

EMERGENCY ACTION PLAN — BOONDOOMA DAM (ID 227)

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Prepared by Sunwater Limited

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Approved by the delegate of the Chief Executive, Department of Local Government, Water and Volunteers until 1 April 2028.

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Emergency activation quick reference – Dam Hazards

The Emergency Action Plan (EAP) for Boondooma 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 the decision to activate the EAP. Should the IC be unavailable, the Local Event Coordinator (LEC) or Dam Duty Officer (DDO) is responsible for the decision. The DSTDM and FODM are responsible for informing the decision to activate the EAP.

Table 1: Emergency activation quick reference – Dam Hazards

Dam Hazards and section	Activation levels for dam hazards				
numbers	Alert	Lean Forward	Stand Up	Stand Down	
Flood operations See section 5	 Storage EL 280.30 m and rising (0.1 m below FSL) 	Storage above FSL 280.40 m	 Storage above EL 282.50 m (Moderate flood classification level) 	• Storage EL 280.50 m and falling with no forecast increase in EL	
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 reported or felt in the area, AND Intensity less than 5 Modified Mercalli (MM) 	 Earthquake reported 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 reported 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 underway 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	

Emergency activation quick reference – Other Emergency Situations

The EAP for Boondooma Dam covers one other emergency situation evaluated within Sunwater's Dam Safety Management Program. Use the following table to select the relevant scenario that deals with the emergency situation.

NOTE: The FODM or DSTDM 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. **The DSTDM and FODM are responsible for informing the decision to activate the EAP.**

Table 2: Emergency activation quick reference – Other Emergency Situations

Other Emergency	Activation levels			
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	
Comms Failure See section 9	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		11/11/2024
	Principal Engineer – Dam Safety Compliance — Approved for submission		11/11/2024
	GM Asset Integrity — Approved for submission		25/11/2024
	EGM Engineering and Water Resources (or delegate) — Dam Owner Authorising Officer		26/11/2024

Document revision history

lssue	Date	Prepared by	Reason for change	eDOCS#
2	May 2008		Significant changes of Boondooma Dam Emergency Action Plan to reflect Sunwater Management structure and other minor changes.	734129
3	October 2011		Significant changes of Boondooma Dam Emergency Action Plan to reflect current Sunwater Management structure and other changes.	1025278
3C	September 2013		Amendments due to new legislative requirements	1060261
4	August 2016		New Emergency Action Plan developed at expiry of 3E approval. Issued for consultation with Relevant Disaster Management Groups.	1867788
5	October 2017		New Emergency Action Plan with minor amendments including contact list updates.	2092369
6	December 2018		Revised and reviewed Emergency Action Plan 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 (Other Emergency Situations)	2353553
6.1	September 2019		Completed yearly contact updates including all relevant sections. Updated EA Polygon to reflect current inundation modelling. Removed Bundaberg LDMG by agreement as they were not required. Corrected minor errors and other non-substantive items.	2457506
6.2	September 2020		Amended contacts and associated sections, e.g. Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes.	2570604
6.3	September 2021		Amended contacts and associated sections, e.g. Organisation Chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes such as removing Comprehensive Risk Assessments descriptions (2.9) and simplifying FODM role in Activation triggers (5.2.1) including removing para 5.2.2	2652748
6.4	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.	2717945
7.0	April 2023		Error corrections and other non-substantive changes to improve readability and useability. Incorporated global non-substantive EAP changes resulting from feedback from previous internal and external reviews. Amended to comply with the new Sunwater branding. The Chemical Hazard section has been removed as it is not a Dam Safety Hazard and is dealt with in other more relevant documents.	2717945
8.0	August 2023		Amendments to sections 2, 3.4, 5, and emergency action tables. Stand Up – 3 Flood operations amended to consider wave action. Appendix B1 drawing updated, along with updated inundation maps in Appendix B4. D/S notification list order clarified. Fatigue management section added. CRA 2022 added. External notifications list updated. Updated AWS message in EA Request form and added Annexe SMS Messages.	2804418
9.0	March 2024		Full Review pending expiry	2839036

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2	General Manager, Burnett & Lower Mary	Sunwater, Bundaberg		
3	Emergency Action Plan Coordinator	Sunwater, Brisbane		
4	Local Disaster Coordinator — Local Disaster Management Group (LDMG 1)	South Burnett Regional Council, Kingaroy		
5 Local Disaster Coordinator — Local Disaster Management Group (LDMG 2) North Burnett Regional Council, Gayndah				
NOTE: Communication information for each 'Controlled Copy Holder' is in Appendix A.				

