

EMERGENCY ACTION PLAN — COOLMUNDA DAM (ID 254)

ISSUE: 8.0

Date: July 2023

Prepared by Sunwater Limited

Controlled Copy No.

Gated: Yes	Staffed: Yes
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Type: Earth and rock-fill embankment

Project: Coolmunda Dam EAP

File no.: 08-000364/001

Address: 216 Coolmunda Dam Access Road (Rural no.)

Location: Lat. -28.436513° (28°26'11.43"S) Lon. 151.217424° (151°13'02.78"E)

> Approved by the delegate of the Chief Executive, Department of Regional Development, Manufacturing and Water until 1 November 2025.

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Emergency activation quick reference–Dam Hazards

The Emergency Action Plan (EAP) for Coolmunda Dam covers dam hazards evaluated within Sunwater's Dam Safety Management Program.

Use the following table to select the relevant section of the EAP that deals with the dam hazard. Note: The Incident Coordinator (IC) is responsible for activating the EAP unless otherwise directed by the Flood Operations Decision Maker (FODM) or Dam Safety Technical Decision Maker (DSTDM). Should the IC be unavailable, the Local Event Coordinator (LEC), Owner's Regional Representative (ORR) or Dam Duty Officer (DDO) is responsible.

Table 1: Emergency	activation quic	k reference

Dom Horordo and castion numbers	Activation levels for dam hazards				
Dam nazarus anu section numbers	Alert	Lean Forward	Stand Up	Stand Down	
Flood operations See section 5	 Storage above EL 314.18 m OR Spillway gates open 	Storage above EL 314.34 m (out-of-bank flows)	 Storage above EL 314.47 m (major flooding) 	Storage below EL 314.07 m ANDSpillway gates closed	
Piping: embankment, foundation, or abutments See section 6	 Increasing leakage through an embankment, the foundations, or abutments 	 Increasing leakage through an embankment, the foundations, or abutments with cloudy water 	Piping condition has been established	 Risk assessment has determined that failure risk has reduced 	
Earthquake See section 7	 Earthquake confirmed (by DSTDM) or felt in the area, AND Intensity less than 5MM Modified Mercalli 	 Earthquake confirmed (by DSTDM) or felt in the area, AND Intensity greater than or equal to 5MM[~], OR Intensity less than 5MM[~] and change detected during surveillance inspection 	 Earthquake confirmed (by DSTDM) or felt in the area, AND A possible failure path has been identified 	 Risk assessment has determined that failure risk has reduced 	
Terrorist threat/ activity or high energy impact See section 8	Not applicable	Not applicable	 Possible terrorist activity noticed at dam or threat received Large explosion heard/observed at dam (e.g. bomb explosion, aircraft hit) Failure in progress or likely due to impact or explosion Sufficient water in storage to create a dam hazard 	 Risk assessment has determined that failure risk has reduced 	
Gate malfunction See section 9	Loss of control of one or more gates in a dry weather event	Loss of control of one or more gates with forecast rainfall	 Loss of control of one or more gates in a flood event, OR Loss of control of one or more gates with forecast rainfall, AND Timeframe for restoration of gate control cannot be determined 	Confirmation that all gates are functioning correctly	

Next page: Emergency activation quick reference-Other Emergency Situations



ALL ACTION MUST BE TAKEN WHEN IT IS SAFE TO DO SO e.g. taking photographs/video, dam inspections, instrument readings

Emergency activation quick reference – Other Emergency Situations

The EAP for Coolmunda Dam covers one other emergency situation evaluated within Sunwater's Dam Safety Management Program. Use the following table to select the relevant section of the EAP that deals with the other emergency situation. Note: The IC is responsible for activating the EAP unless otherwise directed by the FODM or DSTDM. Should the IC be unavailable, the LEC, ORR or DDO is responsible.

	Activation levels		
Other Emergency Situations and section	Communications Failure – Dam Site (DDO)	Communications Failure – Local Area (LEC/ORR)	Communications Failure – Brisbane (IC/DSTDM)
numbers	Site managed (DDO — becomes LEC)	Brisbane managed by IC	Locally managed by LEC
		Activation triggers for other emergency situations	
Comms Failure See section 10	Unable to communicate to or from dam site	Unable to communicate to or from local area	Unable to communicate to or from Sunwater Brisbane

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Document control

Authorisation of document

Name	Position/role	Signature	Date
	EAP Program Lead — Prepared for submission		10/11/2023
	Sunwater Dam Safety SME — Approved for submission		15/11/2023
	GM Asset Integrity – Approved for submission		11/01/2024
	EGM – Engineering and Water Resources (or delegate) — Dam Owner Authorising Officer	,2024 11:22 GMT+10)	-12/01/2024



Document revision history

Version	Date	Prepared by	Reason for change	Ref No.
2	January 2008		Substantial review of Coolmunda Dam Emergency Action Plan to reflect Sunwater Management structure and updated inundation maps.	
3	October 2011		Significant changes to all sections of Coolmunda Dam Emergency Action Plan to reflect current Sunwater Management structure and other changes.	# 1135687
3D	September 2013		Amendments due to new legislative requirements	# 1135687
4	August 2016		New Emergency Action Plan developed at expiry of 3G approval. Issued for consultation with Relevant Disaster Management Groups.	# 1865930
5	September 2017		Revised and reviewed Emergency Action Plan developed at expiry of approval. Also includes; updates that reflect the Water Legislation (Dam Safety) Amendment Act 2017, implementation of changes to Sunwater management structure, new event management roles and addition of new Emergency Activation section (<i>Other</i> <i>Emergency Situations</i>).	# 2091397
6	September 2018		Amended contacts and associated sections, eg Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes.	# 2366531
6-v2	November 2018		Non-substantive amendments to Section 3.2 and Appendix B (new maps) to align with new 2018 FIA. (reference L)	# 2366531
7	September 2019		Amended contacts and associated sections, added Emergency siren instructions, added new hazard for Gate failures and removed DSTDM participation in chemical hazard. Incorporated global changes. Reviewed by Flood operations and Dam Safety personnel.	# 2418359
7.1	November 2019		Updates to Appendix A, updated Sunwater reporting process in Action tables, added a reference to the Goondiwindi Regional Councils Disaster Management Plans, re- inserted access routes and moved rating curve from App C to section 5.1. Corrected minor errors including formatting issues.	# 2418359

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Version	Date	Prepared by	Reason for change	Ref No.
7.2	September 2020		Amended contacts and associated sections, e.g. Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes.	# 2571773
7.3	September 2021		Amended contacts and associated sections, e.g. Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes. Refer to attached spreadsheet for more detail.	# 2654419
7.4	September 2022		Amended contacts and associated sections. Minor error corrections and other non- substantive changes. The Chemical Hazard section has been removed as it is not a Dam Safety Hazard and is dealt with in other more relevant documents.	# 2725090
7.5	September 2023		Added Fatigue Management (section 2.5). Removed Hazard Management Toolkit (Appendix D). Removed references to chemical spill. Added Annexe and amended messaging in communication tables to comply with AWS requirements. Non- substantive updates as part of Annual Safety Statement. Minor error corrections and readability improvements.	# 2811401
8.0	July 2023		Added AWS to Abbreviations and Business Terms and Definitions sections. Flood triggers amended and Stand Up 3 trigger removed. AWS warning levels added to Flood Action tables. References updated. PAR updated re 2022 CRA. Removed references to spillway adequacy. Added NSW SES to External Notifications List. Spillway discharge table and discharge curve updated and moved to Appendix C. General dam information updated. Minor error corrections and readability improvements.	# 2810628



Controlled document distribution list

Copy no.	Position	Location		
1	Storage Supervisor	Sunwater, Coolmunda Dam		
2	General Manager, South	Sunwater, Goondiwindi		
3	Emergency Action Plan Coordinator	Sunwater, Brisbane		
4	Local Emergency Coordinator, Local Disaster Management Group (LDMG)	Goondiwindi Regional Council, Inglewood		
5 Deputy Local Disaster Coordinator, Local Disaster Goondiwindi Regional Council, Management Group (LDMG) Inglewood				
Notes: Communication information for each 'Controlled Copy Holder' is attached in Appendix A.				

Electronic document distribution list

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Position	Location		
District Disaster Coordinator, Warwick District Disaster Management Group (DDMG)	Police, Warwick		
Officer in Charge	Police, Inglewood		
Senior Flood Forecaster	Bureau of Meteorology, Brisbane		
Note: Communication information for each 'Electronic Copy Holder' is in Appendix A.			

1. References, abbreviations, and definitions

1.1 References/associated documents

Ref.	Document title	Reference/location	
А	Water Supply (Safety and Reliability) Act 2008 — Current 08 March 2022	https://www.legislation.qld.gov.au/view/whole/pdf/in force/current/act-2008-034	
В	Queensland Disaster Management Act 2003 — Current 08 April 2022	https://www.legislation.qld.gov.au/view/pdf/inforce/c urrent/act-2003-091	
С	Queensland Disaster Management Guidelines	https://www.disaster.qld.gov.au/dmg/Pages/DM- Guideline.aspx	
D	Guidelines on Selection of Acceptable Flood Capacity for Dams (ANCOLD, 2000)	ANCOLD	
E	Queensland Dam Safety Management Guidelines (DNRME October 2020)	https://www.dnrme.qld.gov.au/ data/assets/pdf fil e/0007/78838/dam-safety-management.pdf	
F	Australian Rainfall and Runoff (ARR) 2019	http://book.arr.org.au.s3-website-ap-southeast- 2.amazonaws.com/	
G	Sunwater (internal) Strategic Event Procedure	Strategic Event Procedure	
Н	Sunwater (internal) Coolmunda Dam Safety Condition Schedule – for internal use only	<u>edocs # 2742383</u>	
I	Sunwater (internal) Coolmunda Dam Break Study 2022 – for internal use only	<u>edocs # 2807239</u>	
J	Sunwater (internal) Coolmunda Dam Comprehensive Risk Assessment 2022 – for internal use only	edocs # 2720024	
К	Sunwater (internal) Coolmunda Dam Operation and Maintenance Manual including Spill Operations Manual	Coolmunda_Dam_OM_Manual	
L	Guideline for Failure Impact Assessment of Water Dams (DNRME 2018)	https://www.resources.qld.gov.au/ data/assets/pdf file/0005/78836/guidelines-failure-impact- assessment.pdf	
Μ	Fatigue Management Procedure WHS42 (Sunwater internal)	Fatigue Management Procedure	
Ν	Sunwater (internal) Standing Operating Procedure (SOP) 12 – Dam Log Books	Policies, Procedures and Guidelines - SOP12 Dam Log Books - All Documents - Default (Function and Activity) (sharepoint.com)	
0	Sunwater website — Emergency Action Plans, Flood Maps and Dam Emergency Sirens	https://www.sunwater.com.au/community/preparing- for-weather-events/emergency-management/	
Ρ	Coolmunda Dam Discharge Rating Curve, 2017 Revision	edocs # 2253884	

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1.2 Abbreviations and acronyms

Annual Exceedance Probability
Australian Height Datum
Adopted Mean Thread Distance
Australian National Committee on
Large Dams
Large Danis
Australian warning System
Bureau of Meteorology
Chief Engineer Dams
Chief Executive Officer
Comprehensive Risk Assessment
Counter Terrorism Group
Downstream
Dam Crest Flood
Dam Crest Level
District Disaster Coordinator
District Disaster Management Group
District Disaster Management Plan
Dam Duty Officer
Director Dam Safety
Dam Safety Regulator
Dam Safety Surveillance Coordinator
, Dam Safety Technical Decision Maker
Emergency Action Plan
Emergency Alert
Emergency Alert
Emergency Event Report
Executive General Manager Operations
Executive General Manager Engineering
& Water Resources
Elevation Level
Fixed Crest Level
Flood Operations Decision Maker
Full Supply Level
General Manager
Insident Coordinator
Incremental Flood Hazard Category
Incremental Flood Hazard Category Inspector-General Emergency
Incremental Flood Hazard Category Inspector-General Emergency Management
Incremental Flood Hazard Category Inspector-General Emergency Management Left Bank
Incremental Flood Hazard Category Inspector-General Emergency Management Left Bank Local Disaster Coordinator
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OB	Observation Bore
00	Operations Centre
	Operations Centre Duty Officer
000	Operations Coordinator
	Operations Coordinator
OMGR	Operations Manager
OS	Operations Supervisor
ORR	Owner's Regional Representative
PAR	Population at Risk
PDSE	Principal Dam Safety Engineer
PFRM	Predictive Flood Routing Model
PLL	Probable Loss of Life
PMF	Probable Maximum Flood
РМР	Probable Maximum Precipitation
	Probable Maximum Precipitation
	Design Flood
	Drincipal Water Pesources Engineer
	Queensland Disector Management
QDIVIC	
0.550	Committee
QFES	Queensland Fire & Emergency Services
QPS	Queensland Police Service
RB	Right Bank
RC	Regional Council
RCC	Roller Compacted Concrete
RDMW	Department of Regional Development,
	Manufacturing & Water
ROC	Regional Operations Centre
RPFO	Registered Professional Engineer of
	Augensland
DCI	Reduced Supply Lovel
SCED	Senior Civil Engineer Dams
SDCC	State Disaster Coordination Centre
SDF	Sunny Day Failure
SDTE	Senior Dam Technical Engineer
SES	State Emergency Service
SMS	Short Message Service
SMT	Sunwater Media Team
SO	Standby Operator
SOP	Standard Operating Procedure
SRT	Strategic Response Team
SS	Storage Supervisor
S///I	Storage Water Level
SWRE	Senior Water Resources Engineer
	Linstroom
VVHS	workplace Health & Safety
WSSK	water Supply (Safety and Reliability)
WQ	Water Quality

1.3 Business terms and definitions

The meaning of terms used in this section are set out in accordance with relevant legislation or as defined by operator requirements.

Term	Definition		
Terms defined in accordance with the WSSR Act (reference A)			
Australian Warning System (AWS)	A national approach to information and warnings during emergencies like bushfire, flood, storm, extreme heat and severe weather.		
Dam hazard	 Means a reasonably foreseeable situation or condition that may: cause or contribute to the failure of the dam, if the failure may cause harm to persons or property, OR require an automatic or controlled release of water from the dam, if the release of the water may cause harm to persons or property 		
Dam hazard event	 Means an event arising from a <i>dam hazard</i> if: persons or property may be harmed because of the event, AND a coordinated response, involving two or more of the following <i>relevant entities</i>, is unlikely to be required; each <i>local group</i> and <i>district group</i> for the EAP, each local government whose area may be affected, the Chief Executive, another entity the owner of the dam considers appropriate, AND the event is not an <i>emergency event</i> 		
Disaster Management Plan (DMP)	Of a <i>district group</i> or local government, means the group's District DMP (DDMP) or local government's Local DMP (LDMP) under the Queensland Disaster Management Act 2003 (reference B).		
District group (DDMG)	For an EAP, means a district group established under the Queensland Disaster Management Act 2003 (reference B), section 22 whose disaster district under that Act could, under the plan, be affected by a <i>dam hazard</i> .		
Emergency event	 Means an event arising from a <i>dam hazard</i> if: persons or property may be harmed because of the event, AND any of the following apply: a coordinated response, involving 2 or more of the following <i>relevant entities</i>, is likely to be required; each <i>local group</i> and <i>district group</i> for the EAP, each local government whose area may be affected, the Chief Executive, another entity the owner of the dam considers appropriate, OR the event may arise because of a disaster situation declared under the Queensland Disaster Management Act 2003 (reference B), OR an entity performing functions under the State <i>Disaster Management Plan</i> may, under that plan, require the owner of the dam to give the entity information about the event 		
Local group (LDMG)	For an EAP, means a local group established under the Queensland Disaster Management Act 2003 (reference B), section 29 whose local government area could, under the plan, be affected by a <i>dam hazard</i> .		
Notice response	A dam owner's written response to a notice following an assessment of an EAP by a local government or <i>district group</i> .		

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Term	Definition
Referable dam	A dam, or a proposed dam after its construction, will be a referable dam if:
	 a failure impact assessment of the dam, or the proposed dam, is carried out under the WSSR Act, AND
	• the assessment states the dam has, or the proposed dam after its construction will have, a category 1 or category 2 failure impact rating, AND
	• the Chief Executive has, under section 349 of the WSSR Act, accepted the assessment
	Also, a dam is a referable dam if:
	• under section 342B of the WSSR Act, the owner of a dam is given a referable dam notice and, before the effective day for the notice, does not give the Chief Executive a failure impact assessment for the dam, AND
	• the Chief Executive has not, under section 349 of the WSSR Act, accepted a failure impact assessment of the dam
Relevant entity	Means each of the following under the EAP for the dam:
	• the persons who may be affected, or whose property may be affected, if a <i>dam hazard event</i> or <i>emergency event</i> were to happen for the dam, for example the owners of parcels of farmland adjacent to the dam or residents of a township
	each local group and district group for the EAP
	• each local government whose local government area may be affected if a <i>dam hazard event</i> or <i>emergency event</i> were to happen
	the Chief Executive
	 another entity the owner of the dam considers appropriate, e.g. the Queensland Police Service (QPS)
Terms consistent with Queensland	Disaster Management Guidelines (reference C)
Activation levels	The four levels of EAP activation are:
	• Alert: A heightened level of vigilance due to the possibility of an event occurring. No further action may be required; however, the situation should be monitored by someone capable of assessing the potential of the threat. Moving to an Alert level indicates the dam owner is getting ready to activate the Lean Forward level of the EAP if the situation deteriorates.
	• Lean Forward: An operational state characterised by a heightened level of situational awareness of an impending disaster event and a state of operational readiness. Disaster coordination centres are on standby and prepared but not activated.
	• Stand Up: The operational state where resources are mobilised, personnel are activated, and operational activities commenced. Disaster coordination centres are activated. The dam owner needs to provide an Emergency Event Report (EER) in accordance with the provision of the WSSR Act.
	• Stand Down: Transition from responding to an event back to normal core business and/or continuance of recovery operations. There is no longer a requirement to respond to the event and the threat is no longer present.
	Notes:
	The movement through these levels of activation is not necessarily sequential. It should be applied with flexibility and adaptability and be tailored to the location and event.



