nights (32.7) and very hot days (5.3) for 2050.

Table 6-6 Predicted Annual Changes in Hot Days, Hot Nights and Very Hot Days for 2030 and 2050 (Trancoso et al., 2024).

Variable	Season	Reference Period 1995-2014	2030			2050		
			SSP1-2.6	SSP2-4.5	**SSP3-7.0**	SSP1-2.6	SSP2-4.5	**SSP3-7.0**
Hot days (≥35°C)	**Annual**	64.3	10.5	12	**8.7**	17.6	22.3	**24.2**
Hot nights (≥20°C)	**Annual**	127.5	14.8	15.8	**16.3**	21.4	28.1	**32.7**
Very hot days (≥40°C)	**Annual**	3.7	1.8	1.8	**1.9**	3.0	4.6	**5.3**

6.4.3 Climate Change Predictions – Rainfall

Table 6-7 provides the predicted annual and seasonal changes in daily precipitation for 2030 and 2050 (Trancoso et al., 2024). The SSP3-7.0 climate change predictions for 2030 show no change in daily precipitation on an annual or seasonal basis. The SSP3-7.0 climate change predictions for 2050 show a slight reduction in daily precipitation for the summer, autumn and wet seasons and annually, and no change for the winter, spring and dry seasons. In general, the daily precipitation rate does not change significantly over the life of the Project.

Table 6-7 Predicted Annual and Seasonal Changes in Precipitation for 2030 and 2050 (Trancoso et al., 2024).

Variable	Season	Reference Period 1995-2014	2030			2050		
			SSP1-2.6	SSP2-4.5	**SSP3-7.0**	SSP1-2.6	SSP2-4.5	**SSP3-7.0**
Precipitation (mm/day)	**Annual**	1.7	0	-0.1	**0**	-0.1	-0.1	**-0.1**
	Summer	3.4	0	-0.2	**0**	-0.1	-0.1	**-0.1**
	Winter	0.8	-0.1	0	**0**	-0.1	0	**0**
	Autumn	1.7	0	-0.1	**0**	-0.2	-0.1	**-0.2**
	Spring	0.8	0	0	**0**	-0.1	-0.1	**0**
	Wet	2.6	0	-0.1	**0**	-0.2	-0.1	**-0.1**
	Dry	0.8	0	0	**0**	-0.1	-0.1	**0**

Table 6-1Table 6-8 provides the predicted annual change in extreme precipitation indices for 2030 and 2050 (Trancoso et al., 2024). The SSP3-7.0 climate change predictions show an increase in four of the extreme precipitation indices assessed, a decrease in the index, ‘extremely wet day precipitation’ and no change in the index, ‘consecutive dry days’. The SSP3-7.0 climate change predictions for the extreme precipitation indices show a general decrease from 2030 to 2050, except for the index ‘consecutive dry days’, which increases marginally. In summary, extreme precipitation conditions may increase slightly at the start of the Project and then decrease over the life of the Project.

Table 6-8 Predicted Annual Changes in Extreme Precipitation Indices for 2030 and 2050 (Trancoso et al., 2024).

Extreme Precipitation Indices	Season	Reference Period 1995-2014	2030			2050		
			SSP1-2.6	SSP2-4.5	**SSP3-7.0**	SSP1-2.6	SSP2-4.5	**SSP3-7.0**
Maximum 1-day precipitation (mm)	**Annual**	75.9	-0.8	-3.1	**0.6**	-0.9	1.9	**-1.6**
Maximum 5-day precipitation (mm)	**Annual**	131.8	1.6	-4.2	**1.5**	0.7	5.1	**-1.1**
Extremely wet day precipitation (mm)	**Annual**	74.6	-2.5	-7.5	**-0.4**	-4.3	2.6	**-5.2**
Simple daily intensity (mm/day)	**Annual**	8.8	0.0	-0.2	**0.1**	-0.1	0.0	**-0.1**
Consecutive dry days (days)	**Annual**	61.1	0.8	0.8	**0.0**	2.4	1.3	**0.2**
Consecutive wet days (days)	**Annual**	8.3	0.2	0.0	**0.3**	0.0	0.0	**0.0**