Electronic document distribution list

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Position	Location	
District Disaster Coordinator — Gympie District Disaster Management Group (DDMG 1)	Police, Gympie	
District Disaster Coordinator — Bundaberg District Disaster Management Group (DDMG 2)	Police, Bundaberg	
Emergency Management Coordinator	Queensland Police Service,	
Officer in Charge – Proston Police	Police, Proston	
Officer in Charge – Mundubbera Police	Police, Mundubbera	
Officer in Charge – Murgon Police	Police, Murgon	
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
A	Water Supply (Safety and Reliability) Act 2008 (May 2020)	https://www.legislation.qld.gov.au/view/whole/pdf/inforce/current/act -2008-034
В	Emergency action plan for referable dam guideline (RDMW 2023)	https://www.resources.qld.gov.au/ data/assets/pdf file/0018/84015/ eap-guideline.pdf
С	Queensland State Disaster Management Plan 2023 (Queensland's Disaster Management Arrangements)	Queensland State Disaster Management Plan
D	Queensland Government arrangements for coordinating public information in a crisis	Queensland Government arrangements for coordinating public information in a crisis
E	Safety for the Development of Communication Education, Awareness and Engagement Programs (2010)	https://knowledge.aidr.org.au/media/1970/manual-45-guidelines-for- the-development-of-communication-education-awareness-and- engagement-programs.pdf
F	Queensland Emergency Alert Manual – M.1.174 (November 2022)	Queensland Emergency Alert Manual – M.1.174
G	Sunwater website — Emergency Action Plans, Flood Maps and Dam Emergency Sirens	https://www.sunwater.com.au/community/preparing-for-weather- events/emergency-management/
Н	Sunwater website — Emergency Notification Service	https://www.sunwater.com.au/community/preparing-for-weather- events/stay-informed/emergency-notification-service/
I	Professional Engineers Act 2002 (RPEQ) (September 2013)	https://www.legislation.qld.gov.au/view/pdf/inforce/2013-09-23/act- 2002-054
J	Referable Structures Standing Operating Procedure	SOP12 Dam Logbooks
к	Sunwater (internal) Strategic Event Procedure	Strategic Event Procedure
L	Sunwater (internal) Boondooma Dam Safety Condition Schedule	eDOCS# 15-009144/003
М	Queensland Disaster Management Act 2003 (December 2020)	https://www.legislation.qld.gov.au/view/pdf/inforce/current/act-2003-091
Ν	Queensland Disaster Management Guidelines	Prevention preparedness response and recovery disaster management guideline Disaster Management Queensland Government
0	Guidelines on Safety Assessments for Referable Dams (November 2023) Version 8	re <u>Guidelines on Safety Assessments for Referable Dams</u> (rdmw.qld.gov.au)
Р	Queensland Dam Safety Management Guidelines (RDMW February 2024)	https://www.dnrme.qld.gov.au/data/assets/pdf_file/0007/78838/da m-safety-management.pdf
Q	Australian Rainfall and Runoff (ARR) 2016	http://book.arr.org.au.s3-website-ap-southeast-2.amazonaws.com/
R	Sunwater (internal) Boondooma Dam Operation and Maintenance Manual	Boondooma Dam O&M Manual
S	Guidelines on Dam Safety Management (ANCOLD, 2003)	ANCOLD ISBN: 0-731027620
Т	Guidelines on Consequence Categories for Dams (ANCOLD, 2012)	ANCOLD ISBN: 978-0-9808192-5-0
U	Guideline for Failure Impact Assessment of Water Dams (DNRME 2018)	Guideline for failure impact assessment of water dams
V	Sunwater (internal) Emergency Alert Protocol	eDOCS# 2156253
W	Water Act 2000	https://www.legislation.qld.gov.au/view/pdf/inforce/current/act-2000- 034
Х	Boondooma Dam Failure Impact Assessment – Sunwater, June 2016	eDocs #2259939
Y	Queensland Rainfall and River Conditions (BOM-Flood Warning)	http://www.bom.gov.au/qld/flood/index.shtml?ref=hdr
Z	Comprehensive Risk Assessment (2022)	eDOCS# 2720038
AA	Fatigue Management Procedure WHS42 (Sunwater internal)	Fatigue Management Procedure