Term	Definition		
	Triggering one of these levels of activation may not necessarily mean a similar activation of LDMGs or DDMGs.		
AWS warning levels	The three AWS warning levels are:		
	• Advice: The first warning level of the Australian Warning System meaning an incident has started but there is no immediate danger. Stay up to date in case the situation changes.		
	• Watch and Act: The second warning level of the Australian Warning System meaning there is a heightened level of threat. Conditions are changing you need to start taking action now to protect you and your family.		
	• Emergency: The third and highest warning level of the Australian Warning System meaning lives may be in danger and action should be taken immediately.		
	Notes:		
	These AWS warning levels do not change the Activation Levels of the EAP and are intended for external public-facing information only.		
Pureau of Mataaralamy (POM)	The three levels of floading are:		
flood level classifications	 Minor flooding: This causes inconvenience such as closing of minor 		
	roads and the submergence of low-level bridges and makes the removal of pumps located adjacent to the river necessary.		
	 Moderate flooding: This causes the inundation of low-lying areas requiring the removal of stock and/or the evacuation of some houses. Main traffic bridges may be closed by flood waters. 		
	• Major flooding: This causes inundation of large areas, isolating towns and cities. Major disruptions occur to road and rail links. Evacuation of many houses and business premises may be required. In rural areas widespread flooding of farmland is likely.		
Concurrent Flooding	Flood flows downstream of a dam that are not a result of dam outflows; for instance, those from adjacent catchments or from the sea, and which occur in the same period as downstream releases or flooding from the dam.		
Dam crest (reference D)	The lowest elevation of the non-overflow crest section of the dam excluding handrails, parapets or wave walls that have not been designed to store water.		
Dam crest flood (DCF) (reference D)	The flood event which, when routed through the reservoir, results in a still water reservoir level equivalent to the lowest dam crest level.		
Dam failure	Dam failure is the physical collapse of all or part of a dam or the uncontrolled release of any of its contents.		
Downstream releases	Downstream releases are outflows from the dam made through appurtenant structures such as spillways or outlet works that are in accordance with the design of the dam.		
Earthquake	A sudden release of energy in the earth's crust or upper mantle, usually caused by movement along a fault plane or by volcanic activity, resulting in the generation of seismic waves that can be destructive. The potential consequences of an earthquake include:		
	• settlement, sliding, or overturning of monoliths in the dam wall		
	 Initiation of seepage lines in the foundations or abutments that could lead to piping damage and potential inoperability of appurtenant works 		

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Term	Definition
Flood release	A flood release from a dam occurs when catchment inflows raise the storage level above the FSL resulting in a discharge from the spillway of the dam.
Piping	Internal scour caused by the water flow and seepage that occurs through earth dams, dam foundations, or dam abutments. The internal scour can lead to the formation of a pipe, which can lead to a failure of the dam.
Plane strike or other impact	The impact of a plane, meteorite, or other high energy item on or in close vicinity of a dam that could damage the dam structure or create a wave that could overtop the dam.
Probable maximum flood (PMF) (reference E)	The flood resulting from the probable maximum precipitation coupled with the worst flood-producing catchment conditions that can be realistically expected in the prevailing meteorological conditions.
Probable maximum precipitation (PMP) (reference E)	The theoretical greatest depth of precipitation for a given duration that is physically possible over a particular drainage basin.
Probable maximum precipitation design flood (PMPDF) (reference F)	The flood resulting from the probable maximum precipitation coupled with typical catchment conditions.
Stability, main embankment	High foundation pore pressure peaks may reduce the Factor of Safety against slip circle failure to an unacceptable level.
'Sunny day' failure (SDF)	A failure that occurs at the FSL and there is no concurrent rain associated flooding.
Terrorist activity	A deliberate attempt to damage, fail or contaminate a dam.

2. Introduction

2.1 Context

Under the *Water Supply (Safety and Reliability) Act (2008)* (reference A) (the WSSR Act), the owner of a referable dam must have an approved EAP for the dam. Referable dams, by definition, would put lives at risk if they were to fail.

This EAP has been prepared in accordance with Chapter 4 of the WSSR Act. The content requirements for EAPs are contained in section 352H of the WSSR Act.

Summary of legal requirements – Section 352H

Section 352H(1) of the WSSR Act requires that the EAP must identify each dam hazard for the dam;

and for each of these dam hazard types (e.g. flood operations):

- Identify the area likely to be affected by a dam hazard event or emergency event arising from the dam hazard; and
- Identify each circumstance that indicates a material increase in the likelihood of the dam hazard event or emergency event happening; and
- State when and how the owner of the dam plans to warn persons who may be harmed, or whose property may be harmed by an event caused by the dam hazard, if one happens, and/or there is a material increase in the likelihood of an occurrence, including the order of priority in which the persons or categories of persons are to be warned; and
- State when and how the owner plans to notify the relevant entities for the dam, if a dam hazard event or emergency event happens or, there is a material increase in the likelihood of such an occurrence, including the order of priority in which the relevant entities are to be notified; and
- State the actions the owner of the dam plans to take in response to a dam hazard event or emergency event.

In accordance with section 352H(2) of the WSSR Act, the EAP may provide for the dam owner to make arrangements with a relevant entity for warnings to be given by the relevant entity on behalf of the dam owner in appropriate circumstances.

Section 352HA of the WSSR Act states that before giving the Chief Executive an EAP, the owner of the dam must give a copy of the plan to each local government whose area may be affected by a dam hazard identified in the plan, and each district group for the plan.

Section 352HB of the WSSR Act states that the local government must assess the EAP for consistency with its disaster management plan. In its assessment, the local government must consult with the local district group for the plan.

Within 30 business days of receiving the EAP, the local government must give the owner of the dam a notice, which states whether it considers the plan is consistent with its disaster management plan; and if not, give reason why it considers the EAP is not consistent. The EAP must include any such notices, provided to the owner of the dam by a local government (or district group); and any responses which the owner gives to these notices. Section 352H(1) further stipulates that an EAP must include any other relevant matter prescribed by regulation.

The local government whose area may be affected by a dam hazard for Coolmunda Dam has been determined as **Goondiwindi Regional Council (GRC)**. Sunwater has provided the GRC with a copy of the draft EAP for assessment.

Section 352HC of the WSSR Act states that a district group may review the EAP for consistency with its disaster management plan. The district group for Coolmunda Dam is **Warwick DDMG**. Sunwater has provided the DDMG with a copy of the draft EAP for review.

Note: Sunwater has attempted to write the EAP to cope with all reasonably foreseeable emergencies. However, there is considerable uncertainty about how any emergency might develop and progress. Factors such as the weather, the location, the mechanics, and the rate and size of any actual failure can considerably affect any resulting flood discharges. Therefore, a significant number of assumptions have had to be made in compiling sections of the EAP. Some variation in outcome should be expected where the event differs from the assumed behaviour.

2.2 Purpose

The purpose of this EAP is:

- to minimise the risk of harm to persons or property if a dam hazard event or emergency event for the dam happens
- to identify dam hazards that could occur at Coolmunda Dam and the area likely to be affected for each hazard
- to prescribe emergency actions taken by the dam owners and operating personnel in identifying and responding to dam hazards and notifying relevant entities

It is possible for more than one dam hazard to exist at Coolmunda Dam at the same time. In such a circumstance, it may be necessary to act on the procedures within separate sections simultaneously.

The focus of this EAP is the management of dam hazards at Coolmunda Dam by the owner of the dam (Sunwater) and the communication and notification of dam hazards to the LDMGs, DDMGs and broader community. However, the EAP sits within the broader emergency response framework. This EAP has been assessed and considered to be consistent with the Goondiwindi Local Disaster Management Plan.

2.3 Scope

The Coolmunda Dam EAP covers:

- dam hazards evaluated within Sunwater's Dam Safety Management Program
- details about the dam that are relevant to a dam hazard
- identification of circumstances that indicates a material increase in the likelihood of a dam hazard event or emergency event
- triggers for activation of a tiered response to a dam hazard event or emergency event
- roles and responsibilities in responding to a dam hazard event or emergency event
- notification, warning, and communication protocols
- inspection, monitoring, and reporting protocols during emergencies
- other relevant information that may assist with identifying the area affected by a dam hazard event or emergency event, and the management of such.

2.4 Sunwater provides training

Training of the use and implementation of this EAP document is carried out at various times throughout the year, but specific pre-wet season training is undertaken leading up to the wet. During this period, Sunwater staff complete work instructions for site preparations and from July to September carry out checks on stores, supplies of fuel and the current EAP, such as contact details for individuals and dam information.

The EAP training that is carried out on-site includes walkthroughs of new changes, scenario (role play) and Q&A to check the knowledge and competency of all those who attended. This on-site training is presented to relevant Sunwater staff (DDOs, LECs and ICs) and disaster management stakeholders. DSTDM information sessions are carried out once a year with the same walkthrough of new changes and Q & A but this is not specific to any one dam. New Sunwater employees in these various roles would also have a walkthrough of the EAP.

Sunwater is also working towards carrying out exercises involving each local authority and disaster management stakeholders. Where there is more than one referable dam in a local area, the exercise could involve more than one dam, or the location will be rotated. This full test would involve the State Disaster Coordination Centre (SDCC) and include the (non- live) testing of emergency alerts. The test results relating to numbers of alerts generated will be shared with local authority and disaster management stakeholders.

2.5 Fatigue Management Plan

Sunwater has a Fatigue Management Procedure (reference M). This document recognises fatigue as an important workplace hazard and has identified and outlined control processes to mitigate the risk of fatigue impaired HSE incidents. A copy of Sunwater's Fatigue Management Procedure can be provided upon request.

2.6 Dam emergency organisation within Sunwater

The Sunwater dam hazard management framework is illustrated in Figure 1 below.

Figure 1: Sunwater dam hazard management framework



Key aspects of the emergency management framework are described below:

- Central to the framework is the role of Incident Coordinator (IC) for any dam hazard at a dam. The IC will maintain overall responsibility for coordination of the EAP when activated.
- The DSTDM is primarily responsible for analysing dam safety and providing expert technical advice in this regard. They will be expected to discuss dam hazards with peers and other technical experts and make sound decisions to mitigate risks and to determine a response to incidents and emerging issues. The DSTDM is the key communication contact with the Dam Safety Regulator.
- The FODM has responsibility for all matters involving flood modelling and forecasting and determining the
 associated impact to Sunwater storages/infrastructure and EAP actions. The FODM may pre-emptively advise
 the IC to activate the EAP in accordance with available hydrology forecast information. For example, if an EAP
 trigger level is predicted to be exceeded based on forecast dam inflows derived from observed rainfall and
 streamflow conditions upstream of the dam, the EAP may be activated to the predicted level. Regarding the
 operation of the OC, the FODM must liaise with the IC as necessary to inform of decisions made.
- The IC is responsible for the decision to activate the EAP. The IC is the lead coordinator in the implementation of any EAP in events for Sunwater. Should the IC be unavailable, the Local Event Coordinator (LEC) followed

by the Dam Duty Officer (DDO) is responsible for the implementation of the EAP. If the IC loses all communications during a dam hazard, then as a fail-safe position, the LEC followed by the DDO will assume the duties and responsibility of the IC. However, loss of communications could result in some communication processes defined in this EAP not being carried out.

 The FODM and DSTDM roles are filled by Registered Professional Engineers of Queensland (RPEQ) and are suitably qualified professionals who are able to make engineering decisions and provide engineering decisions as defined in the Professional Engineers Act of Queensland.

2.7 Community information

Sunwater with the assistance of the local councils will ensure community education around messaging and impacts of the EAP and its related events is undertaken and continually improved by incorporating actions from Lessons Learnt (section 2.8).

Sunwater currently provides information externally to customers, downstream (D/S) residents and the community in a range of methods or channels in relation to dam hazards and emergencies. Individuals can access information through Facebook, Twitter, the Sunwater web page, Sunwater App and at several show/field days across regional Queensland where Sunwater may have stalls and information available.

Immediate D/S residents are also provided information in text message/phone calls in the event of an activation of this EAP.

In the event of an emergency event or when otherwise required, Sunwater and the affected local government also have the use of the National Emergency Alert System to send a voice message and SMS. This service is provided by Telstra and managed by Queensland Fire and Emergency Services (QFES) at the SDCC. The process Sunwater follows is documented in Appendix A9.

Sunwater has installed a Dam Emergency Siren at Inglewood. In the highly unlikely event of a dam failure, the siren will sound ensuring that the downstream community receives urgent warning alerts. **Siren warnings are in addition to existing Sunwater, council and Local Disaster Management Group emergency notifications**. Siren details including locations are available to the public on the Sunwater website (reference O).

The siren will only be activated if an EAP has been triggered for dam failure (either expected or underway). It will not be activated in the event of water releases or downstream flooding.

The Goondiwindi Regional Council has undertaken considerable planning for flooding at Inglewood and this resource, amongst others, can be accessed on the GRC website by searching for 'Disaster Management plans'.

A copy of all Sunwater approved EAPs are available to the public on the Sunwater website (reference O). These copies are redacted to protect people's personal details.

2.8 Lessons Learnt

Sunwater carries out Lessons Learnt workshops as part of its post event management. These Lessons Learnt can result in changes to the EAP. These are captured and if applicable to this document are implemented at the earliest opportunity and are made available in the next EAP update to the Dam Safety Regulator (DSR) as part of Sunwater's continual improvement of its EAPs. The Lessons Learnt actions if relevant are provided to stakeholders, such as the LDMGs, DDMGs, other dam owners and Department of Regional Development, Manufacturing and Water (RDMW) as appropriate.

In addition, Sunwater requests any post event learnings be communicated regarding operational effectiveness and areas for improvement.

2.9 Downstream notification lists

Sunwater has compiled the notification lists through an iterative process. At least every five years, Sunwater writes to all lot on plan landholders that are impacted in the downstream zones. In addition to individual letters, advertisements are placed yearly in local papers to capture any new residents in the areas. Throughout the year, individuals can register to receive notifications for this EAP and are able to register either through the Sunwater website (https://www.sunwater.com.au/) or by calling the Sunwater call centre on 13 15 89.

3. Dam details

3.1 General dam information

Location: Coolmunda Dam is located on Macintyre Brook at 77.8 km AMTD, approximately 13 km east of Inglewood (halfway between Warwick and Goondiwindi) in south-east Queensland.

Purpose: The main purpose of Coolmunda Dam is to store and release irrigation water to farming areas along the lower reach of the Macintyre Brook, and to regulate flow in both the Macintyre Brook and the Dumaresq Rivers. **Construction:** Coolmunda Dam, completed in 1968, is a zoned, earth-fill embankment with a central clay core and outer zones of gravel and rock-fill. The mass concrete spillway is controlled by seven counterweighted radial gates. A sacrificial fuse plug is located in the far-left embankment.

Specification: The table below lists general specifications of Coolmunda Dam.

Table	2:	Cool	munda	Dam	specification	าร
TUNIC	<u> </u>	000	manaa	Dam	specification	

Description	Specification	
Dam type	Earth and rock-fill embankment	
Full Supply Level	EL 314.07 m	
Dam Crest Level	EL 316.66 m (design) EL 316.58 m (surveyed)	
Fuse plug crest level	EL 315.44 m to EL 316.20 m (design) EL 315.32 m to EL 316.14 m (surveyed)	
Minimum drawdown level	EL 301.21 m	
Maximum Historical storage level — Feb 1976	Max EL 314.92 m (0.85 m above FSL)	
Storage capacity at FSL	68,142 ML	
Storage area at FSL	1,730 ha	
Catchment area	1,735 km ²	
Max embankment height	18.6 m	
Total length across crest (main embankment, spillway, & fuse plug)	2,286 m	
Spillway type	Gated (automatic) ogee crest, concrete-lined chute with dissipator	
Spillway crest level	EL 304.32 m	
Spillway crest length	107.0 m	
Spillway capacity (fuse plug overtopping)	7,242 m ³ /s (at EL 315.32 m)	
Total discharge at dam crest level (fuse plug breached)	13,266 m ³ /s (at EL 316.58 m)	
Spillway gates	7 x (12.80 m wide x 11.5 m high) automatic opening radial gates	
Outlet works	One 915 mm pipe with butterfly valve	
Outlet control	1 x 762 mm regulating valve and cone dispersion 1 x 305 mm low flow regulating valve and cone dispersion	

3.2 Population at risk

A Comprehensive Risk Assessment (reference J) was completed in 2022 with the following findings on Population at Risk (PAR):

- The maximum PAR for Sunny Day Failure is 845 during piping of the right embankment.
- The maximum PAR for Flood Failure is 3,675 (418 incremental) during a dam crest flood failure.
- Coolmunda Dam has a Category 2 Failure Impact Rating.
- The amount of concurrent downstream flooding assumed for hydraulic simulations of dam failure scenarios is detailed in the 2022 Dam Break Study (reference I). A streamflow correlation was found between Coolmunda Dam and Canning Creek but not Dumaresq River or Macintyre River. Assumed concurrent downstream flows are minor compared to the discharge from Coolmunda Dam. For example, in the PMF scenario, concurrent flooding of 1 in 113 AEP is assumed in Canning Creek.