6.4.4 Climate Change Predictions – Hydrology

Hydrology is the science of the properties, distribution, and circulation of water on and below the earth's surface and in the atmosphere. To predict the climate change effects on hydrology in relation to the Project, rainfall, evaporation, and extreme climate events that influence water, have been assessed. Further details on how climate change effects have been incorporated into the assessment of the Project's hydrology are provided in **Chapter 9**.

Section 6.4.3 provides the Project's climate change predictions for rainfall and Section 6.4.5 provides the climate change predictions for extreme weather events.

Table 6-9 provides the predicted increases in annual and seasonal pan evaporation rates for 2030 and 2050 (i.e. relative to the reference period, 1995-2014). The SSP3-7.0 climate change predictions show an increase in the daily pan evaporation rate (mm/day) on an annual and seasonal basis for 2030, and an even greater increase in the daily pan evaporation rate (mm/day) on an annual and seasonal basis for 2050 (i.e. two to three times greater than 2030). In general, the daily pan evaporation rate continues to increase over the life of the Project.

Table 6-9 Predicted Annual and Seasonal Increases in Pan Evaporation for 2030 and 2050 (Trancoso et al., 2024).

Season	2030	2050
Annual	0.32 mm/day	0.91 mm/day
Summer	0.32 mm/day	1.19 mm/day
Winter	0.25 mm/day	0.52 mm/day
Autumn	0.35 mm/day	1.03 mm/day
Spring	0.38 mm/day	0.92 mm/day
Wet	0.39 mm/day	1.19 mm/day
Dry	0.29 mm/day	0.65 mm/day

6.4.5 Climate Change Predictions – Extreme Weather Events

6.4.5.1 Heatwaves

Over the life of the Project, there is expected to be an increase in heatwave frequency and heatwave duration, including hot days (≥35°C) and hot nights (≥20°C) (QFES, 2019). Section 6.4.2 reports that under SSP3-7.0 climate change predictions there will be an increase in the hot days, hot nights and very hot days for 2030 and an even greater increase in the hot days, hot nights and very hot days for 2050.

6.4.5.2 Droughts

For the Isaac region, using the SSP3-7.0 climate change predictions for 2030 and 2050, the predicted future changes in the frequency of moderate, severe and extreme droughts relative to reference period (1995-2014) are provided in Table 6-10[9]. In summary, there is a predicted increase in the frequency of droughts over the life of the Project.

Table 6-10 Predicted Future Changes in the Frequency of Droughts for 2030 and 2050

Prediction Period	Drought Severity	Change in the Number of Events
2030	Moderate	1.6
	Severe	2.1
	Extreme	2.1
2050	Moderate	2.9
	Severe	4.4
	Extreme	4.3

For the Isaac region, using the SSP3-7.0 climate change predictions for 2030 and 2050, the predicted future changes in the duration of moderate, severe and extreme droughts relative to reference period (1995-2014) are provided in Table 6-11[10]. In summary, there is a predicted increase in the duration of droughts over the life of the Project

[9] https://longpaddock.qld.gov.au/qld-future-climate/dashboard-cmip6/#responseTab5
[10] https://longpaddock.qld.gov.au/qld-future-climate/dashboard-cmip6/#responseTab5

Table 6-11 Predicted Future Changes in the Duration of Droughts for 2030 and 2050

Prediction Period	Drought Severity	Change in Months
2030	Moderate	0.3
	Severe	0.6
	Extreme	0.9
2050	Moderate	2.5
	Severe	1.5
	Extreme	2.1

6.4.5.3 Cyclones

BoM (2024), DEC (2024) and QFES (2021) predict that cyclones are expected to become less frequent but more intense for the Mackay, Isaac and Whitsunday region. These predictions are more applicable to the coastal portions of this region (i.e. Mackay and Whitsunday areas of the region). As discussed in Section 6.2.7.3, cyclones normally lose their intensity and become rain depressions once they cross the coast and move over land.