1.2 Abbreviations and acronyms

ABC	Australian Broadcasting Corporation	0&M	Operation & Maintenance
AEP	Annual Exceedance Probability	OB	Observation Bore
AHD	Australian Height Datum	OC	Operations Centre
AMTD	Adopted Mean Thread Distance	OCDO	Operations Centre Duty Officer
ANCOLD	Australian National Committee on	OM	Operator Maintainer
	Large Dams	OMGR	Operations Manager
AWS	Australian Warning System	OS	Operations Supervisor
BOM	Bureau of Meteorology	ORR	Owner's Regional Representative
CED	Chief Engineer Dams	PAR	Population at Risk
CEO	Chief Executive Officer	PDSE	Principal Dam Safety Engineer
CRA	Comprehensive Risk Assessment	PFRM	Predictive Flood Routing Model
CTG	Counter Terrorism Group	PLL	Probable Loss of Life
D/S	Downstream	PMF	Probable Maximum Flood
DCF	Dam Crest Flood	PMP	Probable Maximum Precipitation
DCL	Dam Crest Level	PMPF	Probable Maximum Precipitation
DDC	District Disaster Coordinator		Flood
DDMG	District Disaster Management Group	PWRE	Principal Water Resources Engineer
DDMP	District Disaster Management Plan	QDMC	Queensland Disaster Management
DDO	Dam Duty Officer		Committee
DDS	Director Dam Safety	QPS	Queensland Police Service
DSR	Dam Safety Regulator	RB	Right Bank
DSSC	Dam Safety Surveillance Coordinator	RC	Regional Council
DSTDM	Dam Safety Technical Decision Maker	RCC	Roller Compacted Concrete
EAP	Emergency Action Plan	RDMW	Department of Regional Development,
EA	Emergency Alert		Manufacturing and Water
EER	Emergency Event Report	ROC	Regional Operations Centre
EGMO	Executive General Manager	RPEQ	Registered Professional Engineer of
	Operations		Queensland
EGM E&WR	Executive General Manager	RSL	Reduced Supply Level
	Engineering & Water Resources	SCED	Senior Civil Engineer Dams
EL	Elevation Level	SCTN	Security and Counter Terrorism Network
FCL	Fixed Crest Level	SDCC	State Disaster Coordination Centre
FODM	Flood Operations Decision Maker	SDF	Sunny Day Failure
FSL	Full Supply Level	SDTE	Senior Dam Technical Engineer
GM	General Manager	SES	State Emergency Service
IC	Incident Coordinator	SMS	Short Message Service
IFHC	Incremental Flood Hazard Category	SMT	Sunwater Media Team
IGEM	Inspector-General Emergency	SO	Standby Operator
	Management	SOP	Standing Operating Procedure
LB	Left Bank	SRT	Strategic Response Team
LDC	Local Disaster Coordinator	SS	Storage Supervisor
LDMG	Local Disaster Management Group	SWL	Storage Water Level
LDMP	Local Disaster Management Plan	SWRE	Senior Water Resources Engineer
LEC	Local Event Coordinator	U/S	Upstream
MAP	Manager Asset Planning	WHS	Workplace Health & Safety
Max. OL	Maximum Operating Level	WQ	Water Quality
ME	Manager Environment		-
MM	Modified Mercalli		

1.3 Business terms and definitions

Term	Definition	
Terms defined	in accordance with the Water Supply (Safety and Reliability) Act 2008 (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.	
	• NOTE: Various dam failure modes have been referred to as <i>hazards</i> in this document e.g. piping, instability, and overtopping.	
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	Of a <i>district group</i> or local government, means the group's District Disaster Management Plan (DDMP) or local government's Local Disaster Management Plan (LDMP).	
District group	For an EAP, means a district group established under the Queensland Disaster Management Act 2003, (ref M), 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 two or more of the following relevant entities, is likely to be required; each local group and district group 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, (ref M), OR 	
	• an entity performing functions under the State Disaster Management Plan (ref C) may, under that plan, require the owner of the dam to give the entity information about the event.	
Local group	For an EAP, means a local group established under Queensland Disaster Management Act 2003, (ref M), 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> .	
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 Act, AND	
	• the assessment states the dam has, or the proposed dam after its construction will have, a category one or category two failure impact rating, AND	
	• the Chief Executive has, under section 349 of the Act, accepted the assessment.	
	Also, a dam is a referable dam if:	
	• Under section 342B of the 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 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, e.g. 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 <i>a dam hazard event or 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).	