3.3 General arrangement

The general arrangement drawings are in Appendix B1.

3.4 Emergency inspections and monitoring

The Coolmunda Dam has been designed to conform to modern design standards, so that its failure is highly unlikely. To maintain the dam in a safe condition and detect any dam hazard, as soon as it begins to develop, or becomes apparent, the following is applicable to Coolmunda Dam.

3.4.1 Inspections:

- Routine Visual Inspection: conducted as per routine surveillance Work Order or as directed by the DSTDM
- Detailed Inspection: conducted annually
- **Comprehensive Inspection**: conducted five yearly

3.4.2 Instrumentation and monitoring

To confirm the structural behaviour and safety of the embankment, the following instrumentation was installed, and is monitored, at Coolmunda Dam:

- Water level and seepage measurement:
 - 9 combined water level and electric settlement points (Note: these points are numbered 2 10. Point 1, originally installed, no longer exists) (WS02 WS10)
 - 18 observation bores (Note: bores numbered 1-20. Bores 6 and 7 do not exist) (OB01 OB20).
 - 4 v-notch weirs located along the left and right abutment toe (SLVN01, SRVN01, SRVN02, SRVN03)
 - 1 storage level monitoring station (416409A Coolmunda Dam headwater) is located in the Operations hut and 4 gauge boards on upstream side of spillway (See Section 5.6 of Coolmunda O&M Manual, reference K)
 - 1 gauging station (416416A Coolmunda Dam tailwater) is located on the right bank approximately 60 m downstream of the dam. (See Section 5.7 of Coolmunda O&M Manual reference K)
 - 2 rain gauges; a Sunwater automatic gauge located on the right spillway training wall adjacent the Operations hut, and a Bureau of Meteorology (BOM) manual gauge adjacent the Sunwater office (See Section 5.8 of Coolmunda O&M Manual (reference K).
- Settlement/movement measurement:
 - 9 combined water level and electric settlement installations located within the embankment (see above – WS02- WS10)
 - o 6 electric settlement installations located along the crest within the embankment (ES01 ES06)
 - 8 surface settlement points (SS11 SS18).
- Pore Pressure measurement:
 - 6 Vibrating Wire Piezometer located within the foundation and embankments (BH1 and BH2).

The location of instrumentation and monitoring equipment is in the drawing in Appendix B1.

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4. Roles and responsibilities

Roles and responsibilities	Position holder
Owner (Sunwater)	
Liaise with the Board and Minister.	CEO
 Activate Sunwater Strategic Response (reference G) and Business Continuity Plans, if required. 	EGMO EGME&WR
 Ensure necessary resources are available to manage any event. 	
 Maintain an up-to-date list of immediate D/S residents (Appendix A4) of Coolmunda Dam. The downstream limit is indicated in the drawing in Appendix B2 by the zone labelled <i>Limit of downstream notification area</i>. 	
• At all times, aim to provide timely advice and support to the LDMGs in the affected local government areas and the DDMGs in the affected disaster districts.	
 During a dam hazard event that occurs with little or no warning, undertake the following actions to ensure the community is informed as soon as possible: 	
 notify the residents listed in Appendix A4 via SMS. 	
 contact SDCC Watch Desk to request an Emergency Alert campaign throughout the Coolmunda Dam Emergency polygon. 	
 During a dam hazard event that occurs with adequate warning, notify the residents listed in Appendix A4 via SMS, unless otherwise agreed with the LDMGs. 	
 Record communications, notifications and observations as required. 	
Owner's Head Office Representative	
 Authorise the issuing of EAPs, SOPs and O&M Manuals and Amendments. 	GM Asset
 Facilitate Dam Safety Training Courses for Service Managers, Operations Supervisor, Dam Operators and other staff as appropriate and ensure that all staff required to undertake Dam Safety work are trained and accredited. 	Integrity GM Asset Management
• Ensure that risks identified in CRAs or other technical reports undertaken in relation to Dam Safety are included in the EAP.	
 Ensure visual inspections and instrumentation monitoring frequencies conform to ANCOLD Guidelines. 	
• Ensure all Dam Safety work orders, work instructions and Lesson Learned outcomes are fully implemented.	
• Ensure requirements of the Dam Condition Schedule (reference H) are met.	
• Ensure the work instructions are correct and the Log Books, SOPs, Data Books, and EAPs are reviewed annually.	
 Undertake and prepare the five yearly Comprehensive Inspection Reports with suitably qualified personnel within the time specified in the Dam Condition Schedule and that work orders are created for recommendations and work is undertaken as required. 	
 Undertake Annual Inspections and prepare reports within the time frames specified in the Dam Condition Schedule and that work orders are created for recommendations and work is undertaken as required. 	
 Review the Dam Safety Instrumentation Database and evaluate data to verify the structural integrity of the dams on a regular basis and maintain a spread sheet for verification for audit and quality control. 	
Record communications, notifications and observations as required.	

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	Roles and responsibilities	Position holder
Owner's	Regional Representative (ORR)	
•	Liaise with the Storage Supervisor/Operator Maintainer.	GM South
•	Arrange dam specific training and accreditation for relevant staff.	000
•	Ensure competent, trained and accredited personnel operate the storages.	OS
•	Undertake the role of LEC as required.	
•	Liaise with the Local Disaster Coordinator or proxy.	
•	Activate the EAP, when necessary.	
•	Ensure the EAP is implemented appropriately and carry out the LEC role as required.	
•	Ensure all work orders, work instructions and Lesson Learned outcomes are fully implemented.	
•	Record communications, notifications and observations as required.	
Technica	al Advisor	
•	Analyse the situation and provide expert technical advice.	ME
•	Discuss issue with peers and other technical experts and make sound decisions to mitigate the risk.	
•	Determine response to incidents and emerging issues.	
•	Record communications, notifications and observations as required.	
Dam Saf	ety Technical Decision Maker (DSTDM)	
•	Maintain current RPEQ accreditation.	Various
•	Analyse the situation and provide expert technical advice in relation to Dam Safety.	personnel as
•	Discuss Dam Hazard with peers and other technical experts and make sound decisions to mitigate the risk.	roster
•	Determine response to incidents and emerging issues.	
•	Issue warning on dam failure and advise on protective measures.	
•	Ensure the EAP is implemented appropriately and carry out the DSTDM role as required.	
•	Liaise with DSR as required.	
•	Record communications, notifications and observations as required.	
Flood Op	perations Decision Maker (FODM)	
•	Maintain current RPEQ accreditation.	Various
•	Provide hydrological advice in relation to predicted and actual dam outflows including assessment of weather and flood warnings and other related matters as identified in the OC SOP.	personnel as per FODM roster
•	Interpret and apply rainfall data in accordance with the OC SOP, including, as required under the OC SOP, liaising with BOM.	
•	Ensure the EAP is implemented appropriately and carry out the FODM role as required.	
•	Record communications, notifications and observations as required.	
Sunwate	er Media Team (SMT)	
•	Analyse sensitive issues, discuss with the Owner and issue media releases.	Various
•	Handle public and customer comments (including social media) and advise the Owner if necessary.	personnel as per Media Team
•	Liaise with the IC and update QDMC of flood events.	IUSTEI
•	Record communications, notifications and observations as required.	

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Roles and responsibilities	Position holder
 Incident Coordinator (IC) Notify LDMGs, or councils if LDMGs not Stood Up, of intent to use the Emergency Alert. Activate the EAP, when necessary. Ensure the EAP is implemented appropriately and carry out the IC role as required. Arrange Situation Reports and determine frequency, as required. Record communications, notifications and observations as required. 	Various personnel as per IC roster
Event Coordinator (LEC) Refer to ORR role.	
 Dam Duty Officer (DDO) Complete accreditation to operate and maintain relevant storage. Ensure the EAP is implemented appropriately and carry out the DDO role as required. Take direction from the DSTDM and IC as requested. Arrange immediate site inspection and make informed assessment of the situation. Escalate any issue not covered in the EAP or where actions are not clear. Record communications, notifications and observations as required. 	SOM SS OM
 Councils have legislated local government functions, as per Section 80 of reference B — these include: Ensure it has a disaster response capability. Approve its local disaster management plan. Ensure information about an event or a disaster in its area is promptly given to the DDMG for the disaster district in which area it is situated. Perform other functions given to the local government under the Queensland Disaster Management Act 2003 (reference B). And as per Section 352HB of the WSSR Act: Must assess (in consultation with its LDMG) the EAP for consistency with the LDMP. 	
Queensland Police Service (QPS)Manage the initial situation based on local operational procedures; including but not limited to:• conduct emergency operations.• coordinate and support Sunwater during a declared emergency at the dam.• liaise with relevant organisations.• evacuation of persons if required.• control of essential traffic.• security of specific area.	Local Police

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Roles and responsibilities	Position holder
Disaster Management Groups/Personnel — (In addition to requirements outlined in the Queensland Disaster Management Act 2003 (reference B)). LDMG	LDMG QFES
• As per IGEM review recommendation, work together with Sunwater and the councils to ensure community education around messaging and impacts of EAP related events is undertaken and continually improves.	DDMG
• Work with councils and Sunwater to ensure the EAP is regularly exercised.	
 Identify and coordinate the use of resources and support services that may be required for an EAP event, noting that for safety events unique to the dam Sunwater will approach councils to initiate. 	
• During a dam hazard event, providing they are Stood Up , the LDMGs in the affected local government areas will take the lead role in notifying the broader community.	
 Identify and provide advice to the relevant DDMGs about support services required by the LDMG to manage an EAP event. 	
 Provide reports and make recommendations to the relevant DDMGs about matters relating to EAP events. 	
QFES	
 Work with the dam owner and LDMGs to ensure Emergency Alert polygons are prepared, stored and tested at the State Watch Desk. 	
And as per Section 352HC of the WSSR Act:	
DDMG	
May review the EAP for consistency with the DDMP.	
Dam Safety Regulator (DSR)	
Liaise with relevant Minister on necessary actions.	DDS
Approve this document as required under legislation.	
Liaise with Chief Executive as required in administering (regulating) the WSSR Act.	

5. Dam hazard — flood operations

5.1 Overview

The emergency action described in this section (Dam hazard — flood operations) relates to:

- A dam hazard where natural catchment inflows fill Coolmunda Dam to FSL (314.07 m) and the rate of inflow exceeds the capacity of the outlet works. If the storage level continues to rise (to ~314.18 m), spillway gate 4 will begin to discharge water downstream into the Macintyre Brook. These flood flows can create a dam hazard event. Note:
 - The greater the rate of inflow, the higher the storage will rise.
 - The higher the storage level rises, the greater the loads on the dam structure.
 - Although unlikely, the greater the loading, the higher the likelihood of a dam failure.
 - Typically, the level of surveillance is increased during flood operations (refer tables in this section).
- Spillway discharge from the dam where there have been no indications that a dam failure may be initiating or in progress.

The area likely to be affected by this dam hazard is described as:

- As the rate of discharge increases, there will be an impact on low-level road crossings of Macintyre Brook and other infrastructure in the river such as pump sites.
- When the storage height exceeds major flood level EL 314.47 m (0.4 m above FSL), extensive rural areas and/or urban areas are inundated. Many buildings may be affected above the floor level. Properties and towns are likely to be isolated and major rail and traffic routes closed. Evacuation of flood affected areas may be required. Utility services may be impacted.
- Detailed information on downstream flood impacts is presented in the maps in Appendix B.

The following table shows historical floods experienced at Coolmunda Dam.

Flood Rank	Date	Peak height – EL (m AHD)	Peak Height – over FSL (m)
1	Feb 1976	314.92	0.85
2	Feb 1971	314.55	0.48
3	Apr 1988	314.51	0.44
4	Nov 2021	314.50	0.43
5	Apr 1990	314.47	0.40

Table 3: Historical floods experienced at Coolmunda Dam

5.2 Emergency actions

Regarding the emergency action tables in this section, each level of activation includes both its own actions and the actions of any lower level, unless those lower level actions are superseded.

5.2.1 Activation triggers

Table 4. Flood Elliergelicy activation trigger Summary	Table 4: Flood	emergency	activation	trigger s	summary
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EAP Flood Activation Trigger	Trigger Summary	AWS Warning Level
Alert	• Storage above EL 314.18 m OR	
(AWS advice)	Spillway gates open	
Lean Forward (AWS watch and act)	 Storage above EL 314.34 m (out-of-bank flows) 	Advice
Stand Up – 1 (AWS emergency)	 Storage above EL 314.47 m (major flooding) 	Watch and Act
Stand Up — 2	 Storage above EL 314.92 m (flood of record — February 1976) 	
Stand Up — 3	 Storage above EL 315.32 m* (fuse plug overtopping allowing for wave action) *OR as advised by the DSTDM 	Emergency
Stand Up — 4	 Storage above EL 316.58 m* (main embankment overtopping allowing for wave action) *OR as advised by the DSTDM 	Emergency
Stand Down	Storage below EL 314.07 m ANDSpillway gates closed	

While this EAP is not activated until Coolmunda Dam reaches the Alert trigger, Sunwater and the Goondiwindi LDMG will work cooperatively and will endeavour to share intelligence of any rainfall event when either organisation becomes aware of a situation that could result in the activation of the EAP.

In respect of forecast rainfall, as is identified in the roles and responsibilities of the FODM, regard must be had to the OC SOP.

The activation of Stand Up 3 & 4 requires consideration of wave action. For example, if the gauge reading was forecast to reach 1 m below the dam crest level and the DDO reported 1 m high waves, Stand Up 3 & 4 will be triggered. Furthermore, the DSTDM may also trigger this activation if there are any dam safety concerns as the storage approaches dam crest level.

5.2.2 Emergency actions

Table 5 to Table 10 specify emergency actions for the following roles:

- Dam Duty Officer
- Local Event Coordinator
- Incident Coordinator
- Dam Safety Technical Decision Maker
- Flood Operations Decision Maker.

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		Tal	ole 5: Flood operations	- DDO emergency ac	tion		
Activation level	Alert	Lean Forward	Stand Up — 1	Stand Up — 2	Stand Up — 3	Stand Up — 4	Stand Down
Activation trigger	Storage above EL 314.18 m OR gates open	 Storage above EL 314.34 m (out of bank flow) 	 Storage above EL 314.47 m (major flooding) 	 Storage above EL 314.92 m (flood of record) 	 Storage above EL 315.32 m* (fuse plug overtopping allowing for wave action) *OR as advised by the DSTDM 	 Storage above EL 316.58 m* (main embankment overtopping allowing for wave action) *OR as advised by the DSTDM 	Storage below EL 314.07 m AND • Spillway gates closed
Actions	 Record all communication. Inspect the dam daily (or as instructed by the DSTDM) and photograph/video and record using approved forms and send to IC & DSTDM Undertake site preparations including but not limited to: check fuel and operation of backup generator and in position check operations of sump pump check communication systems 	 As per previous activation level, AND Attention will be given to: visual inspection of flow patterns over spillway and dissipator for evidence of scouring record the flow of v-notch weirs daily inspect embankment for leaks, deformation, and scour Monitor to ensure that automatic gate operations occur. 	 As per previous activation level, AND Inspect the dam twice daily (or as instructed by the DSTDM). Liaise with DSTDM to determine if manual gate operations may be required prior to Stand Up — 3, based on new forecast and observed data[#] 	 As per previous activation level, AND Carry out surveillance four times daily for evidence of piping in spillway abutments. Inspect and photograph/video the spillway flow, tailwater, and any turbulent areas frequently. 	 As per previous activation level, AND Check for scour on D/S face of dam as tailwater level rises. Monitor fuse plug to confirm activation at EL 315.44 m (if safe to do so) *Reservoir level <u>plus</u> wave action, using new forecast and observed information from the dam operator 	 As per previous activation level, AND Remotely inspect the dam three times daily (or as instructed by the DSTDM). When approaching EL 316.58 m, relocate staff to a safe location. 	 Return to routine surveillance activities and frequencies. Inspect the dam and photograph any damage identified during the event. Forward all communication and inspection sheets for EER to: Update Dam Log Book as per SOP 12 (ref N).
 systems (including backup radio, satellite, phones, fax, and internet) Valve house; ensure that the test & dewater pump is set for remote operation from pier deck – Operations & Maintenance (O&M) Manual, Appendix A, section 6.4. 	 Refer to O&M Manual, Appendix A, section 6. Monitor and record the stream flows at the spillway, Barongarook, and Terraine gauging stations every hour. Liaise with DSTDM and monitor wave action as instructed. 	*NOTE: Under auto EL 315.31 m. If the I Stand Up — 3 activa required. The potent with the DSTDM prior ALL AC e.g. taki	matic gate control, spillway g reservoir level plus wave acti ation level, manual intervention ial timing of manual gate inter- or to any action being taken. TION MUST BE TAKEN WHEN ng photographs/video, dam in ACTIONS CONTINUED C	ates are not fully open until on is expected to exceed the on of gate operations may be revention must be discussed IT IS SAFE TO DO SO spections, instrument readings			