Figure 6-12 displays the future modelled predictions for the ARIs for cyclones interacting with the Isaac region under a high emission scenario for 2050 (i.e. as the best available predictive data). While the future modelled predictions don't align exactly with the Project's operational life, as for the current modelled conditions for the ARIs for cyclones interacting with the Isaac region, the Project is more likely to experience a tropical depression than a severe cyclone during Queensland's cyclone season.

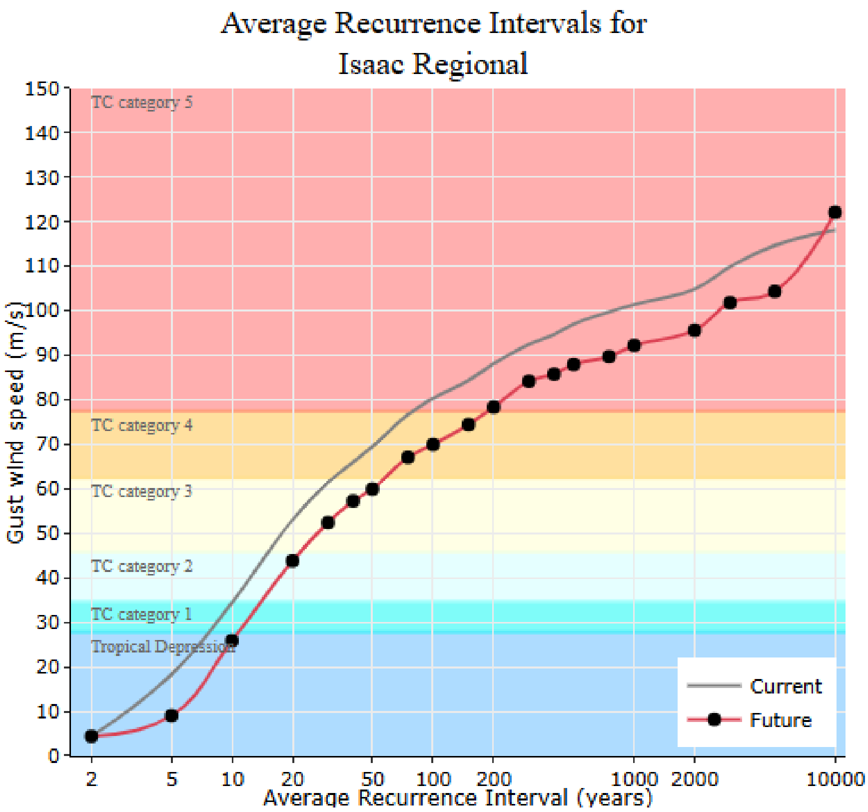


Figure 6-12 Isaac Region – Predicted Future Average Recurrence Intervals for Cyclones (2050)

6.4.5.4 Thunderstorms

Climate model simulations predict that heavy rainfall events will further intensify during the 21st century, with the rate of intensification proportional to the rate of global warming. Changes in heavy rainfall in particular locations are also influenced by changes in weather systems, such as east coast lows and tropical cyclones, both of which are expected to become less frequent. These conditions may lead to some regions experiencing trends in heavy rainfall that differ from typical values at the national or global scale, particularly for rainfall events that occur multiple times per year as opposed to rarer events. Increased atmospheric moisture can also provide more energy for some processes, such as enhanced updrafts in thunderstorms, that generate heavy rainfall events, which can further increase the intensity of heavy rainfall due to global warming. In addition, although widespread heavy rainfall typically occurs when very high atmospheric moisture coincides with unusually severe or persistent synoptic systems, localised heavy rainfall from thunderstorms may not as be well simulated by climate models as larger-scale systems[11].