Term	Definition	
Terms consistent with Queensland Disaster Management Guidelines (ref N)		
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 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.	
	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.	
	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.	
	There is no Stand Down equivalent in AWS warning levels.	
Bureau of Meteorology 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	The flood event that causes reservoir levels to reach the lowest point of non-overflow section of a dam.	
Dam crest flood	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 of 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 (additional structures such as spillways). 	

Term	Definition
Flood release	A flood release from a dam occurs when catchment inflows raise the storage level above the Full Supply Level (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	The flood resulting from the <i>probable maximum precipitation</i> coupled with the worst flood-producing catchment conditions that can be realistically expected in the prevailing meteorological conditions.
Probable maximum precipitation	The theoretical greatest depth of precipitation for a given duration that is physically possible over a particular drainage basin.
Probable maximum precipitation flood	The flood resulting from the <i>probable maximum precipitation</i> 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	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 *Water Supply (Safety and Reliability) Act 2008* (ref A), (the 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 Act. The content requirements for EAPs are contained in section 352H of the Act.

Summary of legal requirements – Section 352H

Section 352H (1) of the 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 or piping risk):

- identify the area likely to be affected by a dam hazard event or emergency event arising from the dam hazard.
- identify each circumstance that indicates a material increase in the likelihood of the dam hazard event or emergency event happening.
- 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.
- 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.
- 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 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 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 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 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 Boondooma Dam has been assessed as **South Burnett Regional Council (SBRC) and North Burnett Regional Council (NBRC)**. Sunwater has provided the **SBRC and NBRC** with a copy of the draft EAP for assessment.

Section 352HC of the Act states that a district group may review the EAP for consistency with its disaster management plan. The district group for Boondooma Dam is **Gympie and Bundaberg Police District Disaster Management Group (DDMGs)**. Sunwater has provided the DDMGs with a copy of the draft EAP for review.

NOTE: Sunwater has attempted to write the EAP to cope with all reasonably foreseeable emergency situations. However, there is considerable uncertainty about how any emergency situation 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:

- enable the dam owner and the LDMG to respond to dam hazard events or dam emergency events in a timely and effective manner.
- minimise the risk of harm to persons or property if a dam hazard event or dam emergency event for the dam happens.
- identify dam hazards that could occur at Boondooma Dam and the area likely to be affected for each hazard.
- 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 Boondooma Dam at the one 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 Boondooma 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 developed to be consistent with and support the objectives of the South Burnett and North Burnett Local Disaster Management Plans (LDMP) and is a sub-plan of the LDMP.

2.3 Scope

The Boondooma 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 and/or emergency event happening
- triggers for activation of a tiered response to 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 training

Training of the use and implementation of this EAP document is carried out at various times throughout the year. Specific pre-wet season training is undertaken leading up to the wet season. 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 training is presented to relevant Sunwater staff (DDO's, LECs and ICs) and disaster management stakeholders. DSTDM and FODM information sessions are carried out once a year with the same walkthrough of new changes and Q&A (not specific to any one dam). New Sunwater employees in these various roles also have a walkthrough of the EAP.

NOTE: All enquiries regarding EAP training should be directed to

Sunwater works 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 (EAs). The test results relating to numbers of alerts generated will be shared with local authority and disaster management stakeholders.

2.5 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 2.6).

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, the Sunwater web page (sunwater.com.au), Sunwater App

(<u>sunwater.com.au/community/sunwater-app/</u>) and at several show/field days across regional Queensland where Sunwater may have stalls and information available.

Notifiable D/S residents are also provided information in text messages, phone calls and emails 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 Police Service (QPS) at the SDCC. The process Sunwater follows is documented in Appendix A8.

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

2.6 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.

2.7 Fatigue Management Plan

Sunwater has a Fatigue Management Procedure (ref AA). 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.

2.8 Dam hazard management within Sunwater

The Sunwater emergency management framework generally utilises the organisation's hierarchy and in-house experts as illustrated in Figure 1 below.





Key aspects of the dam hazard management framework are:

- 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 (ref I).