Activation level	Alert	Lean Forward	Stand Up — 1	Stand Up — 2	Stand Up — 3	Stand Up — 4	Stand Down
	 Notify the SO. Record the Storage Level twice daily (or as instructed by the DSTDM) using the gauge boards and confirm accuracy of gauging station. Check gate control intake is clear of debris. Remove fine trash screens. If bulkhead gate is installed in gate slot, contact DSTDM to determine if it can be removed. If required, arrange removal. Record rainfall — daily Update Dam Log Book as per SOP 12 (ref N) 						
Internal notifications	ICLEC/ORRSO	 As per previous activation level, AND FODM 	 As per previous activation level, AND DSTDM 	As per previous activation level	As per previous activation level	As per previous activation level	 Inform all previously notified contacts of stand down
External notifications	As required	As required	As required	As required	As required	As required	 Inform all previously notified contacts of stand down
AWS Warning Level		Advice	Watch and Act		Emergency	Emergency	



Activation level	Alert	Lean Forward	Stand Up — 1	Stand Up — 2	Stand Up — 3	Stand Up — 4	Stand Down
Activation trigger	Storage above EL 314.18 m OR gates open	 Storage above EL 314.34 m (out of bank flow) 	 Storage above EL 314.47 m (major flooding) 	 Storage above EL 314.92 m (flood of record) 	 Storage above EL 315.32 m* (fuse plug overtopping allowing for wave action) *OR as advised by the DSTDM 	 Storage above EL 316.58 m* (main embankment overtopping allowing for wave action) *OR as advised by the DSTDM 	 Storage below EL 314.07 m AND Spillway gates closed
Actions	 Liaise with DDO, IC and LDMG re: situation Develop/implement staff roster. Record all communication. 	 As per previous activation level, AND Ensure all abnormal observations or damage have been reported to DSTDM and IC. 	As per previous activation level	As per previous activation level	As per previous activation level *Reservoir level <u>plus</u> wave action, using new forecast and observed information from the dam operator	 As per previous activation level, AND When approaching EL 316.58 m, ensure staff are relocated to a safe location. 	 Forward all communication including relevant emails for EER to: Return to routine activities.
Internal notifications	DDOIC	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level	 Inform all previously notified contacts of stand down
External notifications	• LDMG	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level	 Inform all previously notified contacts of stand down
AWS Warning Level		Advice	Watch and Act		Emergency	Emergency	

Table 6: Flood operations — LEC emergency action

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	Table 7: Flood operations — IC emergency action							
Activation level	Alert	Lean Forward	Stand Up — 1	Stand Up — 2	Stand Up — 3	Stand Up — 4	Stand Down	
Activation trigger	Storage above EL 314.18 m OR gates open	 Storage above EL 314.34 m (out of bank flow) 	 Storage above EL 314.47 m (major flooding) 	 Storage above EL 314.92 m (flood of record) 	 Storage above EL 315.32 m* (fuse plug overtopping allowing for wave action) *OR as advised by the DSTDM 	 Storage above EL 316.58 m* (main embankment overtopping allowing for wave action) *OR as advised by the DSTDM 	 Storage below EL 314.07 m AND Spillway gates closed 	
Actions	 Liaise with Sunwater Customer Support to send SMS to D/S residents Liaise with the DDO, LEC, DSTDM and the FODM as required. Create Incident Report Record. Update Sunwater intranet with dam status. Record all communication. NOTE: IC to carry out LEC actions unless LDMG is stood up 	 As per previous activation level, AND Ensure all abnormal observations or damage has been reported to DSTDM. 	 As per previous activation level. Liaise with DSTDM to determine if manual gate operations may be required prior to Stand Up — 3, based on new forecast and observed data[#] #NOTE: Under au EL 315.31 m. If th Stand Up — 3 act required. The pote with the DSTDM p 	As per previous activation level tomatic gate control, spillway g e reservoir level plus wave act ivation level, manual interventi ential timing of manual gate inter rior to any actions being taken	As per previous activation level *Reservoir level <u>plus</u> wave action, using new forecast and observed information from the dam operator gates are not fully open until tion is expected to exceed the ion of gate operations may be ervention must be discussed h.	 As per previous activation level, AND When approaching EL 316.58 m, ensure staff are relocated to a safe location. Liaise with the DSTDM to confirm that dam failure is in progress. 	 Complete all internal and external notifications. Forward all communications including relevant emails for EER to Close Incident Report Record. Update Sunwater intranet with dam status. Return to routine activities. 	
Internal notifications	 DDO FODM DSTDM LEC/ORR SMT SRT 	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level	 Inform all previously notified contacts of stand down 	
External notifications	 D/S Residents & Irrigators DDMG 	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level, ANDSDCC Watch Desk	As per previous activation level, ANDEmergency siren	 Inform all previously notified contacts of stand down 	
AWS Warning Level		Advice	Watch and Act		Emergency	Emergency		

ALL ACTION MUST BE TAKEN WHEN IT IS SAFE TO DO SO e.g. taking photographs/video, dam inspections, instrument readings



Table 8: Flood operations —	LEC and IC external	communication	plan
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Activation level	Trigger for communications	Group to contact	Method	Message text	AWS Activation Level
	Storage above EL 314.18 m OR gates open	LDMGDDMG	Phone	 Describe current situation with dam: What is the event? What is the status? Advise of current storage level and whether any flood releases are due to commence 	
Alert		D/S Residents & Irrigators	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.	
Lean	 Storage above EL 314.34 m (out of bank flow) 	LDMGDDMG	Phone	 Describe current situation with dam: What is the event? What is the status? Advise of current storage level and describe gates opening if appropriate Discuss any potential road/bridge closures 	Advice
Forward		 D/S Residents & Irrigators 	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.	Autoc
Stand Up —	Storage above EL 314.47 m (major flooding)	LDMGDDMG	Phone	 Describe current situation with dam: What is the event? What is the status? (storage is greater than Major Flood level) Advise of current storage level and describe gates opening if appropriate Advise of any forecasts you are aware of 	Wetch and Art
1		 D/S Residents & Irrigators 	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.	Watch and Act
Stand Up —	Storage above EL 314.92 m (flood of record)	LDMGDDMG	Phone	 Describe current situation with dam: What is the event? What is the status? (storage is greater than flood of record) Advise of current storage level and describe gates opening if appropriate Advise of any forecasts you are aware of 	
2		 D/S Residents & Irrigators 	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.	



Table 8	(Continued): Flood o	perations —	LEC and IC external	communication	plan
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Activation level	Trigger for communications	Group to contact	Method	Message text	
Stand Up — 3	 Storage above EL 315.32 m* (fuse plug overtopping allowing for wave action) *OR as advised by the DSTDM 	LDMGDDMG	Phone	 Describe current situation with dam: What is the event? What is the status? Advise of current storage level and describe gates opening if appropriate Advise of any forecasts you are aware of Advise fuse plug may soon be overtopped 	Emergency
		 SDCC Watch Desk 	Phone & Email	Complete Emergency Alert Request Form as per instructions and email to SDCC Watch Desk to send.	
		 D/S Residents & Irrigators 	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.	
Stand Up — 4	 Storage above EL 316.58 m* (main embankment overtopping allowing for wave action) *OR as advised by the DSTDM 	LDMGDDMG	Phone	 Describe current situation with dam: What is the event? What is the status? Advise of current storage level and describe gates opening if appropriate Advise of any forecasts you are aware of 	Emergency
		SDCC Watch Desk	Phone & Email	 Complete Emergency Alert Request Form as per instructions (copies in Appendix A9) and email to SDCC Watch Desk to send. Liaise with Sunwater Customer Support to send SMS. 	
		D/S Residents & Irrigators	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.	
		Emergency Siren	Phone & Email	 Complete Emergency Siren instructions in Appendix 10 and notify SRT. Not to be used UNLESS confirmed dam failure is in progress and the Emergency Alert is being sent out. 	
Stand Down	 Storage below EL 314.07 m AND Spillway gates closed 	LDMGDDMG	Phone	 Describe current situation with dam: What is the event? What is the status? Advise of current storage level Advise EAP has been deactivated 	
		 D/S Residents & Irrigators 	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.	


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	Table 9: Flood operations — DSTDM emergency action								
Activation level	Alert	Lean Forward	Stand Up — 1	Stand Up — 2	Stand Up — 3	Stand Up — 4	Stand Down		
Activation trigger	Storage above EL 314.18 m OR gates open	 Storage above EL 314.34 m (out of bank flow) 	 Storage above EL 314.47 m (major flooding) 	 Storage above EL 314.92 m (flood of record) 	 Storage above EL 315.32 m* (fuse plug overtopping allowing for wave action) *OR as advised by the DSTDM 	 Storage above EL 316.58 m* (main embankment overtopping allowing for wave action) *OR as advised by the DSTDM 	 Storage below EL 314.07 m AND Spillway gates closed 		
Action	 Provide technical advice to DDO and IC on a needs basis Review surveillance reports and determine if any additional responses are required Record all communication 	As per previous activation level	 As per previous activation level Liaise with FODM to determine if manual gate operations may be required prior to Stand Up — 3, based on new forecast and observed data# 	As per previous activation level	As per previous activation level *Reservoir level <u>plus</u> wave action, using new forecast and observed information from the dam operator	 As per previous activation level Liaise with the IC and confirm need to sound emergency siren due to dam failure 	 Forward all communications including relevant emails for EER to Return to routine activities 		
Internal notifications	DDOIC	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level	 As per previous activation level, AND CEO — if time permits 	 Inform all previously notified contacts of stand down 		
External notifications	• DSR	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level	 Inform all previously notified contacts of stand down 		
AWS Warning Level		Advice	Watch and Act		Emergency	Emergency			

*NOTE: Under automatic gate control, spillway gates are not fully open until EL 315.31 m. If the reservoir level plus wave action is expected to exceed the Stand Up — 3 activation level, manual intervention of gate operations may be required. The potential timing of manual gate intervention must be discussed by the DSDTM and FODM prior to any actions being taken.

sunwater

	Table 10: Flood operations — FODM emergency action								
Activation level	Alert	Lean Forward	Stand Up — 1	Stand Up — 2	Stand Up — 3	Stand Up — 4	Stand Down		
Activation trigger	Storage above EL 314.18 m OR gates open	 Storage above EL 314.34 m (out of bank flow) 	 Storage above EL 314.47 m (major flooding) 	 Storage above EL 314.92 m (flood of record) 	 Storage above EL 315.32 m* (fuse plug overtopping allowing for wave action) *OR as advised by the DSTDM 	 Storage above EL 316.58 m* (main embankment overtopping allowing for wave action) *OR as advised by the DSTDM 	 Storage below EL 314.07 m AND Spillway gates closed 		
Action	 Extract data from available sources Update flood models as per SOP of OC Update and issue flood operations report Liaise with BOM Update IC and DSTDM re: current flood situation and PFRM results Record all communication 	 As per previous activation level, AND Issue a Flood Situation Report — daily 	 As per previous activation level Liaise with DSTDM re: wave action monitoring Monitor and inform DSTDM for Stand Up — 3 Trigger as new forecast and observed data (e.g. wave action) becomes available[#] 	As per previous activation level	As per previous activation level *Reservoir level <u>plus</u> wave action, using new forecast and observed information from the dam operator	As per previous activation level	 Forward all communications including relevant emails for EER to Return to routine activities 		
Internal notifications	ICDSTDMDDO	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level	 Inform all previously notified contacts of stand down 		
External notifications	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	 Inform all previously notified contacts of stand down 		
AWS Warning Level		Advice	Watch and Act		Emergency	Emergency			

*NOTE: Under automatic gate control, spillway gates are not fully open until EL 315.31 m. If the reservoir level plus wave action is expected to exceed the Stand Up — 3 activation level, manual intervention of gate operations may be required. The potential timing of manual gate intervention must be discussed by the DSDTM and FODM prior to any actions being taken.

6. Dam hazard — piping: embankment, foundation, or abutments

6.1 Overview

The emergency action described in this section relates to a potential dam hazard due to a piping condition through the embankment (Main Dam or Saddle Dams), foundations, or dam abutment. An early indicator of a piping condition can be an increase in seepage or a new area of seepage. If the seepage water is cloudy or has become cloudy, this may indicate that material is being transported and a pipe is being established.

If a pipe is established and progresses, then a dam failure may result. If a potential pipe is detected early, remedial repairs may be possible in the form of constructing a filter and weighting zone over the pipe exit if safe to do so.

The flood outlines in Appendix B3 are there to provide indicative outlines of the maximum potentially affected area of a dam hazard caused by piping. The use of these flood outlines is prescribed below:

- Use the SDF outline when a dam failure is in progress or likely due to piping and no concurrent flooding or downstream releases are occurring or expected to occur, or
- Use the PMF outline when a dam failure is in progress or likely due to piping and concurrent flooding or downstream releases are occurring or expected to occur.
 - Note: Definitions for *Concurrent Flooding* and *Downstream Releases* are provided in Section 1.3

6.1.1 Assessment of circumstances that indicate an increase in the likelihood of piping

- An increase in seepage or a new area of seepage is a circumstance that could indicate an increased likelihood of piping. This circumstance is the trigger for the alert status for piping.
- Cloudy seepage water is a circumstance that could indicate an increased likelihood of piping. This circumstance is the trigger for the lean forward status for piping.

6.2 Emergency action roles

Table 11 to Table 15 specify emergency actions for the following roles:

- Dam Duty Officer
- Local Event Coordinator
- Incident Coordinator
- Dam Safety Technical Decision Maker.





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Activation level	Alert	Lean Forward	Stand Up — 1	Stand Up — 2	Stand Down
Activation trigger	 Increasing leakage through the embankment, the foundations, or abutments 	 Increasing leakage through the embankment, the foundations, or abutments with cloudy water 	Piping condition has been established	 Failure in progress or likely due to piping, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has determined that failure risk has reduced
Actions	 Monitor flows every 6 hours (or as otherwise instructed by the DSTDM) until a decreasing trend is observable, or as directed by the IC. Photograph/video the piping from a safe point and record using approved forms and send to IC & DSTDM. Notify SO. Update Dam Log Book as per SOP 12 (ref N). Record all communication. 	As per previous activation level	 As per previous activation level, AND Support/supervise remedial works as required. Lower the storage if directed. Close any affected roads if not already closed by others. Maintain surveillance of area immediately downstream of dam (if safe to do so) and move on any members of the public 	 As per previous activation level, AND Vacate the immediate vicinity of the piping condition. Ensure remedial works cease and plant and personnel have been moved to a safe location. Record/photograph the piping damage and/or dam failure from a safe point. 	 Forward all communication and inspection sheets for EER to: Update Dam Log Book as per SOP 12 (ref N). Return to routine activities.
Internal notifications	 DSTDM IC LEC/ORR SO 	As per previous activation level	As per previous activation level	As per previous activation level	Inform all previously notified contacts of stand down
External notifications	As required	As required	As required	As required	 Inform all previously notified contacts of stand down

Table 11: Piping: embankment, foundation, or abutments — DDO emergency action



sunwater

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Activation level	Alert	Lean Forward	Stand Up — 1	Stand Up — 2	Stand Down
Activation trigger	 Increasing leakage through the embankment, the foundations, or abutments 	 Increasing leakage through the embankment, the foundations, or abutments with cloudy water 	 Piping condition has been established 	 Failure in progress or likely due to piping, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has determined that failure risk has reduced
Actions	Liaise with DDO and IC re: situation.Record all communication.	 As per previous activation level, AND Liaise with LDMG re: situation 	 As per previous activation level, AND Liaise with DDO and relevant council(s) regarding potential road/bridge closures. 	 As per previous activation level, AND Liaise with LDMGs re potential for evacuations. 	 Forward all communication including relevant emails for EER to: Return to routine activities
Internal notifications	DDOIC	As per previous activation level	As per previous activation level	As per previous activation level	 Inform all previously notified contacts of stand down
External notifications	• LDMG	As per previous activation level	As per previous activation level	As per previous activation level	 Inform all previously notified contacts of stand down

Table 12: Piping: embankment, foundation, or abutments — LEC emergency action





Activation level	Alert	Lean Forward	Stand Up — 1	Stand Up — 2	Stand Down
Activation trigger	 Increasing leakage through the embankment, the foundations, or abutments 	 Increasing leakage through the embankment, the foundations, or abutments with cloudy water 	 Piping condition has been established 	 Failure in progress or likely due to piping, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has determined that failure risk has reduced
Actions	 Liaise with DDO, DSTDM and LEC re: situation. Create Incident Report Record. Complete Situation Report, unless otherwise directed. Update Sunwater intranet with dam status. Record all communication. NOTE : IC to carry out LEC actions unless LDMG is <i>stood up</i>	 As per previous activation level, AND Investigate availability of machinery and materials (if insufficient stockpiles available). Place machinery operators on standby if directed by DSTDM. Consider the need to appoint a Recovery Coordinator. The Recovery Coordinator is then responsible for the follow through on actions to close out all matters and works outstanding after the initial emergency is over. 	 As per previous activation level, AND Liaise with Sunwater Customer Support to send SMS to D/S residents and phone those without mobiles. Mobilise resources to undertake remedial works if directed by DSTDM 	 As per previous activation level, AND Liaise with the DSTDM to confirm that dam failure is in progress. Confirm that remedial works have ceased if directed by the DSTDM and plant and personnel have been moved to a safe location. Liaise with DDO and DSTDM re: potential for evacuations 	 Complete all internal and external notifications. Forward all communications including relevant emails for EER to Close Incident Report Record Update Sunwater intranet with dam status. Return to routine activities
Internal notifications	 DDO DSTDM LEC/ORR SMT SRT 	As per previous activation level	As per previous activation level	As per previous activation level	Inform all previously notified contacts of stand down
External notifications	As required	• DDMG	 As per previous activation level, AND D/S Residents & Irrigators SDCC Watch Desk 	 As per previous activation level, AND Emergency siren 	Inform all previously notified contacts of stand down





Table 14: Piping: embankment, foundation, or abutments — LEC and IC external communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	 Increasing leakage through an embankment, the foundations, or abutments 	• LDMG	Phone	 Describe current situation with dam: What is the event? (Unconfirmed piping risk) What is the status? (Unconfirmed leakage — Investigation continues) Advise of current storage level Advise any issues you are aware of Standby for further advice
Lean Forward	 Increasing leakage through an embankment, the foundations, or abutments with cloudy water 	LDMGDDMG	Phone	 Describe current situation with dam: What is the event? (Unconfirmed piping risk) What is the status? (Unconfirmed leakage — Investigation continues) Advise of current storage level Advise any issues you are aware of Standby for further advice
Stand Up — 1	 Piping condition has been established 	LDMGDDMG	Phone	 Describe current situation with dam: What is the event? (Confirmed piping risk). What is the status? (Confirmed piping/leakage) Advise of current storage level Advise any issues you are aware of Discuss any potential road/bridge closures Prepare for possible evacuations
		 SDCC Watch Desk 	Phone & Email	Complete Emergency Alert Request Form as per instructions and email to SDCC Watch Desk to send.
		D/S Residents & Irrigators	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.