Therefore, under climate change, the Isaac region can expect thunderstorms to become more intense, leading to more severe heavy rainfall and flash flooding, despite potential changes in frequency. Warmer temperatures will provide more energy for thunderstorms, resulting in stronger updrafts and more lightning, which will increase the severity of intense rainfall events and localised flooding.

6.5 Climate Extremes and Change Predictions – Project Risk Assessment

The residual (post mitigation) risk assessment of how the combination of climate extremes and change may affect management of the Project is provided in Table 6-13. The risk assessment uses the consequence and likelihood risk matrix provided in Table 6-12 to assess residual risk after management / mitigation measures are applied. The assessment of the prediction of climate extremes for the Project provided in Section 6.2.7 and the assessment of climate change predictions for the Project provided in Sections 6.4.2, 6.4.3, 0 and 6.4.5 were used in combination to identify the potential associated impacts.

For the risk assessment, 'likelihood' is assessed as:

- *A (Almost Certain)*: The event has occurred frequently, it occurs one or more times per year and is likely to re-occur within 1 year; or has a >90% chance.
- *B (Likely)*: The event has occurred but is not frequent, it occurs less than once per year and is likely to re-occur within 5 years; or has 50-90% chance.
- *C (Possible)*: The event has happened in the business in the past 10 years or could happen within the next 10 years; or has a 30-50% chance.
- *D (Unlikely)*: The event has happened in the business in the past 20 years or could happen within the next 20 years; or has a 10-30% chance.
- *E (Rare)*: The event has never been known to occur in the business and it is highly unlikely that it will occur within less than the next 20 years; or has a <10% chance.

For the risk assessment, 'consequence' is ranked as:

- *1 (Insignificant)*: Negligible reversible environmental impact, slight negative impact on individuals in local community, or insignificant indirect impacts on the business (e.g. workers, infrastructure and mining operations), water availability or land productivity.
- *2 (Minor)*: Minor reversible environmental impact requiring minor remediation, creates minor issues in affected communities, or minor indirect or temporary impacts on the business (e.g. workers, infrastructure and mining operations), water availability or land productivity.
- *3 (Moderate)*: Moderate reversible environmental impact with short term effect requiring moderate remediation, public criticism and community complaints, or moderate indirect or

[11] https://www.csiro.au/en/research/environmental-impacts/climate-change/State-of-the-Climate/Australias-Changing-Climate

temporary impacts on the business (e.g. workers, infrastructure and mining operations), water availability or land productivity.

- *4 (Major)*: Major environmental impact with medium term effect requiring significant remediation, impact on community's economic viability, or severe or long term impacts on the business (e.g. workers, infrastructure and mining operations), water availability or land productivity.
- *5 (Catastrophic)*: Extreme environmental impact with long term effect requiring major remediation, major breakdown of social order in communities, or catastrophic or permanent impacts on the business (e.g. workers, infrastructure and mining operations), water availability or land productivity.

The assessment focuses on impacts to the Project from the combination of climate extremes and change that have the potential to result in the consequences described above. Following implementation of management / mitigation measures, the risk ranking for impacts from the combination of climate extremes and change on the Project were assessed as 'low to medium'.

The Project's construction, operation and decommissioning will consider the risks of climate extremes and change through appropriate design, construction and planning. The Project's various management plans and Safety Health Management System (SHMS) are designed to manage climate risks and the potential associated impacts.

Table 6-12 Risk Matrix

		Consequence				
		1 (Insignificant)	*2 (Minor)*	*3 (Moderate)*	*4 (Major)*	*5 (Catastrophic)*
Likelihood	*A (Almost Certain)*	Medium (M)	High (H)	H	Extreme (E)	E
	B (Likely)	M	M	H	H	E
	C (Possible)	Low (L)	M	M	H	H
	D (Unlikely)	L	L	M	M	H
	E (Rare)	L	L	M	M	M

Table 6-13 Project Risk Assessment – Combined Climate Extremes and Change Predictions