3. Dam details

3.1 General dam information

Location: The Boondooma Dam is located on Boyne River at AMTD 86.7 km. The dam is situated where Sandy Creek enters the Boyne River.

Purpose: The purpose of Boondooma Dam is to supply water to Tarong Power Station.

Construction: Boondooma Dam was built in 1983 and consists of two concrete-faced, rock-fill embankments built on Boyne River and Sandy Creek. The spillway is located away from the embankments and is situated at the left of both embankments.

Specification: Table 3 below lists general specifications of Boondooma Dam. All elevations listed are in Australian Height Datum (AHD).

Table 3: Boondooma Dam specifications

Description	Specification
Main Dam	Concrete faced, rock-fill embankment
Full Supply Level (FSL)	EL 280.40 m
Dam Crest Level (DCL)	EL 295.50 m
Top of dam crest wall	EL 296.70 m
Dam length across crest (m)	310 m
Dam height above original stream bed	63 m
Storage capacity at FSL	204,200 ML
Storage area at FSL	1,815 ha
Catchment area	4,147 km ²
Main Embankment	Boyne River
Historical recorded max storage – Jan 2013	EL 286.56 m (Note: First filling conditions will apply above this level*)
Dam Crest Level Flood	1 in 77,500 AEP (interpolated CRA 2022)
Spillway	Uncontrolled concrete ogee crest
Spillway Spillway discharge capacity at DCF	Uncontrolled concrete ogee crest 14,300 m ³ /s
Spillway Spillway discharge capacity at DCF Spillway crest level	Uncontrolled concrete ogee crest 14,300 m ³ /s EL 280.40 m (FSL)
Spillway Spillway discharge capacity at DCF Spillway crest level Maximum Spillway depth at DCF	Uncontrolled concrete ogee crest 14,300 m ³ /s EL 280.40 m (FSL) 16.3 m
Spillway Spillway discharge capacity at DCF Spillway crest level Maximum Spillway depth at DCF Spillway crest length	Uncontrolled concrete ogee crest 14,300 m³/s EL 280.40 m (FSL) 16.3 m 115 m
Spillway Spillway discharge capacity at DCF Spillway crest level Maximum Spillway depth at DCF Spillway crest length Sandy Creek Embankment (Saddle Dam)	Uncontrolled concrete ogee crest 14,300 m ³ /s EL 280.40 m (FSL) 16.3 m 115 m Concrete faced, rock-fill embankment
Spillway Spillway discharge capacity at DCF Spillway crest level Maximum Spillway depth at DCF Spillway crest length Sandy Creek Embankment (Saddle Dam) Dam Crest Level (DCL)	Uncontrolled concrete ogee crest14,300 m³/sEL 280.40 m (FSL)16.3 m115 mConcrete faced, rock-fill embankmentEL 295.5 m
Spillway Spillway discharge capacity at DCF Spillway crest level Maximum Spillway depth at DCF Spillway crest length Sandy Creek Embankment (Saddle Dam) Dam Crest Level (DCL) Top of dam crest wall (wave wall)	Uncontrolled concrete ogee crest14,300 m³/sEL 280.40 m (FSL)16.3 m115 mConcrete faced, rock-fill embankmentEL 295.5 mEL 296.7 m
Spillway Spillway discharge capacity at DCF Spillway crest level Maximum Spillway depth at DCF Spillway crest length Sandy Creek Embankment (Saddle Dam) Dam Crest Level (DCL) Top of dam crest wall (wave wall) Length along crest	Uncontrolled concrete ogee crest 14,300 m ³ /s EL 280.40 m (FSL) 16.3 m 115 m Concrete faced, rock-fill embankment EL 295.5 m EL 296.7 m 260 m (approx.)
Spillway Spillway discharge capacity at DCF Spillway crest level Maximum Spillway depth at DCF Spillway crest length Sandy Creek Embankment (Saddle Dam) Dam Crest Level (DCL) Top of dam crest wall (wave wall) Length along crest Maximum height above original stream bed	Uncontrolled concrete ogee crest 14,300 m³/s EL 280.40 m (FSL) 16.3 m 115 m Concrete faced, rock-fill embankment EL 295.5 m EL 296.7 m 260 m (approx.) 40.55 m
Spillway Spillway discharge capacity at DCF Spillway crest level Maximum Spillway depth at DCF Spillway crest length Sandy Creek Embankment (Saddle Dam) Dam Crest Level (DCL) Top of dam crest wall (wave wall) Length along crest Maximum height above original stream bed	Uncontrolled concrete ogee crest 14,300 m³/s EL 280.40 m (FSL) 16.3 m 115 m Concrete faced, rock-fill embankment EL 295.5 m EL 296.7 m 260 m (approx.) 40.55 m
Spillway Spillway discharge capacity at DCF Spillway crest level Maximum Spillway depth at DCF Spillway crest length Sandy Creek Embankment (Saddle Dam) Dam Crest Level (DCL) Top of dam crest wall (wave wall) Length along crest Maximum height above original stream bed Outlet River Outlet works	Uncontrolled concrete ogee crest 14,300 m ³ /s EL 280.40 m (FSL) 16.3 m 115 m Concrete faced, rock-fill embankment EL 295.5 m EL 295.7 m 260 m (approx.) 40.55 m Works 2/1200 mm concrete-lined mild steel pipe, with 2/750 mm regulating valves, and 2/1200 mm butterfly valves