Table 14 (Continued): Piping: embankment, foundation, or abutments — LEC and IC external communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
	 Failure likely due to piping, AND Sufficient water in storage to create a dam hazard 	LDMGDDMG	Phone	 Describe current situation with dam: What is the event? (Confirmed piping risk) What is the status? (Possible Dam Failure) Advise of current storage level Prepare coordinated evacuations
		 SDCC Watch Desk 	Phone & Email	Complete Emergency Alert Request Form as per instructions and email to SDCC Watch Desk to send.
		D/S Residents & Irrigators	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.
Stand Up — 2	Dam failure in progress	LDMGDDMG	Phone	 Describe current situation with dam: What is the event? (Confirmed piping risk) What is the status? (Dam Failure in Progress) Advise of current storage level Coordinate evacuations of affected downstream residents and move people to higher ground
		 SDCC Watch Desk 	Phone & Email	 Complete Emergency Alert Request Form as per instructions (copies in Appendix A9) and email to SDCC Watch Desk to send.
		 D/S Residents & Irrigators 	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.
		Emergency Siren	Phone & Email	 Complete Emergency Siren instructions in Appendix 10 and notify SRT. Not to be used UNLESS confirmed dam failure is in progress and the Emergency Alert is being sent out.
Stand Down	 Risk assessment has determined that failure risk has reduced 	LDMGDDMG	Phone	 Describe current situation with Dam: What is the event? (Dam Safety Risk — piping) What is the status? (Dam Hazard Stood Down) Advise risk assessment has determined that failure risk has reduced and EAP has been deactivated
		D/S Residents & Irrigators	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.

Table 15: Piping: embankment, foundation, or abutments — DSTDM emergency action

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Activation level	Alert	Lean Forward	Stand Up — 1	Stand Up — 2	Stand Down
Activation trigger	 Increasing leakage through the embankment, the foundations, or abutments 	 Increasing leakage through the embankment, the foundations, or abutments with cloudy water 	 Piping condition has been established 	 Failure in progress or likely due to piping, AND Sufficient water in storage to create a dam hazard 	Risk assessment has determined that failure risk has reduced
Action	 Arrange an inspection of the dam to assess its condition as soon as possible, when safe to do so. Determine if piping condition has been established. Monitor situation and assess risks Record all communication. Advise DSR on EAP activation. 	As per previous activation level	 As per previous activation level, AND Assess risk and determine if failure likely or in progress. Liaise with the LEC & IC Determine if remedial repairs are practical. Determine if risks can be reduced by lowering storage (if the storage is required to be drawn down, then the DSTDM needs to assess the maximum rate of drawn down based on latest available data and advise in writing. to IC and DDO) Supervise* remedial repairs (if applicable) 	 As per previous activation level, AND Liaise with the IC and confirm need to sound emergency siren due to dam failure. Liaise with the IC and advise on need to recommend evacuations. 	 Forward all communications including relevant emails for EER to Return to routine activities.
Internal notifications	DDOIC	As per previous activation level	 As per previous activation level, AND LEC/ORR 	 As per previous activation level, AND CEO — if time permits 	Inform all previously notified contacts of stand down
External notifications	• DSR	As per previous activation level	As per previous activation level	As per previous activation level	Inform all previously notified contacts of stand down

* Supervision means provide technical oversight to the work. It does not necessarily mean on-site supervision.

7. Dam hazard — earthquake

7.1 Overview

The emergency action described in this section relates to a potential dam hazard due to an earthquake causing damage to the dam embankment (Main Dam or Saddle Dams), foundations, or dam abutment or pertinent structures. Damage could take the form of cracking or slumping of the embankment, deformation or land slip, increased seepage, or movement of retaining or training walls.

If damage does occur, then a dam failure may result. If damage is detected early, remedial repairs may be possible depending on the nature of the damage.

The flood outlines in Appendix B3 are there to provide indicative outlines of the maximum potentially affected area of a dam hazard caused by earthquake. The use of these flood outlines is prescribed below:

- Use the SDF outline when a dam failure is in progress or likely due to earthquake and no concurrent flooding or downstream releases are occurring or expected to occur, or
- Use the PMF outline when a dam failure is in progress or likely due to earthquake and concurrent flooding or downstream releases are occurring or expected to occur.
- Notes: Definitions for *Concurrent Flooding* and *Downstream Releases* are provided in Section 1.3.

7.2 Emergency action roles

Table 16 to Table 20 specify emergency actions for the following roles:

- Dam Duty Officer
- Local Event Coordinator
- Incident Coordinator
- Dam Safety Technical Decision Maker.

sunwater

Figure 3: Earthquake flowchart



Table 16: Earthquake — DDO emergency action

sunwater

Activation level	Alert	Lean Forward	Stand Up — 1	Stand Up — 2	Stand Down
Activation trigger	 Earthquake confirmed (by DSTDM) or felt in the area, AND Intensity less than 5MM[~] 	 Earthquake confirmed (by DSTDM) or felt in the area, AND Intensity greater than or equal to 5MM⁻, OR Intensity less than 5MM⁻ and change detected during surveillance inspection 	 Earthquake confirmed (by DSTDM) or felt in the area, AND A possible failure path has been identified 	 Failure in progress or likely due to earthquake, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has been determined that failure risk has reduced
Actions	 Inspect the dam wall, spillway structure and abutments in daylight hours (if safe to do so) and report to the DSTDM and IC — photograph/video and record using approved forms and send to IC & DSTDM. Check for springs, deformation, slides, and concrete damage. Notify SO. Update Dam Log Book as per SOP 12 (ref N). Record all communication. 	 As per previous activation level, AND Immediately Inspect for leakage and evidence of initiation of piping of embankment slips on both upstream and downstream slopes and in the abutments. Repeat the inspection as directed. 	 As per previous activation level, AND Support/supervise remedial work as required. Lower the storage if directed. Close any affected roads, if not already closed by others. Maintain surveillance of area immediately downstream of dam (if safe to do so) and move on any members of the public. Vacate the immediate vicinity of the embankment. 	 As per previous activation level, AND Ensure remedial works cease and plant and personnel have been moved to a safe location. Record/photograph the earthquake damage and/or dam failure from a safe point. 	 Forward all communication and inspection sheets for EER to: Update Dam Log Book as per SOP 12 (ref N). Return to routine activities.
Internal notifications	 DSTDM IC LEC/ORR SO 	As per previous activation level	 As per previous activation level 	As per previous activation level	 Inform all previously notified contacts of stand down
External notifications	As required	As per previous activation level	As per previous activation level	As per previous activation level	 Inform all previously notified contacts of stand down

~ DDO to assess magnitude (MM scale) at dam location.

ALL ACTION MUST BE TAKEN WHEN IT IS SAFE TO DO SO e.g. taking photographs/video, dam inspections, instrument readings



sunwater

Activation level	Alert	Lean Forward	Stand Up — 1	Stand Up — 2	Stand Down
Activation trigger	 Earthquake confirmed (by DSTDM) or felt in the area, AND Intensity less than 5MM[~] 	 Earthquake confirmed (by DSTDM) or felt in the area, AND Intensity greater than or equal to 5MM[~], OR Intensity less than 5MM[~] and change detected during surveillance inspection 	 Earthquake confirmed (by DSTDM) or felt in the area, AND A possible failure path has been identified 	 Failure in progress or likely due to earthquake, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has been determined that failure risk has reduced
Actions	 Liaise with IC and DDO re: situation. Record all communication. 	 As per previous activation level, AND Liaise with LDMG re: situation. 	 As per previous activation level, AND Liaise with DDO and relevant council(s) regarding potential road/bridge closures. 	As per previous activation level	 Forward all communication including relevant emails for EER to: Return to routine activities
Internal notifications	ICDDO	As per previous activation level	As per previous activation level	As per previous activation level	 Inform all previously notified contacts of stand down
External notifications	• LDMG	As per previous activation level	As per previous activation level	As per previous activation level	 Inform all previously notified contacts of stand down

[~] DDO to assess magnitude (MM scale) at dam location.

Table 17: Earthquake — LEC emergency action



Table 18: Earthquake — IC emergency action

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Activation level	Alert	Lean Forward	Stand Up — 1	Stand Up — 2	Stand Down
Activation trigger	 Earthquake confirmed* or felt in the area, AND Intensity less than 5MM[~] 	 Earthquake confirmed* or felt in the area, AND Intensity greater than or equal to 5MM[~], OR Intensity less than 5MM[~] and change detected during surveillance inspection 	 Earthquake confirmed* or felt in the area, AND A possible failure path has been identified 	 Failure in progress or likely due to earthquake, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has been determined that failure risk has reduced
Actions	 Liaise with DDO, DSTDM and LEC. Create Incident Report Record. Update Sunwater intranet with dam status. Record all communication. NOTE: IC to carry out LEC actions unless LDMG is <i>stood up</i>	 As per previous activation level, AND Investigate availability of machinery and materials (if insufficient stockpiles available) Place machinery operators on standby if directed by DSTDM 	 As per previous activation level, AND Liaise with DDO and relevant council(s) regarding potential road/bridge closures. Mobilise resources to undertake remedial works if directed by DSTDM. 	 As per previous activation level, AND Liaise with the DSTDM to confirm that dam failure is in progress. Cease remedial works if directed by the DSTDM and plant and personnel to be moved to a safe location. Liaise with DDO and DSTDM re: potential for evacuations. 	 Complete all internal and external notifications. Forward all communications including relevant emails for EER to Close Incident Report Record. Update Sunwater intranet with dam status. Return to routine activities.
Internal notifications	 DDO DSTDM LEC/ORR SMT SRT 	As per previous activation level	As per previous activation level	As per previous activation level	 Inform all previously notified contacts of stand down
External notifications	As required	 As per previous activation level, AND DDMG 	 As per previous activation level, AND D/S Residents & Irrigators SDCC Watch Desk 	 As per previous activation level, AND Emergency siren 	Inform all previously notified contacts of stand down

[~] DDO to assess magnitude (MM scale) at dam location.

ALL ACTION MUST BE TAKEN WHEN IT IS SAFE TO DO SO e.g. taking photographs/video, dam inspections, instrument readings





Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	 Earthquake confirmed or felt in the area, AND Intensity less than 5MM[~] 	• LDMG	Phone	 Describe current situation with dam: What is the event? (Dam Safety Risk — Earthquake damage) What is the status? (Under investigation) Advise of current storage level Stand by for further information
Lean Forward	 Earthquake confirmed or felt in the area, AND Intensity greater than or equal to 5MM⁻, OR Intensity less than 5MM⁻ and change detected during surveillance inspection 	LDMGDDMG	Phone	 Describe current situation with dam: What is the event? (Dam Safety Risk — Earthquake damage) What is the status? (Under investigation) Advise of current storage level Stand by for further information
Stand Un — 1	 Earthquake confirmed or felt in the area, AND A possible failure path has been identified 	LDMGDDMG	Phone	 Describe current situation with dam: What is the event? (Dam Safety Risk — Earthquake felt or reported in area) What is the status? (Possible earthquake damage to dam) Advise of current storage level Discuss any potential road/ bridge closures Activate emergency response
		 SDCC Watch Desk 	 Phone & Email 	Complete Emergency Alert Request Form as per instructions and email to SDCC Watch Desk to send.
		D/S Residents & Irrigators	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.

Table 19 (Continued): Earthquake — LEC and IC external communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Stand Up — 2	 Failure likely due to earthquake, AND Sufficient water in storage to create a dam hazard 	LDMGDDMG	Phone	 Describe current situation with dam: What is the event? (Dam Safety Risk — Earthquake damage) What is the status? (Dam Failure Likely) Advise of current storage level Discuss any potential road/bridge closures Prepare coordinated evacuation
		SDCC Watch Desk	 Phone & Email 	Complete Emergency Alert Request Form as per instructions and email to SDCC Watch Desk to send.
		D/S Residents & Irrigators	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.
	 Dam failure in progress 	LDMGDDMG	Phone	 Describe current situation with dam: What is the event? (Dam Safety Risk — Earthquake damage) What is the status? (Dam Failure in progress) Advise of current storage level Coordinate evacuation of downstream residents and move people to higher ground
		SDCC Watch Desk	Phone & Email	 Complete Emergency Alert Request Form as per instructions (copies in Appendix A9) and email to SDCC Watch Desk to send. Liaise with Sunwater Customer Support to send SMS.
		D/S Residents & Irrigators	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.
		Emergency Siren	Phone & Email	 Complete Emergency siren instructions in Appendix 10 and notify SRT. Not to be used UNLESS confirmed dam failure is in progress and the Emergency Alert is being sent out.
Stand Down	 Risk assessment has determined that failure risk has reduced 	LDMGDDMG	Phone	 Describe current situation with dam: What is the event? (Dam Safety Risk — Earthquake damage) What is the status? (Dam Hazard Stood Down) Advise risk assessment has been determined, that failure risk has reduced, and that EAP has been deactivated
		D/S Residents & Irrigators	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.

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Activation level	Alert	Lean Forward	Stand Up — 1	Stand Up — 2	Stand Down
Activation trigger	 Earthquake confirmed* or felt in the area, AND Intensity less than 5MM⁻ 	 Earthquake confirmed* or felt in the area, AND Intensity greater than or equal to 5MM⁻, OR Intensity less than 5MM⁻ and change detected during surveillance inspection 	 Earthquake confirmed* or felt in the area, AND A possible failure path has been identified 	 Failure in progress or likely due to earthquake, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has been determined that failure risk has reduced
Action	 Monitor situation and assess risks. Liaise with DDO and IC as required. Record all communication NOTE: 'Reported' is defined as an alert received from Geoscience Australia or other source that advises an earthquake >4.9ML (Richter Scale) has occurred within a 200km radius of the dam. 	 As per previous activation level, AND Review surveillance inspection of the dam and assess its condition as soon as possible. Determine if there are any possible failure paths from reported damage. 	 As per previous activation level, AND Arrange an inspection of the dam and assess its condition as soon as possible, when safe to do so. Assess risk and determine if failure likely or in progress. Liaise with the IC. Determine if remedial repairs are practical. Determine if risks can be reduced by lowering storage (if the storage is required to be drawn down, then the DSTDM needs to assess the maximum rate of drawn down based on latest available data and advise in writing to IC and DDO). Supervise^ remedial repairs (if applicable). 	 As per previous activation level, AND Liaise with the IC and confirm need to sound emergency siren due to dam failure. 	 Forward all communications including relevant emails for EER to Return to routine activities
Internal notifications	DDOIC	As per previous activation level	As per previous activation level	As per previous activation level	Inform all previously notified contacts of stand down
External notifications	• DSR	As per previous activation level	As per previous activation level	As per previous activation level	Inform all previously notified contacts of stand down

Table 20: Earthquake — DSTDM emergency action

-DDO to assess magnitude (MM scale) at dam location

· 'Confirmed' is defined as an alert received from Geoscience Australia or other source that advises an Earthquake >4.9 ML (Richter Scale) has occurred within a 200km radius of the dam

^Supervision means provide technical oversight to the work. It does not necessarily mean on-site supervision.



8. Dam hazard — terrorist threat/activity or high energy impact

8.1 Overview

The emergency action described in this section relates to a potential dam hazard due to a terrorist threat/activity or a high energy impact on the dam such as a plane crash or meteorite.

The vulnerability of Coolmunda Dam to a terrorist attack is low.

Note: Risk is higher due to gated nature of spillway.

The flood outlines in Appendix B3 are there to provide indicative outlines of the maximum potentially affected area of a dam hazard caused by a terrorist threat/activity or a high energy impact. The use of these flood outlines is prescribed below:

- Use the SDF outline when a dam failure is in progress or likely due to a terrorist threat/activity or a high energy impact and no concurrent flooding or downstream releases are occurring or expected to occur, or
- Use the PMF outline when a dam failure is in progress or likely due to a terrorist threat/activity or a high energy impact and concurrent flooding or downstream releases are occurring or expected to occur.
 - Notes: Definitions for Concurrent Flooding and Downstream Releases are provided in Section 1.3

8.1.1 Assessment of circumstances that indicates an increase in the likelihood of terrorist threat/activity or high energy impact.