Combined Climate Extremes and Change Predictions	Potential Impacts	Management Actions / Mitigation Measures	Likelihood	Consequence	Residual Risk
Extreme temperature conditions - heatwaves	Safety issues for workers and visitors	• Implementation of the Project's SHMS (e.g. fatigue management standard operating procedures).	Rare	Moderate	Medium
	Equipment or infrastructure failure releasing contaminants and/or causing safety and business issues	• Implementation of the Project's SHMS. • Equipment and infrastructure engineered to cope with extreme heat conditions. • Equipment and infrastructure properly maintained for efficient operation in extreme heat conditions. • Mobile equipment operators will be skilled in the operation of the equipment under extreme heat conditions. • Procurement of new equipment designed to operate under extreme heat conditions (as required).	Rare	Minor	Low
Extreme rainfall events	Flooding of mining operations	• Approved design and construction of levees to protect mining operations from flood events in the Isaac River and Cherwell Creek (i.e. to a 1:1,000 ARI). • Implementation of the annual inspection and reporting of the levees' performance as a regulated structure.	Rare	Severe	Medium

Combined Climate Extremes and Change Predictions	Potential Impacts	Management Actions / Mitigation Measures	Likelihood	Consequence	Residual Risk
	Excessive on-site erosion / sediment release	• Implementation of approved surface water management and erosion and sediment control plans. • Appropriate water and sediment control structure design.	Unlikely	Minor	Low
	Uncontrolled release of mine affected water to the receiving environment	• Implementation of an approved surface water management plan (including the design and operation of a suitable mine-affected water dam). • Establishment of a pipeline to allow water transfer to IPC's larger water containment structures. • Approved water release criteria.	Rare	Moderate	Medium
	Failure of the Conrock Gully diversion	• Construction of an approved gully diversion design. • Implementing a rehabilitation plan for the diversion with appropriate monitoring and maintenance actions.	Rare	Minor	Low
	Damage to rehabilitation	• The Project's PRCP contains management actions to identify and repair rehabilitation that may be negatively affected.	Possible	Minor	Medium
	Damage to internal roads and infrastructure	• Inspect and repair as required roads and infrastructure after extreme rainfall events.	Likely	Minor	Medium

Combined Climate Extremes and Change Predictions	Potential Impacts	Management Actions / Mitigation Measures	Likelihood	Consequence	Residual Risk
Increased droughts	Water supply issues	• Construction of on-site water storages involving a mine-affected water dam and sediments dams. • Maintenance of a pipeline to obtain water from IPC's existing significant water storages. • Maintenance of a pipeline connection to IPC's contracted external raw water supply from SunWater.	Rare	Moderate	Medium
	Rehabilitation (revegetation) failure	• The Project's PRCP contains management actions to identify and repair rehabilitation that may be negatively affected. • Revegetation species may be periodically reviewed, and if required, more drought tolerant species may be used.	Possible	Minor	Medium
Cyclones and thunderstorms	Unsafe operating conditions	• Implementation of the Project's SHMS.	Rare	Minor	Low
	Flash flooding	• Implementation of approved surface water management and erosion and sediment control plans. • Appropriate water and sediment control structure design.	Rare	Minor	Low
	Damage to rehabilitation	• The Project's PRCP contains management actions to identify and repair rehabilitation that may be negatively affected.	Possible	Minor	Medium
	Damage to infrastructure resulting in release of contaminants	• Appropriate and secure storage of contaminants (e.g. to Australian Standards). • Implementation of the Project's SHMS.	Rare	Minor	Low

Combined Climate Extremes and Change Predictions	Potential Impacts	Management Actions / Mitigation Measures	Likelihood	Consequence	Residual Risk
Increased Bushfire risks	Injury or death to workers or visitors	• Implementation of the Project's BMP. • Implementation of the Project's Emergency Response Plan. • Implementation of the Project's SHMS.	Rare	Major	Medium
	Destruction of mine infrastructure with potential release of contaminants	• Implementation of the Project's BMP. • Implementation of the Project's SHMS.	Rare	Minor	Low
	Rehabilitation damage due to bushfires destroying rehabilitation areas	• Implementation of the Project's BMP. • The Project's PRCP contains management actions to identify and repair rehabilitation that may be negatively affected.	Unlikely	Minor	Low

6.6 Climate Extremes and Change – Project Management Strategies

6.6.1 Overview

Section 6.2.7 outlines the potential climate extremes the Project is likely to experience during its construction, operational and decommissioning phases.