*First-filling conditions are when the storage level is above the historical maximum and is rising at a rate of rise equal to or greater than 300mm/d. The dam should be inspected at 4-hourly intervals.

3.2 Population at risk

Total Population at Risk (PAR) Downstream of Boondooma Dam as per the 2022 Consequence Assessment is:

- Flood Overtopping of 33,792 (5,919 incremental) including cascade failure of Paradise Dam. Refer to the Paradise Dam EAP for further information impacts downstream of Paradise Dam.
- Flood Overtopping of 3,920 (827 incremental) without cascade failure of Paradise Dam.
- Sunny Day of 31.

Additional information on the hydrology, hydraulics and dam failure studies is available upon request to Sunwater.

3.3 Inspections and monitoring

The Boondooma 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 hazards, as soon as it begins to develop, or becomes apparent, the following is applicable to Boondooma Dam.

3.3.1 Inspections

- Routine Visual Inspection: Conducted as per the ANCOLD guidelines or as directed by the DSTDM
- Detailed Inspection: Conducted annually
- Comprehensive Inspection: Conducted five-yearly.

4. Roles and responsibilities

	Roles and responsibilities	Position holder
Ow	/ner (Sunwater)	
•	Liaise with the Board and Minister.	
•	Execute Sunwater Strategic Event Procedure (ref K) and Business Continuity Plans, if required.	
•	Ensure necessary resources are available to manage any dam hazard and emergency event.	
•	Maintain an up-to-date list of notifiable D/S residents (Appendix A4) of Boondooma Dam. The downstream limit is indicated in the drawing in Appendix B by the zone labelled Limit of downstream notification area.	
•	At all times, aim to provide timely advice and support to the Local Disaster Management Groups (LDMG) in the affected local government areas and the District Disaster Management Groups (DDMG) in the affected disaster districts.	CEO EGMO
•	During a dam hazard emergency event that occurs with little or no warning, undertake the following actions to ensure the community is informed as soon as possible:	EGM E&WR
	o notify the residents listed in Appendix A via SMS.	
	 contact the SDCC to request an Emergency Alert campaign as detailed in the emergency alert request and threat direction polygon 	
•	Where a dam hazard event occurs with adequate time to warn downstream residents, notify the residents listed in the EAP via SMS unless otherwise agreed with the LDMGs .	
•	Record communications, notifications and observations as required.	
Stra	ategic Response Team (SRT)	
•	Facilitate the assessment, escalation and notification and management of strategic response and recovery for a high or extreme risk, or impact, event. Responsible for the following key activities:	
	o initial and ongoing assessment of event status and requirements	
	o development, and revision of, strategic objectives based on requirements	Various ELT members
	o identifying, managing, and monitoring strategic risks	as per SRT roster
	o monitor media and stakeholder/customer impacts	
	 managing/overseeing event communications including media, stakeholder, customer and internal communications. 	
•	Record communications, notifications and observations as required.	
Ow	ner's Head Office Representative	
•	Authorise the issuing of EAPs, SOPs and O&M Manuals and amendments.	
•	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.	
•	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.	GM Asset Integrity
•	Ensure requirements of the Dam Condition Schedule (ref L) are met.	
•	Ensure the work instructions are correct and the Logbooks, SOPs, Data Books and EAPs are reviewed annually as per the Dam Condition Schedule (ref L)	GM Asset Management
•	Undertake and prepare the 5 yearly Comprehensive Inspection Reports with suitably qualified personnel within the time specified in the Dam Condition Schedule (ref L) 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 (ref L) 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.	