Advice from authorities of a specific risk to water infrastructure is a circumstance that could indicate increased likelihood of a terrorist threat. If this were specific enough to name a dam, this circumstance would trigger Stand Up–1 activation level.

8.2 Emergency action roles

Table 21 to Table 25 specify emergency actions for the following roles:

- Dam Duty Officer
- Local Event Coordinator
- Incident Coordinator
- Dam Safety Technical Decision Maker.

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Table 21: Terrorist threat/activity	or high energy impact —	DDO emergency action
	- 0 0/ 1	

Activation level	Alert/Lean Forward	Stand Up — 1	Stand Up — 2	Stand Up — 3	Stand Down
Activation trigger	Not applicable	 THREAT Possible terrorist activity/suspicious behaviour noticed at the dam, OR Threat received 	EVENT • Large explosion heard/observed at dam (e. g. bomb explosion, aircraft hit)	 RESPONSE Failure in progress or likely due to impact or explosion, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has determined that failure risk has reduced
Actions	• Not applicable	 In an emergency call 000. Record all communication. If any suspicious behaviour noticed, contact DSTDM for advice. If instructed by DSTDM, of if threat received, complete the following: Inspect dam (if safe) and ensure all security measures in place (locked gates, etc.) Photograph/video suspicious items from a safe point and record using approved forms and send to IC & DSTDM. If Police appoint Incident Manager support and follow instructions Close any affected roads as directed. Notify SO Update Dam Log Book as per SOP 12 (ref N). 	 As per previous activation level, AND Vacate the immediate vicinity of the affected area. Undertake surveillance inspection of dam (if safe) 	 As per previous activation level, AND Lower storage level, if directed by DSTDM Sound gate operations siren if required. 	 Forward all communication and inspection sheets for EER to: Update Dam Log Book as per SOP 12 (ref N). Return to routine activities
Internal notifications	Not applicable	 DSTDM IC SO LEC/ORR 	As per previous activation level	As per previous activation level	Inform all previously notified contacts of stand down
External notifications	Not applicable	• #000 Emergency	As per previous activation level	As per previous activation level	Inform all previously notified contacts of stand down

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Table 22: Terrorist threat/activity or high energy impact — LEC emergency action

Activation level	Alert/Lean Forward	Stand Up — 1	Stand Up — 2	Stand Up — 3	Stand Down
Activation trigger	Not applicable	 THREAT Possible terrorist activity/suspicious behaviour noticed at the dam, OR Threat received 	EVENT • Large explosion heard/observed at dam (e.g. bomb explosion, aircraft hit)	 RESPONSE Failure in progress or likely due to impact or explosion, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has determined that failure risk has reduced
Actions	Not applicable	 Liaise with DDO, IC and LDMG re: situation If Police appoint Incident Manager support and follow instructions Liaise with DDO and relevant council(s) regarding possible road/bridge closures. Record all communication. 	As per previous activation level	 As per previous activation level, AND Liaise with DDO and LDMG re: potential for evacuations 	 Forward all communication including relevant emails for EER to: Return to routine activities
Internal notifications	Not applicable	DDOIC	As per previous activation level	As per previous activation level	Inform all previously notified contacts of stand down
External notifications	Not applicable	• LDMG	As per previous activation level	As per previous activation level	Inform all previously notified contacts of stand down



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Activation level	Alert/Lean Forward	Stand Up — 1	Stand Up — 2	Stand Up — 3	Stand Down
Activation trigger	Not applicable	 THREAT Possible terrorist activity/suspicious behaviour noticed at the dam, OR Threat received 	EVENT • Large explosion heard/observed at dam (e.g. bomb explosion, aircraft hit)	 RESPONSE Failure in progress or likely due to impact or explosion, AND Sufficient water in storage to create a dam hazard 	Risk assessment has determined that failure risk has reduced
Actions	Not applicable	 Record all communication Liaise with DDO, DSTDM, and LEC Contact National Security If Police appoint Incident Manager support and follow instructions Create Incident Report Record Update Sunwater intranet with dam status NOTE: IC to carry out LEC actions unless LDMG is stood up 	As per previous activation level	 As per previous activation level, AND Liaise with the DSTDM to confirm that dam failure is in progress Liaise with DDO, DSTDM, and LEC re: potential for evacuations Mobilise resources to undertake remedial works if directed by DSTDM 	 Complete all internal and external notifications Forward all communications including relevant emails for EER to Close Incident Report Record Update Sunwater intranet with dam status Return to routine activities
Internal notifications	Not applicable	 DDO DSTDM LEC/ORR SMT SRT 	As per previous activation level	As per previous activation level	 Inform all previously notified contacts of stand down
External notifications	Not applicable	CTGDDMG	 As per previous activation level, AND D/S Residents & Irrigators SDCC Watch Desk 	 As per previous activation level, AND Emergency siren 	 Inform all previously notified contacts of stand down



Table 24: Terrorist threat/activity or high energy impact — LEC and IC external communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Alert			A	LERT NOT APPLICABLE
Lean Forward			LEAN	FORWARD NOT APPLICABLE
Stand Up — 1	 THREAT Possible terrorist activity/suspicious behaviour noticed bat the dam, OR Threat received 	National Security HotlineLDMGDDMG	Phone	 Describe current situation with dam: What is the event? (Dam Safety Risk — Security threat/ impact/explosion, etc.) What is the status? (Received/noted terrorist threat) Discuss any potential road/bridge closures Activate emergency response
Stand Up — 2	EVENT • Large explosion heard/observed at dam (e.g., bomb explosion, aircraft hit)	National Security HotlineLDMGDDMG	Phone	 Describe current situation with dam: What is the event? (Dam Safety Risk — Security threat/ impact/explosion, etc.) What is the status? (Under Investigation) Discuss any potential road/bridge closures (if not discussed at Stand Up — 1) Prepare coordinated evacuation
		SDCC Watch Desk	Phone & Email	Complete Emergency Alert Request Form as per instructions and email to SDCC Watch Desk to send.
		D/S Residents & Irrigators	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.

Table 24 (Continued): Terrorist threat/activity or high energy impact — LEC and IC external communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
	 RESPONSE Failure in progress or likely due to impact or explosion, AND Sufficient water in storage to create a dam hazard 	LDMGDDMG	Phone	 Describe current situation with dam: What is the event? (Dam Safety Risk — Security threat/ impact/ explosion, etc.) What is the status? (Dam Failure Likely/In Progress) Initiate evacuations
Stand Up — 3		SDCC Watch Desk	Phone & Email	 Complete Emergency Alert Request Form as per instructions (copies in Appendix A9) and email to SDCC Watch Desk to send. Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.
		D/S Residents & Irrigators	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.
		Emergency Siren	Phone & Email	 Complete Emergency Siren instructions in Appendix A10 and notify SRT. Not to be used UNLESS confirmed dam failure is in progress and the Emergency Alert is being sent out.
Stand Down	 Risk assessment has determined that failure risk has reduced 	LDMGDDMG	Phone	 Describe current situation with dam: What is the event? (Dam Safety Risk — Security threat/ impact/explosion, etc.) What is the status? (Dam Hazard Stood Down) Advise that failure risk has been reduced and EAP has been deactivated
		D/S Residents & Irrigators	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Customer Support and communications to send appropriate messaging via SMS.



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• Inform all previously notified

• Inform all previously notified

contacts of stand down

contacts of stand down

Table 25: Terrorist threat/activity or high energy impact — DSTDM emergency action								
Activation level	Alert/Lean Forward	Stand Up — 1	Stand Up — 2	Stand Up — 3	Stand Down			
Activation trigger	Not applicable	 THREAT Possible terrorist activity/suspicious behaviour noticed at the dam, OR Threat received 	EVENT • Large explosion heard/observed at dam (e.g. bomb explosion, aircraft hit)	 RESPONSE Failure in progress or likely due to impact or explosion, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has determined that failure risk has reduced 			
Action	• Not applicable	 Record all communication Liaise with IC and DDO Assess risks Liaise with SRT Notify DSR 	 As per previous activation level, AND Arrange an inspection of the dam and assess its condition as soon as possible, when safe to do so Assess risk and determine if failure likely or in progress Liaise with LEC Determine if remedial repairs are practical Determine if risks can be reduced by lowering storage (if the storage is required to be drawn down, then the DSTDM needs to assess the maximum rate of drawn down based on latest available data and advise in writing to IC and DDO) Supervise* remedial repairs (if applicable) Monitor situation and assess risks 	 As per previous activation level, AND Liaise with the IC and confirm need to sound emergency siren due to dam failure Liaise with the IC and LEC and advise on need to recommend evacuations 	 Forward all communications including relevant emails for EER to Return to routine activities 			

* Supervision means provide technical oversight to the work. It does not necessarily mean on-site supervision.

• IC

• DDO

• SRT

DSR

• As per previous activation level,

• As per previous activation level

AND

• LEC/ORR

• As per previous activation level

• As per previous activation level

Not applicable

• Not applicable

Internal

External

notifications

notifications

9. Dam hazard — gate malfunction

9.1 Overview

The emergency action described in this section relates to the malfunction of one or more gates.

9.1.1 Assessment of circumstances that indicates an increase in the likelihood of gate malfunction occurring

The following EAP dam hazards could indicate an increased likelihood of gate malfunction:

- flood operations/blockage
- earthquake
- terrorist threat
- mechanical or electrical failure during an operational test could also result in gate malfunction.

9.2 Emergency action roles

Table 26 to Table 30 specify emergency actions for the following roles:

- Dam Duty Officer
- Local Event Coordinator
- Incident Coordinator
- Dam Safety Technical Decision Maker.



Table 26: Gate malfunction — DDO emergency action

Activation level	Alert	Lean Forward	Stand Up	Stand Down
Activation trigger	 Loss of control of one or more gates in a dry weather event 	 Loss of control of one or more gates with forecast rainfall 	 Loss of control of one or more gates in a flood event, OR Loss of control of one or more gates with forecast rainfall, AND Timeframe for restoration of gate control cannot be determined 	Confirmation that all gates are functioning correctly
Actions	 Liaise with DSTDM and IC re: situation Refer to reference O&M Manual Appendix A (Spill Operations Manual) (reference K) for manual gate operations procedures. Support/supervise remedial works as required Notify SO Update Dam Log Book as per SOP 12 (ref N). Record all communication 	 As per previous activation level, AND Lower the storage if directed Maintain surveillance of area immediately downstream of dam (if safe to do so) and move on any members of the public 	 As per previous activation level, AND Close any affected roads if not already closed by others 	 Forward all communication and inspection sheets for EER to Update Dam Log Book as per SOP 12 (ref N). Return to routine activities
Internal notifications	 DSTDM IC SO LEC/ORR 	As per previous activation level	As per previous activation level	 Inform all previously notified contacts of stand down
External notifications	As required	As required	As required	 Inform all previously notified contacts of stand down





Table 27: Gate malfunction — LEC emergency action

Activation level	Alert	Lean Forward	Stand Up	Stand Down
Activation trigger	 Loss of control of one or more gates in a dry weather event 	Loss of control of one or more gates with forecast rainfall	 Loss of control of one or more gates in a flood event, OR Loss of control of one or more gates with forecast rainfall, AND Timeframe for restoration of gate control cannot be determined 	Confirmation that all gates are functioning correctly
Actions	Liaise with DDO and IC re: situationRecord all communication	 As per previous activation level, AND Liaise with relevant council(s) regarding potential road/bridge closures 	As per previous activation level	 Forward all communications including relevant emails for EER to Return to routine activities
Internal notifications	DDOIC	As per previous activation level	As per previous activation level	 Inform all previously notified contacts of stand down
External notifications	• LDMG	As per previous activation level	As per previous activation level	 Inform all previously notified contacts of stand down





Table 28: Gate malfunction — IC emergency action

Activation level	Alert	Lean Forward	Stand Up	Stand Down
Activation trigger	 Loss of control of one or more gates in a dry weather event 	 Loss of control of one or more gates with forecast rainfall 	 Loss of control of one or more gates in a flood event, OR Loss of control of one or more gates with forecast rainfall, AND Timeframe for restoration of gate control cannot be determined 	Confirmation that all gates are functioning correctly
Actions	 Liaise with the DSTDM, DDO and LEC resituation Consider the need to appoint a Recovery Coordinator. The Recovery Coordinator is then responsible for the follow through on actions to close out all matters and works outstanding after the initial emergency is over. Create Incident Report Record Update Sunwater intranet with dam status Record all communication 	As per previous activation level	 As per previous activation level, AND Activate EAP to section 5 (Flood) 	 Complete all internal and external notifications Forward all communications including relevant emails for EER to Close Incident Report Record Update Sunwater intranet with dam status Return to routine activities
Internal notifications	 DSTDM DDO LEC/ORR SMT SRT 	As per previous activation level	As per previous activation level	 Inform all previously notified contacts of stand down
External notifications	As required	As per previous activation level, ANDDDMG	As per previous activation level	 Inform all previously notified contacts of stand down



Table 29: Gate malfunction — LEC and IC external communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	Loss of control of one or more gates in a dry weather event	• LDMG	Phone	 Describe current situation with gates What is the status? (e.g. time to repair?) Advise of current storage level Advise any issues you are aware of — Investigation continues Discuss any potential road/bridge closures Standby for further advice
Lean Forward	Loss of control of one or more gates with forecast rainfall	LDMGDDMG	Phone	 Describe current situation with gates What is the status? (e.g. time to repair?) Advise of current storage level Advise any issues you are aware of — Investigation continues Discuss any potential road/bridge closures Standby for further advice
Stand Up — 1	 Loss of control of one or more gates in a flood event, OR Loss of control of one or more gates with forecast rainfall, AND Timeframe for restoration of gate control cannot be determined 	LDMG DDMG	Phone	 Describe current situation with gates What is the status? (unknown time to repair?) Advise of current storage level Advise of flooding risk if loss of control of gates continue Advise any issues you are aware of — Investigation continues Prepare for possible evacuations
Stand Down	Confirmation that all gates are functioning correctly	LDMGDDMG	Phone	 Describe current situation with gates What is the status? (Dam hazard Stood Down) Confirmation that all gates are functioning correctly, and EAP has been deactivated



Table 30: gate malfunction — DSTDM emergency action

Activation level	Alert	Lean Forward	Stand Up	Stand Down
Activation trigger	 Loss of control of one or more gates in a dry weather event 	Loss of control of one or more gates with forecast rainfall	 Loss of control of one or more gates in a flood event, OR Loss of control of one or more gates with forecast rainfall, AND Timeframe for restoration of gate control cannot be determined 	Confirmation that all gates are functioning correctly
Action	 Arrange an inspection of the dam to assess its condition as soon as possible, when safe to do so Monitor situation and assess risks Liaise with the DDO, IC and LEC Record all communication 	 As per previous activation level, AND Determine if risks can be reduced by lowering storage (if the storage is required to be drawn down, then the DSTDM needs to assess the maximum rate of drawn down based on latest available data and advise in writing to IC and DDO) Supervise* remedial repairs (if applicable) 	Assess risk and determine if failure likely or in progress	 Forward all communications and relevant emails for EER to Return to routine activities
Internal notifications	DDOICLEC/ORR	As per previous activation level	As per previous activation level	 Inform all previously notified contacts of stand down
External notifications	• DSR	As per previous activation level	As per previous activation level	Inform all previously notified contacts of stand down

* Supervision means provide technical oversight to the work. It does not necessarily mean on-site supervision.



10. Other emergency situation — communications failure

10.1 Overview

The emergency action described in this section (Other emergency situation — communications failure) relates to either:

- An emergency situation where all means of communication at the dam site have been lost.
- An emergency situation where all means of communication with the local area have been lost.
- An emergency situation where all means of communication with Brisbane site have been lost.

This section specifies actions and provides guidance for the three situations.

10.2 Emergency actions

Due to the large number of different possible scenarios, the table below only covers the most common or likely conditions.

10.2.1 Activation triggers

Comms Failure – Site	 Unable to communicate to or from dam site (usually affects DDO) 		
Comms Failure – Local area	 Unable to communicate to or from local area (likely to affect LEC or ORR) 		
Comms Failure – Brisbane	 Unable to communicate to or from Sunwater Brisbane (could affect DSTDM or FODM & will affect IC) 		

Table 31: Communications failure emergency activation trigger summary

10.2.2 Assessment of circumstances that indicates the likelihood of communications failure escalating the activation level of a current dam hazard.

The FODM will assess the weather and flood warnings daily in accordance with the OC SOP. They will escalate to the IC any warnings that have the potential to cause a significant communications failure.

The on-call IC will escalate to the FODM any local intelligence on conditions that could increase the probability of a significant communications failure.

The FODM will determine whether it is reasonably likely that there will be a significant communications failure within the subsequent 24 hours and assess the likely effect on current dam hazards. If required, the FODM will instruct the IC to escalate the activation level of any current dam hazards.

10.2.3 Emergency action roles

Table 32 to Table 37 specify emergency actions for the following roles:

- Dam Duty Officer
- Local Event Coordinator
- Incident Coordinator
- Dam Safety Technical Decision Maker
- Flood Operations Decision Maker.

