

# Paradise Dam Emergency Response Overview

**Updated December 2022**

## **Purpose**

Sunwater is committed to ensuring the community has access to information on the risks of Paradise Dam and how they are managed.

In December 2022, this document was updated to reflect how our emergency response has been modified following an approved update to the Paradise Dam Emergency Action Plan (EAP).

This first page outlines the recent EAP changes, and the following topics are covered:

- what is a dam EAP?
- Paradise Dam background
- what could cause Paradise Dam to fail?
- what actions does Sunwater take at key dam water levels?
- how have EAP evacuation triggers changed over time?

## **Why has the EAP been updated and what does this mean for downstream communities?**

Sunwater updated the EAP evacuation triggers on completion of the Essential Works in 2021, and recently conducted a further review in consultation with the Bundaberg and North Burnett local disaster management groups. This latest update aligns the Paradise Dam EAP with Sunwater's current state-wide practices.

### **Changes to evacuation triggers**

Table one (on page 4) summarises how evacuation triggers have changed and confirms the triggers in place from November 2022. Evacuations would now only be required if the dam experiences a 1 in 1000-year flood event, which would be equal to 11.5 metres over the current spillway crest level.

### **Changes to community notifications**

The most recent update of the EAP also changes when notifications are sent to downstream residents. Sunwater has been notifying downstream residents when there is sufficient rainfall forecast in the catchment that could raise the water level of the dam to the top of the current primary spillway. Now we will send notifications if we think the dam is likely to spill or is spilling.

## What is a dam EAP?

By law, Paradise Dam requires an EAP as it is a referable dam: a dam that would put two or more people located downstream in danger if it was to fail. The dam has always had an EAP.

An EAP identifies:

- dam hazards and possible emergency events
- the area likely to be affected by an emergency event
- circumstances that increase the likelihood of emergency events
- people who may be harmed and whose property may be impacted, and how these people are warned
- the actions to be taken in response to a dam hazard or emergency event and who is responsible.

The EAP is regularly tested with local disaster management groups and the district disaster management group.

## Paradise Dam background

Paradise Dam was damaged during flooding in 2011 and 2013 (with more significant damage in 2013), and flood repairs were completed by December 2013. Early-stage improvement works were carried out from 2015 to 2017. Over time, further testing and risk assessments identified more significant structural issues with Paradise Dam.

In September 2019, Sunwater confirmed the increased risk of shear (sliding) failure through reduced strength of the roller compacted lift joints making up the dam wall. This could have resulted in potentially large sections of the dam wall suddenly failing through sliding and overturning, should a major flood have occurred again. That is why the dam's storage level was required to be reduced and Sunwater conducted Essential Works to lower and strengthen the primary spillway during 2020-2021.

The Essential Works reduced the risk of dam failure to a 1 in 5000-year event. Prior to the start of the Essential Works, the dam failure risk was equivalent to a 1 in 200-year event, which is similar to what the community experienced in 2013.

In December 2021, the Queensland Government announced that Paradise Dam will be returned to its original height as part of significant safety improvement works. This decision follows detailed technical investigations that show it is possible to safely re-raise, strengthen and stabilise the dam wall. This work, known as the Paradise Dam Improvement Project (PDIP), will ensure that Paradise Dam meets the stringent safety criteria that apply to all dams in Australia today.

Planning for the PDIP is underway with enabling works scheduled to commence in 2023 followed by works at the dam expected to commence in 2024.

## What could cause Paradise Dam to fail?

Dams are complex structures that can be threatened by a natural event such as flooding or an earthquake, or a deliberate act such as terrorist activity.

As examples, Paradise Dam could fail due to the following events:

- Overturning and sliding: a large concrete block or section of wall (a monolith) moves or collapses and the water released cannot be controlled. This could occur under flood loading because of weakness in:
  - the roller compacted concrete within the wall, or
  - the dam foundation below the wall.

- Scouring and undermining: a flood may cause high velocity flows, damaging and scouring of the area downstream and undercut the dam wall.
- Piping: over time, water movement can lead to internal erosion that can result in a hole or “pipe” forming. If not detected and repaired, the pipe could expand and lead to collapse.
- Terrorism or deliberate act: whilst unlikely, dam owners remain vigilant to this threat.

## What actions does Sunwater take at key dam water levels?

Sunwater monitors Paradise Dam daily and our EAP identifies specific actions to be taken as water rises. Figure one below shows the actions taken as the water level at the dam reaches specific heights. Sunwater and the local councils are focussed on protecting lives and share evacuation information with residents within approximately 10 km downstream of Paradise Dam. It is critical that all residents respond to evacuation alerts. Any evacuations will be managed by the district and local disaster management groups. It is important to note that Paradise Dam is not a flood mitigation dam.