Section 6.4 provides an assessment of climate change over the life of the Project using the SSP3-7.0 predictions of climate change for the Isaac region to ensure the most conservative approach was applied to the assessment of the Project's vulnerabilities to climate change. The SSP3-7.0 predictions of climate change for 2030, representing the period 2020-2039, and 2050, representing the period 2040-2059, were specifically used as the best available data over the Project's life.

Accordingly, the Project's management strategies were developed for the potential impacts associated with the combination of climate extremes and change to minimise safety risks to people and equipment, protect the environment and ensure compliance with the Project's environmental authority.

6.6.2 Temperature

From the assessments completed, it is predicted that extreme heat conditions may potentially impact on the construction, operational and decommissioning phases of the Project. The main potential impacts from extreme heat conditions were identified in Table 6-13 as:

- safety issues for people and visitors
- equipment or infrastructure failure releasing contaminants and/or causing safety and business issues
- increased bushfire risk.

From a vulnerability perspective over the life of the Project, the safety of people and visitors will be appropriately managed by the Project's SHMS, which is a statutory requirement under the *Coal Mining Safety and Health Act 1999* and *Coal Mining Safety and Health Regulation 2017*. **Chapter 19** explains in more detail how the Project's SHMS manages operational hazards and risks.

The Project's equipment and infrastructure will be designed to operate under extreme temperature conditions and will be properly maintained to allow efficient and safe operation under extreme temperature conditions. The Project's operators of mobile equipment will be skilled in the safe operation of this equipment under extreme temperature conditions. As required, new equipment purchases will consider their ability to operate safely and efficiently under extreme temperature conditions as part of the procurement process.

The predicted increase in extreme heat conditions will increase the Project's bushfire risk, and as a result, this risk will be managed by the Project's BMP (**Appendix AJ**).

6.6.3 Rainfall

From the assessments completed, it is predicted that extreme rainfall events may potentially impact on the construction, operational and decommissioning phases of the Project. The main potential impacts from extreme rainfall events were identified in Table 6-13 as:

- flooding of mining operations
- excessive on-site erosion / sediment release
- uncontrolled release of water to the receiving environment
- failure of the Conrock Gully diversion
- damage to rehabilitation
- damage to internal roads and infrastructure.

From a vulnerability perspective over the life of the Project, the flooding of mining operations will be prevented by the construction of levees designed to a 1:1,000 ARI flood immunity along Isaac River and Cherwell Creek, and the implementation of the annual inspection and reporting of the levees' performance required as a regulated structure, which will ensure efficient operation of the levees.

The prevention of excessive on-site erosion and sediment release will be controlled over the life of the Project by the implementation of approved surface water and erosion and sediment control plans, which will also be conditioned requirements of the Project's environmental authority. As a component of these plans, sediment control and water management structures will be appropriately designed to ensure efficient operation and minimise the risk of failure.

The Project's prevention of uncontrolled release of water to the receiving environment will be achieved by the implementation of an approved surface water management plan, which includes the operation of a suitably sized mine-affected water dam. As part of its excess water management, the Project will possess a connecting pipeline to allow the water transfer to IPC's water containment structures, which are suitably sized to handle additional water inputs without release or over-topping. As an emergency option, the Project will also possess water release conditions for specific flood events in the Isaac River (i.e. as part of its environmental authority).

The prevention of the failure of the Project's Conrock Gully diversion will be achieved by constructing an approved gully diversion design and implementing a rehabilitation plan with appropriate monitoring and maintenance actions.