Table 32: Communications failure — DDO emergency action

Activation level	Comms Failure – Local Area	Comms Failure – Brisbane
Activation trigger	Unable to communicate to local area including ORR/LEC	Unable to communicate to Sunwater Brisbane including IC or DSTDM or FODM
Actions	 As much as practicable, assume the role of LEC Continue tasks in accordance with any other current emergency action Every hour, attempt communications by all means noting the following: Mobile phone - try texting instead of voice, much higher probability of success Satellite phone - needs to access open sky unless external antenna fitted Fax - generally uses fixed landline and is therefore less likely to have failed Social media - e.g. Facebook (Internet may be available via landline) Record all communication and attempts via Dam Log Book entries as per SOP 12 (ref N) and communications log if EAP event is current 	 Determine if LEC is in communication and if not, assume the LEC role as much as is practicable Continue tasks in accordance with any other current emergency action Every hour, attempt communications by all means noting the following: Mobile phone - try texting instead of voice, much higher probability of success Satellite phone - needs to access open sky unless external antenna fitted Fax - generally uses fixed landline and is therefore less likely to have failed Social media - e.g. Facebook (Internet may be available via landline) Record all communication and attempts via Dam Log Book entries as per SOP 12 (ref N) and communications log if EAP event is current
Internal Notifications	ICSO (if available)	LECSO (if available)
External Notifications	As required	As required

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Table 33: Communications failure — LEC emergency action

Activation level	Comms Failure – Dam Site	Comms Failure – Brisbane
Activation trigger	Unable to communicate to dam site	Unable to communicate to Sunwater Brisbane including IC or DSTDM or FODM
Actions	 Every hour, attempt communications by all means noting the following: Mobile phone - try texting instead of voice, much higher probability of success Satellite phone - needs to access open sky unless external antenna fitted Fax - generally uses fixed landline and is therefore less likely to have failed Social media - e.g. Facebook (Internet may be available via landline) Record all communication and attempts Assume that the DDO is carrying out LEC role at site as much as practicable Liaise with IC Liaise with DSTDM As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action 	 Create Sunwater Incident Report Every hour, attempt communications by all means noting the following: Mobile phone - try texting instead of voice, much higher probability of success Satellite phone - needs to access open sky unless external antenna fitted Fax - generally uses fixed landline and is therefore less likely to have failed Social media - e.g. Facebook (Internet may be available via landline) Record all communication and attempts Liaise with the DDO and assume IC role As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action
Internal Notifications	 IC DSTDM SO (if available) 	 DDO DSTDM (if available) SO
External Notifications	• LDMG	LDMGDDMG



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Table 34: Communications failure — IC emergency action

Activation level	Comms Failure – Dam Site	Comms Failure – Local Area
Activation trigger	Unable to communicate to dam site	Unable to communicate to local area including ORR/LEC
Actions	 Create Incident Report Record Every hour, attempt communications by all means noting the following: Mobile phone - try texting instead of voice, much higher probability of success Satellite phone - needs to access open sky unless external antenna fitted Fax - generally uses fixed landline and is therefore less likely to have failed Social media - e.g. Facebook (Internet may be available via landline) Record all communication and attempts Liaise with LEC Liaise with DSTDM As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action. 	 Create Incident Report Record Every hour, attempt communications by all means noting the following: Mobile phone - try texting instead of voice, much higher probability of success Satellite phone - needs to access open sky unless external antenna fitted Fax - generally uses fixed landline and is therefore less likely to have failed Social media - e.g. Facebook (Internet may be available via landline) Record all communication and attempts Liaise with the DDO and carry out functions of the LEC as much as practicable As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action.
Internal notifications	 LEC DSTDM SO (if available) 	 DDO (if available) DSTDM SO (if available)
External notifications	• DDMG	LDMG (if available)DDMG (if available)


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				•
Activation level	Trigger for communications	Group to contact	Method	Message text
Comms Failure – Site	 Unable to communicate to or from dam site, AND DDO is at dam site 	 IC/LEC DSTDM SO (if available) LDMG DDMG 	Phone	 Describe current situation with dam communications. What is the status – estimated time to restore communications?
		IC to create Sunwater Incident Report		EAP Alert Notification — Coolmunda Dam — Site Communications Failure
Comms Failure – Local Area	 Unable to communicate to or from local area including ORR/LEC 	 DDO (if available) DSTDM SO (if available) LDMG (if available) DDMG (if available) 	Phone	 Describe current situation with dam communications. What is the status – estimated time to restore communications?
		IC to create Sunwater Incident Report		EAP Alert Notification — Coolmunda Dam — Local Area Communications Failure
Comms Failure – Brisbane	Unable to communicate to or from Sunwater Brisbane	DSTDM (if available)LDMGDDMG	Phone	 Describe current situation with dam communications. What is the status – estimated time to restore communications?
		LEC to create Sunwater Incident Report		EAP Alert Notification — Sunwater Brisbane Communications Failure



Table 36: Communications failure — DSTDM emergency action

Activation level	Comms Failure – Site	Comms Failure – Local Area
Activation trigger	Unable to communicate to dam site	Unable to communicate to local area including LEC and ORR
Actions	 Provide technical advice to IC/LEC on a needs basis Record all communication As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action 	 Provide technical advice to IC on a needs basis Record all communication Assume that the DDO is assisting IC with LEC role As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action
Internal notifications	ICLECCEO (if time permits)	 IC DDO (if available) CEO (if time permits)
External notifications	DSR (if applicable)	DSR (if applicable)



Table 37: Communications failure — FODM emergency action

Activation level	Comms Failure – Site	Comms Failure – Local Area
Activation trigger	Unable to communicate to dam site	Unable to communicate to local area including LEC and ORR
Actions	 Liaise with IC Record all communication As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action 	 Liaise with IC Record all communication Assume that the DDO is assisting IC with LEC role As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action
Internal notifications	ICLECDSTDM	ICDDO (if available)DSTDM
External notifications	Not applicable	Not applicable



APPENDIX A Notification and communication lists

- A1 Sunwater regional notification list
- A2 Sunwater Brisbane notification list
- A3 External notification list
- A4 D/S residents' notification list
- A5 Other D/S residents' notification list (outside area requested messaging)
- A6 D/S irrigators notification list
- A7 Other reference contacts
- A8 Emergency alert polygon
- A9 Dam failure emergency alert request
- A10 Dam failure emergency siren activation

Appendix A1 to Appendix A7 have been redacted



Appendix A9: Dam failure emergency alert request

Queensland emergency alert request guidelines

An Emergency Alert Request form should be completed, if required (see Sections 5 to 8 for actions), and sent to the SDCC Watch Desk to activate the Coolmunda Dam Emergency Polygon.

Instructions

- This form is not to be used for flood UNLESS a flood has triggered an emergency event.
- Print off the following Queensland Emergency Alert Request form.
- Telephone the SDCC Watch Desk on and tell them your intention to use the Emergency Alert for an emergency event for Coolmunda Dam.
- A KML Polygon for this dam is stored in the Sunwater area of the Disaster Management Portal in the Emergency Alert area. Ask the SDCC operative to locate the polygon. It will be a KML file called
- Give them your phone number, confirm their name, and end the call after advising the form will be sent shortly.
- IC and DSTDM will work together to craft a message relevant to the hazard and discuss with the LDMG, if there is time.
- Fill in the form and send to SDCC watch desk email: This form must come from the IC, DSTDM, or member of the Executive.
- Phone back to check the message has been sent and ask for an email to confirm.
- Create Sunwater Incident Report to advise of completion.
- This form MUST be sent from a Sunwater email address. If Sunwater email is not functional, they can confirm identification through the DRDMW (DSR), if required.
- Use the following text to complete the emergency alert request:
 - •

Filename:	Voice Message:	SMS:
	FLOOD EMERGENCY WARNING from Sunwater: People downstream of Cool mun dah Dam including Ingle wood must LEAVE IMMEDIATELY. Cool mun dah Dam possible failure/is failing. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. Ingle wood Waste Facility Assembly Point is safe. More information available at dashboard dot grc dot qld dot gov dot ay you.	FLOOD EMERGENCY WARNING from Sunwater: People downstream of Coolmunda Dam including Inglewood must LEAVE IMMEDIATELY. Coolmunda Dam possible failure/is failing. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. Inglewood Waste Facility Assembly Point is safe. More information available at dashboard.grc.qld.gov.au/

The next two pages contain a pre-filled copy of the Coolmunda Dam Emergency Alert Request form:

ande	PHONE THE SDCC WATCH DI	ESK – ADVI	SE EA IS BEING DEVELOPED
	EMERGE	NCY ALERT R	REQUEST
<u> SERT</u>	Location of Alert: Coolmunda Dam		Date:
Queensland Government	LGA/Agency requesting: Sunwater		Time:
Requesting Officer (e.	g. Disaster Coordinator/Incident Controller)	1	Telephone:
Name: Agency/Position:		(SDCC Watch Desk may telephone you)
Email:			
Advised LDC/L	DMG: YES DDC/DDMG: [YES Neighbouring	g LDMG/LGA: 🗌 YES 🗌 N/A
Send Alert	Immediately: 🛛 YES	Scheduled: YES Date	e & Time / / : hrs
Event Type	□ Cyclone □ Storm □ Bushfire □ Fire Ir □ Tsunami (Sent as Location Based To ☑ Other (please specify): Catastrophic	Tide Flash Flood acident Smoke / Toxic ext Message ONLY) c Dam Failure	Flood Plume Chemical Spill
Distributed by: (Channel)	Voice SMS (Landline only) (Location	 Location Based of phone at time of distribution) 	SMS – Service Address Based (Registered billing address)
Message Severity	Emergency Warning (Activates SEW	/S) 🗌 Watch & Act	Advice
Threat Direction Required (e.g. Fire, Chemical Spill,	ired? ☐ YES Dam Spill) ☐ N/A	Threat location indicated on Only For Emergency Warning Voic	map? XES
EA Messaging Filenar	ne (Doc, Pdf):	Polygon Filename, (Kml, Km	z, Gml, GeoJSON):
		Number of polygons (i	f multiple, attach list in order of priority)
Supplied via: DM P Other (please specify):	Portal 🗌 Email 🔲 Verbal 🗌 Other	Supplied via: DM Portal Other (please specify):	Email Verbal Other
Voice: Type or handw	rite, max 4000 characters incls spaces. <mark>(I</mark>	deally message should be < 450	characters)
FLOOD EMERGENCY LEAVE IMMEDIATELY Go now to a safe plac available at dashboa	FLOOD EMERGENCY WARNING from Sunwater: People downstream of Cool mun dah Dam including Ingle wood must LEAVE IMMEDIATELY. Cool mun dah Dam possible failure/is failing. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. Ing gell wood Waste Facility Assembly Point is safe. More information available at dashboard dot grc dot qld dot gov dot ay you.		
SMS: Type or handwri	te, use capitals for clarity, max 612 chara	cters incls spaces. (Ideally shoul	d be < 160 characters incl. spaces)
FLOOD EMERGENCY	WARNING from Sunwater: People do	ownstream of Coolmunda Dar	m including Inglewood must LEAVE
IMMEDIATELY. Coolr	nunda Dam possible failure/is failing.	Major flooding is happening	now. Your life is at risk. Go now to
dashboard.grc.qld.gc	w.au/	y Assembly Point is sale. Wo	
websites:	Replace previous FA message	Specily Date & Time.	Contact #
Requesting Officer:	Signati	ire:	Date: / /
Send	to	1	to confirm receipt
FOR USE BY SDCC			
EA Request Form com Notification of any delay	vs provided to Requestor:		
EA User Name:			Emergency Alert No:
Signature:		Date: / /	
Authorising Officer Nan	ne:		EMS EA Campaign Report ID:
Signature:		Date: / /	
Report provided to Req	uestor on EA outcomes:	□ NO	1
The EA Man	ual, EA Quick Reference Guide, EA Requ	est Form Template are available	e at: www.disaster.qld.gov.au
	EA Request Form – F.1.177 Lasi	Updated: 31 October 2022 Vers	sion: 3.0

DO NOT SEND THIS PAGE

(Sunwater internal use only)

Emergency Alert (EA) Request instructions

Complete ALL initial fields, especially contact details, and check applicable boxes.

STEP 1.	EA Polygon Area (e.g., detailed description and location reference to allow positive identification of message area, including street names with cross street, areas of interest such as parks, rivers, dams, coastal areas) it is preferable to attach a map identifying the message area. If a Threat Direction has been requested, please clearly indicate it on the map. Check applicable box.
STEP 2.	Enter the Polygon file name/s.
STEP 3.	<i>Sunwater Polygons are all in *.kml format.</i> Check applicable box.
STEP 4.	<i>Sunwater Messaging/spatial data is always supplied via DMportal.</i> Check applicable box. Enter the file name.

Voice Message: Either type or handwrite the required message in CAPITALS. As the message will be translated by a text-to-speech process it is important that words are not unintelligible when translated e.g., "qld" used in a web site address must be entered as "Q L D", similarly the word "DOT" must be entered into a web address instead of a full stop.

An Emergency Warning message must start with "EMERGENCY EMERGENCY" Do not use special characters.

SMS: Either type the message or handwrite the characters into the boxes. Capitals only required as per normal grammar rules, but an Emergency Warning message must start with "EMERGENCY EMERGENCY" (in capitals). Do not use special characters.

Voice example:

EMERGENCY. EMERGENCY. SUN WATER ADVISE IMMINENT FAILURE OF CANIA DAM. RESIDENTS DOWNSTREAM OF THE DAM NEED TO ACT TO PROTECT LIFE AND LEAVE IMMEDIATELY. FAILURE OF THE DAM WILL RESULT IN EXTREMELY DANGEROUS FLOODING DOWNSTREAM INCLUDING: MOONFORD AND MONTO. DO NOT DELAY. LEAVE NOW. CENTRAL MONTO AND BILOELA ARE SAFE LOCATIONS.

SMS example:

EMERGENCY. EMERGENCY. Sunwater advise imminent failure of Cania Dam. Take action to protect life and leave now. Moonford and Monto are at risk. Info on ABC Radio. Central Monto & Biloela are safe.

If using template EA messages, please provide the appropriate variables that are in the template message guides. Refer to the Queensland EA Manual for copies of the template message guides.

Appendix A10: Dam failure emergency siren activation

Emergency siren activation

- Notes: The Emergency siren is not to be activated UNLESS a confirmed dam failure is in progress, the appropriate EAP trigger has been exceeded and the Emergency Alert is being sent out via SDCC and/or an emergency broadcast by ABC radio.
- IC will take the lead to initiate the activation of the emergency siren but may delegate to on-call DSTDM or FODM depending on the situation, noting that the EA and emergency broadcasts are priority. The CEO or Executive Leadership Team member should be made aware if time permits.

Instructions:

- 1. Telephone the SRT on and tell them of your intention to use the dam failure emergency siren for an emergency event for Coolmunda Dam.
- 2. Email previously sent Emergency Alert Request form to:
- 3. Advise the LDMGs, media and CEO if time permits.
- 4. Sound emergency siren following Technical Instructions below.
- 5. Create Sunwater Incident report to advise of the completion of the sounding of the siren.

Technical Instructions

- The emergency siren alarm sequence is activated remotely via the SiRcom SMART Alert (SiSA) software. The SiSA software is accessed either via the client software installed on the local PC located in the Sunwater Operations Centre or via the SiSA web portal which can be accessed via the Sunwater 'Jump Box' infrastructure. Jump Box can be accessed by following this procedure:
- 1. navigate to the Citrix Remote Access
- 2. log in using your Sunwater user credentials (you will also be prompted for a security code via Office 365)
- 3. go to the APPS section
- 4. select the Remote Desktop Connection application and Open
- 5. type the IP address into the 'Computer' field and click **Connect**
- 6. once prompted, enter your **Sunwater user credentials** into the fields in the dialogue box (*if you are prompted with a security prompt, click the 'Yes' button*)
- 7. once you are logged into the Jump-Box click the Start Menu button and type again to open a new Remote Desktop Connection session
- 8. type the address into the 'Computer' field and click **Connect** (you may be prompted, enter your **Sunwater user credentials** into the fields in the dialogue box again)
- Once the User has access to the SiSA software, the alarm is activated by following this procedure:
- 1. Log on to (SiSA) software.
- 2. Select the Siren/s that require activation using the **SELECT UNITS** button.
- 3. Once the Siren/s are selected press the **EVACUATE** button.
- 4. Confirm activation request by selecting the **ACTIVATE** button. Once the alarm is activated the **SiRcom icon** will flash red.
- 5. Allow the Alarm sequence to run to end. If the Alarm needs to be cancelled before the sequence is completed press the STOP ACTIVE SCRIPT button.

APPENDIX B Drawings and maps

- B1 Drawings
- B2 Flood impacts downstream
- B3 Inundation maps
- B4 Catchment plan
- B5 Emergency access routes

NOTE: Actual levels may differ from those shown in flood inundation maps due to variations in assumptions made in the models to actual flood events.