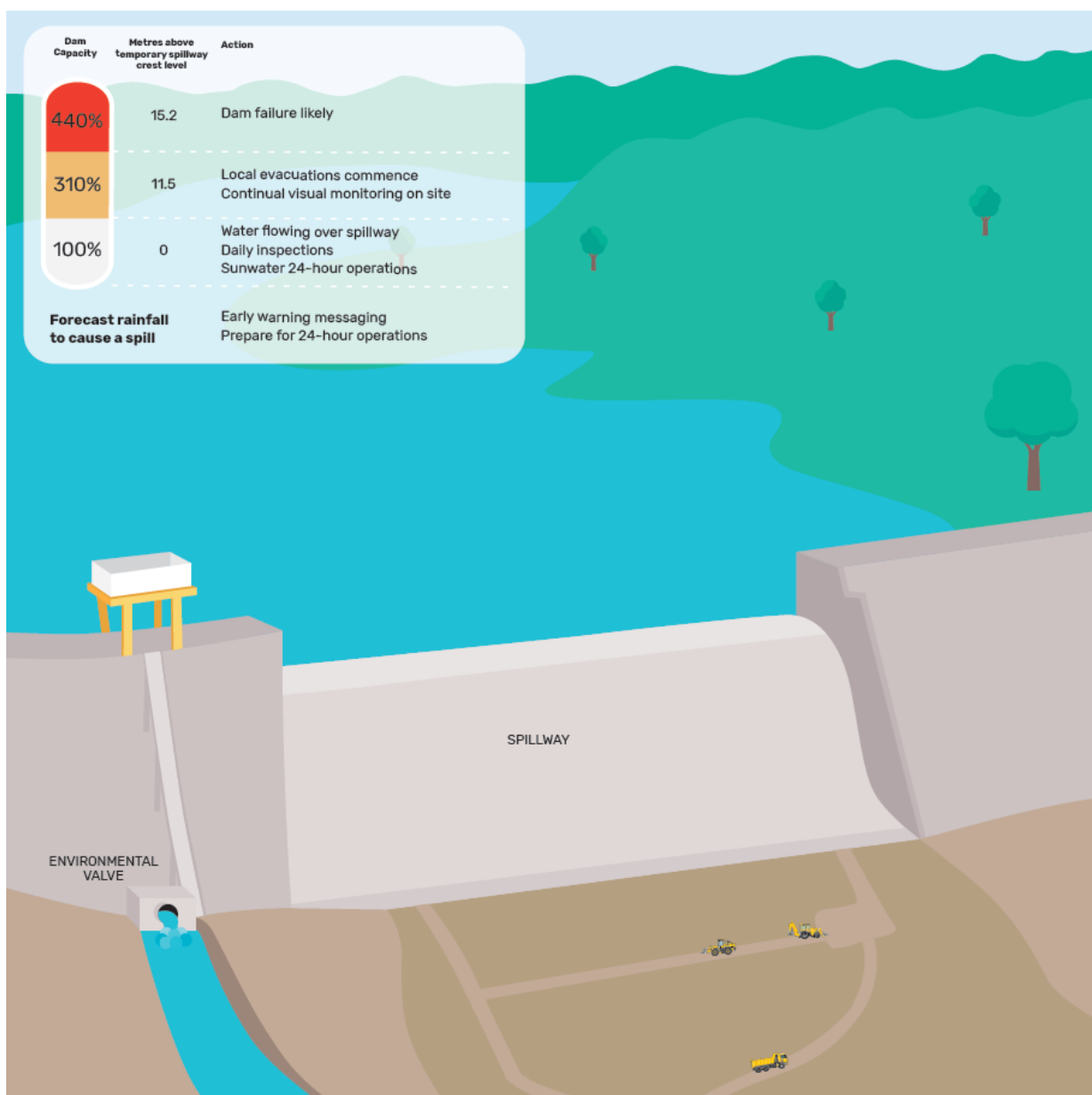


Figure 1: The actions taken as the water level at the lowered temporary spillway crest at Paradise Dam reaches specific heights.

## How have EAP evacuation triggers changed over time?

The following table shows evacuation triggers for residents within 10 km of the dam before the Essential Works versus now (and there have been a range of changes in between, as communicated in previous versions of this document). These changes reflect the understanding of dam failure risks and work undertaken to reduce those risks.

Before the Essential Works, evacuations of residents within 10 km of the dam would have been activated when:	From November 2022 evacuations of residents within 10 km of the dam will be activated when:
The dam experienced a 1 in 50-year flood event	The dam experiences a 1 in 1000-year flood event
Equivalent to 6.9 m over the original spillway crest level	Which is 11.5 metres over the current spillway crest level
Equivalent to 20.8 m at the Walla flood gauge*	Equivalent to 28.0 m gauge height at the Walla flood gauge*
Equivalent to 8.5 m at the Targo Street gauge in Bundaberg*	Equivalent to 11.4 m gauge height at the Targo Street gauge in Bundaberg*

*Table 1: Paradise Dam evacuation triggers*

*\*These numbers do not include any additional inflows downstream of the dam and should be used as a general guide only. Details on any forecast levels should always be sourced from the Bureau of Meteorology.*

The Paradise Dam EAP will be reviewed again once further strengthening and stabilising work is completed as part of the PDIP to meet dam safety guidelines.

### More information

- Access the Paradise Dam EAP at [sunwater.com.au/wp-content/uploads/Home/Community/Preparing-for-weather-events/Emergency-Management/EAPs/Paradise\\_Dam\\_EAP.pdf](https://sunwater.com.au/wp-content/uploads/Home/Community/Preparing-for-weather-events/Emergency-Management/EAPs/Paradise_Dam_EAP.pdf)
- Refer to local disaster information at <https://disaster.bundaberg.qld.gov.au/> and <http://emergency.northburnett.qld.gov.au>
- Access interactive flood mapping: [bundaberg.qld.gov.au/interactive-mapping-system](https://bundaberg.qld.gov.au/interactive-mapping-system)
- Refer to [sunwater.com.au/projects/paradise-dam-improvement-project](https://sunwater.com.au/projects/paradise-dam-improvement-project) for the latest information about Paradise Dam.

The information presented in this flyer is current at the time of publication in December 2022. It may be updated over time in response to new information.