The Project's PRCP possesses management actions to identify and repair rehabilitation that may be damaged by extreme rainfall events.

The damage to the Project's internal roads and infrastructure will be managed by the implementation of an inspect and repair regime after extreme rainfall events.

6.6.4 Hydrology

From the assessments completed, it is predicted that the changes in hydrology may potentially impact on the construction, operational and decommissioning phases of the Project. Identified potential impacts from the changes in hydrology are the same as described in Section 6.6.3 and relate mainly to surface water management, water security and the effects on the proposed post-mining land uses (PMLUs).

The Project's hydrology is detailed in **Chapter 9** and has been developed using projected climate extremes and conservative climate change predictions. A detailed surface water management plan is included for the various stages of the Project and is designed to protect the downstream receiving environment (local environmental values for water) and manage compliance with the approved conditions for water within the Project's environmental authority.

Chapter 9 also incorporates a detailed flood assessment of the Project, the design of flood levees for the protection of the Project's mining operations from flood events in the Isaac River and Cherwell Creek, and the design of a diversion for Conrock Gully to allow the safe and efficient extraction of the Project's coal resource. These key aspects of the Project's water management have been planned using projected climate extremes, conservative climate change predictions and operational parameters to minimise safety risks to people and equipment, protect the downstream receiving environment and ensure compliance with the Project's environmental authority.

Section 1.4.5 demonstrates that the Project possesses adequate water supply options to manage drought conditions or periods of low rainfall. Further details on the Project's water management and hydrology are provided in **Chapter 8** and **Chapter 9**, respectively.

A final void water balance model has been completed for the Project and included the application of climate extremes and conservative climate change predictions where applicable to the various model inputs (**Chapter 8**). This model was developed to demonstrate the viability of the proposed PMLUs of commercial algae production, pumped hydro energy storage generation and a livestock drinking water source. Further details on these proposed PMLUs are provided in **Chapter 5**.

6.6.5 Droughts

From the assessments completed, it is predicted that droughts may impact on the construction, operational and decommissioning phases of the Project. As described in Section 6.3.5, the Project possesses multiple water supply options to manage drought conditions. The Project's PRCP contains management actions to identify and repair rehabilitation that may be negatively affected by drought (**Appendix AB**). The predicted increase in droughts will increase the Project's bushfire risk. However, as previously described, this risk will be managed by the Project's BMP (**Appendix AJ**).

6.6.6 Cyclones and Thunderstorms

From the assessments completed, it is predicted that cyclones (or rain depressions) and thunderstorms may impact on the construction, operational and decommissioning phases of the Project. Section 6.6.3 outlines the potential impacts that may result from extreme rainfall associated with these weather events, and the Project's proposed management strategies for these impacts. In addition, potential safety risks that may arise from operating during cyclones and/or thunderstorms will be managed by the Project's SHMS.

6.7 Conclusion

The local and regional climatic conditions likely to be experienced by the Project were comprehensively assessed. The expected influence of the key climate conditions on the Project's impact assessment process is described, and has been incorporated into the development of mitigation measures to ensure the identified impacts are managed to an acceptable level over the life of the Project.

An assessment of predicted climate change over the life of the Project was conducted using the SSP3-7.0 predictions of climate change for the Isaac region to ensure the most conservative approach was applied to the assessment of the Project's vulnerabilities to climate change.

The potential impacts associated with the combination of climate extremes and change over the life of the Project were identified and mitigation strategies were developed to appropriately manage these impacts. The residual risk (i.e. with proposed management measures) of climate extremes and change on the Project was assessed. With the implementation of the proposed management measures, the risk of impacts to the Project from the combination of climate extremes and change is 'low to medium' (which is acceptable outcome from a risk management perspective).

The Project's impact management strategies achieve the required objective and outcomes for the management of ambient climatic conditions, expected climate extremes and predicted climate change.

6.8 References

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