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DWG 20484C.tif





DWG 20696A.tif

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OBSERVATION BORES

No	LOCATION	ELEVATION
0B01	UNSURVEYED -SEE PLAN	310.54
OB02	16	311.59
0B03) ()	311.05
0B04),e	310.01
0B05	<i></i>	311.95
0B08		308.55
0B09		307.22
OB10	10	308.51
0B11	26	306.93
0B12	217.	304.31
0B13	:H	311.47
0B14	11	308.31
0B15		306.4
0B16) e	308.93
0B17		307.49
OB18	24	306.4
OB19	10	306.98
OB20	10	309.69

VIBRATING WIRE PIEZOMETERS

BOREHOLE PIEZOMETER EASTING NORTHING ELEVATION 325416 6853577 BH1

Let 1 1		122410	0000000	
	PIEZO 1 TIP			308.82
	PIEZO 2 TIP]		298.82
	PIEZO 3 TIP		-	288.82
BH2		325379	6852884	
	PIEZO 1 TIP			311.85
	PIEZO 2 TIP	1		308.35
	PIEZO 3 TIP]		303.35



ACCESS RAMP

WATER LEVEL & ELECTRIC SETTLEMENT INSTALLATIONS

No AXIS DISTANCE OFFSET FROM AXIS ORIGINAL EL FOUNDATION PANEL JOINT

					- 1
WS02	931.2	n.	316.642	31-32	
WS03	1008.6	11	316.789	49-50	
W504	1057.7	11	316.659	61-62	
WS05	1142.7	n.	316.671	80-81	
WS06	1211.6	0	316.741	105-106	
WS07	1253.9	n	316.806	115-116	
WS08	1334.7	11	316.751	135-136	
W509	1377.1	11	316.693	145-146	٦
WS10	1421.9	п	316.816	155-156	

ELECTRIC SETTLEMENT INSTALLATIONS

No	AXIS DISTANCE	OFFSET FROM AXIS	ORIGINAL EL	FOUNDATION PANEL JOINT
ESD1	969.9	2.134 D/S	316.732	MIDWAY 31-32 TO 49-50
ESD2	1057.7	11	316.731	61-62
ES03	1142.7	11	316.721	80-81
ES04	1253.9	"	316.863	115-116
ES05	1332.0	n	316.790	135-136
ESD6	1421.9	n	316.876	155-156

CONTROL STATION

No.	EL	REMARKS
BOLT	316.700	ON FENCE RB SPILLWAY
PM154883	316.679	REPLACED BOLT DEC 2003

	F SETTIEM	ENT DOINTS	(INSTALLED
No	EASTING	NORTHING	ELEVATION
SS11	325345.14	6852600.85	315.702
SS12	325358.15	6852701.95	316.007
SS13	325363.72	6852736.36	316.776
SS14	325371.95	6852839.79	316.814
SS15	325403.66	6852935.90	316.878
SS16	325355.61	6853987.19	316.854
SS17	325334.09	6854139.65	316.785
SS18	325312.68	6854289.48	316.844

V NOTCH WEIRS

Na	EASTING	NORTHING	ELEVATION		
SLVN01	325344.53	6852786.36	307.686		
SRVN01	325401.30	6853484.95	303.895		
SRVN02	325372.67	6853693.90	305.049		
SRVN03	325299.10	6854268.17	309.583		

			3								
					GS	SCALES (A3 SIZE)		DRAWN	DESIGNED		Ir.
11/1	11/22 E	OBSERVATION BORES UPDATE			NN			KP			
11/0	06/20 D	VWPs ADDED & DRG CONVERTED TO A3, MGA	KP	RM	RA			CHECKED	CHECKED	sunwater	
10/0	05/18 C	V NOTCH TABLE, NOs REVISED	RB	RM	Ц Ш	0 100 200	300 METRES		l .		
12/0	06/13 B	SS POINTS AND V NOTCH WEIRS ADDED	WRH	AMB	1 X		1:6000	APPROVED			
10/0	02/04 A	DATA, NOTES, NORTH SYMB ADDED	DNH	BNH	THE T			D.N. H	DUSTON	©SUNWATER LIMITED	
DA	ATE	REMARKS	CKD	PASSED	Ë					ACN 131 034 985	
10001101	11/ 11/ 10/ 12/ 10/ D	11/11/22 E 11/06/20 D 10/05/18 C 12/06/13 B 10/02/04 A DATE	11/11/22 E DBSERVATION BORES UPDATE 11/06/20 D VWPs ADDED & DRG CONVERTED TO A3, MGA 10/05/18 C V NOTCH TABLE, NOS REVISED 12/06/13 B SS POINTS AND V NOTCH WEIRS ADDED 10/02/04 A DATA, NOTES, NORTH SYMB ADDED DATE REMARKS	11/11/22 E DBSERVATION BORES UPDATE 11/06/20 D VWPs ADDED & DRG CONVERTED TO A3, MGA KP 10/05/18 C V NOTCH TABLE, NOS REVISED RB 12/06/13 B SS POINTS AND V NOTCH WEIRS ADDED WRH 10/02/04 A DATA, NOTES, NORTH SYMB ADDED DNH DATE REMARKS CKD	11/11/22 E DBSERVATION BORES UPDATE 11/06/20 D VWPs ADDED & DRG CONVERTED TO A3, MGA KP RM 10/05/18 C V.NDTCH TABLE, NOS REVISED RB RM 12/06/13 B SS POINTS AND V.NOTCH WEIRS ADDED WRH AMB 10/02/04 A DATA, NOTES, NORTH SYMB ADDED DNH DNH DATE REMARKS CKD PASSED	11/11/22 E 0BSERVATION BORES UPDATE Image: Constraint of the state of the	11/11/22 E 0BSERVATION BORES UPDATE Image: Constraint of the second secon	11/11/22 E 0BSERVATION BORES UPDATE Image: Constraint of the second secon	11/11/22 E 0BSERVATION BORES UPDATE Image: Constraint of the state of th	11/11/22 E 0BSERVATION BORES UPDATE Image: Constraint of the c	III/II/22 E OBSERVATION BORES UPDATE III/III/22 E OBSERVATION BORES UPDATE OP III/22 IIII/22 IIII/22 IIII/22 IIII/22 IIII/22 IIII/22 IIII/2

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ACCESS RAMP

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- 1. WATER LEVELS IN SPILLWAY GATE COUNTERWEIGHT WELLS ARE TO BE READ AT SIX MONTHLY INTERVALS.
- 2. CROSS-ARMS IN ALL SETTLEMENT INSTALLATIONS ARE ALIGNED WITH DAM AXIS.
- 3. LEVEL DATUM : AHD DERIVED FROM PM111291 (AT OFFICE) WITH EL 319.122 AHD.
- 4. LEVELS FROM ORIGINAL SURVEY IN SEPTEMBER 1982.
- 5. PROJECTED COORDINATE SYSTEM: MAPPING GRID OF AUSTRALIA (MGA94), ZONE 56
- 6. SETTLEMENT MEASUREMENTS ARE VERTICAL ONLY.



- ₩ATER LEVEL & ELECTRIC SETTLEMENT AND SURFACE SETTLEMENT INSTALLATION
- ✗ ELECTRIC SETTLEMENT INSTALLATION
- OBSERVATION BORE

CREEK

5513

- V NOTCH WEIR
- BOREHOLE WITH VIBRATING WIRE PIEZOMETERS INSTALLED

AM SAFETY INVESTIGATION	S
OOLMUNDA DAM	
ISTRUMENTATION LAYOUT	

CONTRACT NUM	BER
DRAWING NUMBER	REV.
102261	E
SHEET I OF I	
DATE NOV 202	2

NOOGSZE



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relied on or treated as a substitute for specific advice

relevant to particular circumstances.

SCALE (A4 SIZE)

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- PAR - Dam Failure •
- AMTD (Markers) CC Dam Full Supply Level
- C Limit of Downstream Notification Area

NOTES Areas further downstream will become progressively more impacted by other rainfall and inflows that occur downstream of the dam (not shown here).

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Appendix B3: Inundation maps

A Failure Impact Assessment of Coolmunda Dam was conducted in 2022 (reference I).

Drawings:

- Key Map
- Sunny Day Failure
- Probable Maximum Flood

Disclaimer: Every effort has been made to ensure the currency of the flood inundation maps reproduced in this EAP. However, as the maps have been extracted from external sources, their accuracy cannot be guaranteed. Please refer to the Local Disaster Management Plan for the most current information.



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	21/11/18	A	ISSUED FOR USE	IDH	MGH	250822 - Keymap	M.G. HUGHES	SUNWATER LIMITED
	DATE		REMARKS	CKD	PSD	3	RPEQ: 18351	ACN 131 034 985

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CKD PSD

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Appendix B5: Emergency access routes





Emergency access route information

- Distance: Approx. 107 km from Goondiwindi.
- Travel Time: Approx. 1 hour 15 minutes from Goondiwindi.
- **Road Type:** Double lane—bitumen/gravel.
- Speed Limit: 60 100 km/h

Note: When the downstream flood waters have inundated access route(s), then access to the dam will be by helicopter.

sunwater



Figure B6: Coolmunda Dam alternative access routes

APPENDIX C Equipment and technical information

- C1 List of equipment available during an emergency
- C2 Coolmunda dam storage curve

Appendix C1 has been redacted



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ELEVATION (m)	AREA (ha)	CUMMULATIVE VOLUME (ML)	PERCENTAGE FULL
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ELEVATION AREA CUMMULATIVE PERCENTAGE (ha) VOLUME FULL (m) (ML) 311.29 301.17 319.80 3488.8 212120 319.60 3412.4 205222 319.40 3335.5 291.28 198480 319.20 191881 281.59 3266.6 319.00 3198.0 185419 272.11 318.80 3128.8 179095 262.83 318.60 3060.2 172910 253.75 318.40 2989.1 166862 244.87 318.20 2916.4 160960 236.21 227.76 219.50 318.00 2849.1 155197 317.80 2782.5 149568 317.60 317.40 144072 211.43 203.56 2715.9 2648.5 138710 317.20 133484 2581.1 195.89 317.00 2514.1 128390 188.42 316.80 2448.1 123430 181.14 316.60 2381.2 118602 174.05 316.40 2312.7 113909 167.17 316.20 2242.5 109357 160.48 316.00 2176.8 104940 154.00 315.80 315.60 2115.3 147.71 100649 2058.0 141.58 96477 315.40 315.20 1998 4 135.63 92422 1940.9 129.85 88484 315.00 1883.2 84661 124.24 314.80 1779.9 80950 118.80 314.60 1755.9 77390 113.57 314.40 1731.9 73831 108.35

NOTE:

VOLUME AND SUBMERGED AREA CALCULATED FROM DIGITAL _ TERRAIN MODEL COMPILED FROM PREVIOUS DTM MODELING PRODUCED FROM 1959 AND 1993 PHOTOGRAMMETRIC SURVEY.

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NOTE:

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STORAGE CURVE

MACINTYRE BROOK - BASIN 416 COOLMUNDA DAM - AMTD 78.0km

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The figures on the next two pages have been extracted from the Coolmunda Discharge Rating Curve 2017 (ref P). The discharge estimates are for spillway flows only and do not account for flow through the fuse plug or over the embankment.



Figure C8: Coolmunda Dam spillway discharge rating curve

EAP		Lake				Radial	Gate Ope	ning (m)	·			Spillway Discharge
Phase	Key Levels	Level		Gate 4		Ga	ates 3 and	15	Gate	es 1,2,6 a	ind 7	(m ³ /s)
1 nuoc		(m AHD)	Acceptable Minimum	Automatic Design	Acceptable Maximum	Acceptable Minimum	Automatic Design	Acceptable Maximum	Acceptable Minimum	Automatic Design	Acceptable Maximum	Automatic Design
	Full Supply Level	314.07	closed	closed	closed	closed	closed	closed	closed	closed	closed	0
		314.10	closed	closed	closed	closed	closed	closed	closed	closed	closed	0
		314.15	closed	closed	0.12	closed	closed	closed	closed	closed	closed	0
	Gate 4 opens	314.18	closed	0.00	0.45	closed	closed	closed	closed	closed	closed	0
		314.20	closed	0.20	0.66	closed	closed	0.04	closed	closed	closed	11
Alort	Gates 3 and 5 open	314.22	closed	0.38	0.87	closed	0.00	0.28	closed	closed	closed	25
Alen		314.25	closed	0.66	1.16	closed	0.29	0.63	closed	closed	closed	81
	Gates 1,2,6, and 7 open	314.29	closed	1.02	1.54	0.03	0.66	1.06	closed	0.00	0.34	169
		314.30	0.07	1.11	1.63	0.12	0.75	1.16	closed	0.10	0.44	210
		314.34	0.46	1.45	1.98	0.49	1.11	1.55	closed	0.48	0.85	409
		314.35	0.55	1.54	2.06	0.58	1.19	1.64	closed	0.57	0.95	463
Lean Forward		314.40	1.00	1.96	2.47	1.02	1.61	2.09	0.40	1.02	1.42	738
		314.45	1.42	2.37	2.87	1.45	2.02	2.50	0.85	1.46	1.86	1014
		314.47	1.59	2.53	3.03	1.62	2.18	2.66	1.03	1.63	2.03	1131
		314.50	1.84	2.77	3.26	1.87	2.41	2.89	1.28	1.88	2.28	1304
		314.55	2.24	3.16	3.64	2.28	2.80	3.27	1.69	2.30	2.69	1578
		314.60	2.63	3.54	4.01	2.68	3.18	3.64	2.08	2.70	3.08	1857
		314.65	3.02	3.92	4.39	3.07	3.56	4.00	2.47	3.10	3.47	2133
Stand Up 1		314.70	3.41	4.29	4.76	3.45	3.94	4.37	2.86	3.49	3.85	2405
		314.75	3.79	4.66	5.13	3.83	4.31	4.73	3.25	3.88	4.23	2672
		314.80	4.18	5.03	5.51	4.20	4.69	5.10	3.64	4.26	4.61	2951
		314.85	4.56	5.40	5.88	4.57	5.06	5.47	4.02	4.65	4.99	3223
		314.90	4.94	5.76	6.25	4.93	5.43	5.84	4.41	5.03	5.37	3496
		314.92	5.10	5.91	6.40	5.08	5.58	5.99	4.56	5.18	5.53	3603
		314.95	5.32	6.13	6.62	5.30	5.80	6.22	4.79	5.40	5.75	3772
		315.00	5.70	6.51	6.98	5.66	6.16	6.59	5.16	5.78	6.12	4038
		315.05	6.08	6.89	7.33	6.03	6.51	6.96	5.52	6.15	6.48	4312
		315.10	6.44	7.27	7.66	6.40	6.85	7.32	5.85	6.52	6.82	4591
Stand Up 2	Gates Rapidly Rise	315.14	6.95	7.48	8.10	6.55	7.15	7.68	5.94	6.99	7.13	4887
		315.15	7.13	7.67	8.20	6.70	7.35	7.90	6.13	7.14	7.34	5022
		315.20	8.15	8.51	8.77	7.86	8.33	8.83	7.37	8.09	8.32	5721
		315.25	9.10	9.34	9.47	9.08	9.35	9.61	8.79	9.22	9.26	6456
		315.30	10.26	10.39	10.40	10.23	10.41	10.61	10.09	10.39	10.44	7159
	Max Gate Opening	315.31	fully open	fully open	fully open	fully open	fully open	fully open	fully open	fully open	fully open	7323
	Fuse Plug Crest	315.32	fully open	fully open	fully open	fully open	fully open	fully open	fully open	fully open	fully open	7329
	(2015 Survey)	315.35	fully open	fully open	fully open	fully open	fully open	fully open	fully open	fully open	fully open	7347
		315.40	fully open	fully open	fully open	fully open	fully open	fully open	fully open	fully open	fully open	7377
Stand Up 3		315.44	fully open	fully open	fully open	fully open	fully open	fully open	fully open	fully open	fully open	7400
		315.50	fully open	fully open	fully open	fully open	fully open	fully open	fully open	fully open	fully open	7436
		316.50	fully open	fully open	fully open	fully open	fully open	fully open	fully open	fully open	fully open	8001
	Embankment Crest	316.58	fully open	fully open	fully open	fully open	fully open	fully open	fully open	fully open	fully open	8044
Stand Up 4	(2015 Survey)	316.66	fully open	fully open	fully open	fully open	fully open	fully open	fully open	fully open	fully open	8087

Table C2: Coolmunda Dam Spillway Discharge

Note: Total Discharge values account for flows through the spillway with no contribution from the fuse plug

APPENDIX D Interaction with local government and district groups

Appendix D has been redacted

Annexe — Coolmunda Dam SMS Messages

Advice Stay informed

SMS



Watch and Act Prepare to leave



Emergency Leave immediately To be issued in consultation with council



ADVICE from Sunwater. Coolmunda Dam is releasing excess FLOOD WATCH AND ACT from Sunwater. Excess water water into McIntyre Brook. People downstream of Coolmunda Dam should STAY INFORMED and MONITOR CONDITIONS. Water flows from Coolmunda Dam expected to remain within beds and banks of river/may contribute to widespread/localised/overland flooding. Expect increased river flows in 6-12 hours/later today/overnight/tomorrow. There is no immediate danger. More information here: bit.ly/RecandSafety

releasing from Coolmunda Dam into McIntyre Brook has increased significantly. Water flows from Coolmunda Dam may contribute to dangerous/widespread flooding downstream. Expect increased river flows in 6-12 hours/ later today/overnight/tomorrow. People downstream of Coolmunda Dam must PREPARE TO LEAVE in case the flood available at dashboard.grc.qld.gov.au gets worse. Call Triple Zero (000) if your life is in danger. Call the SES on 132500 for flood help. More information here: bit.ly/RecandSafety

FLOOD EMERGENCY WARNING from Sunwater: People downstream of Coolmunda Dam including Inglewood must LEAVE IMMEDIATELY. Coolmunda Dam possible failure/is failing. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. Inglewood Waste Facility Assembly Point is safe. More information