Roles and responsibilities	Position holder
 Owner's Regional Representative (ORR) Liaise with the Storage Supervisor/Operator Maintainer. Arrange dam specific training and accreditation for relevant staff. Ensure competent, trained and accredited personnel operate the storages. 	GM Burnett and Lower
 Undertake the role of LEC as required: liaise with the Local Disaster Coordinator (LDC) 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. 	OS
 Technical Advisor Analyse the situation and provide expert technical advice. Discuss issues with peers and other technical experts and make sound decisions to mitigate the ri Determine response to incidents and emerging issues. Record communications, notifications and observations as required. 	isk GM Environment
 Dam Safety Technical Decision Maker (DSTDM) Maintain current RPEQ accreditation. Analyse the situation and provide expert technical advice in relation to Dam Safety. Discuss dam hazards with peers and other technical experts and make sound decisions to reduce Determine response to dam safety incidents and emerging issues. Issue warning on dam failure and advise on potential remedial measures. Liaise with DSR as required. Ensure the EAP is implemented appropriately from a dam safety perspective and carry out the DS as required. Record communications, notifications and observations as required. 	the risk. Various personnel as per DSTDM roster
 Flood Operations Decision Maker (FODM) Maintain current RPEQ accreditation. Provide hydrological advice in relation to predicted and actual dam outflows including assessmen weather and flood warnings and other related matters as identified in the OC Procedure (Sunwat internal). Interpret and apply rainfall data in accordance with the OC Procedure, including, as required und Procedure, liaising with BOM. Ensure the EAP is implemented appropriately and carry out the FODM role as required. Record communications, notifications and observations as required. 	nt of ter Various personnel as per FODM roster
 Sunwater Media Team (SMT) Analyse sensitive issues, discuss with the Owner, and issue media releases. Handle public and customer comments (including social media) and advise the Owner if necessar Liaise with the IC and update QDMC of flood events. Record communications, notifications and observations as required. 	y. Various personnel as per Media Team roster
 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

Emergency Action Plan

Roles and responsibilities	Position holder
Local Event Coordinator (LEC) Refer to ORR role. 	Various personnel as per LEC roster
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.	SS
 Take direction from the DSTDM and IC as requested. Arrange immediate site inspection and make informed assessment of the situation. 	OM
 Escalate any issue not covered in the EAP or where actions are not clear. Record communications, notifications and observations as required. 	
Councils Councils have legislated local government functions, as per Section 80 of the Queensland Disaster Management Act 2003 (ref M).	
 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 (ref M).	
 And as per Section 352HB of the Act: <i>Must</i> 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	Local Police
evacuation of persons if required	
control of essential traffic	
security of specific area.	

		Roles and responsibilities	Position holder
Disa Ma	ister nage		
LDN	1G		
	0	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.	
	0	Work with councils and Sunwater to ensure the EAP is regularly exercised.	
	0	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.	
	0	During a dam hazard/emergency event, providing they are Stood Up, the LDMGs in the affected local government areas will take the lead role in notifying the broader community.	LDMG
	0	Identify and provide advice to the relevant DDMGs about support services required by the LDMG to manage an EAP event.	QPS
	0	Provide reports and make recommendations to the relevant DDMGs about matters relating to EAP events.	DDMG
•	QP	S	SCTN Coordinator
	0	Work with dam owner and LDMGs to ensure Emergency Alert polygons are prepared, stored, and tested at the State Disaster Coordination Centre.	
•	DD	MG	
	0	May review the EAP for consistency with the DDMP.	
•	SCT	N (Security and Counter Terrorism Network) Coordinator	
	0	Identifies Areas of Concern during the preparation of disaster plans and provides advice during counter terrorism emergency events	
Dar	n Sat	fety Regulator (DSR)	
•	Liai	se with relevant Minister on necessary actions.	556
•	Ap	prove this document as required under legislation.	DDS
•	Liai	se with Chief Executive as required in administering (regulating) the 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 Boondooma Dam to Full Supply Level (FSL) 280.40m, the spillway will then discharge water downstream into the Boyne River. These flood flows can create a dam hazard event. Inflows will also cause the storage to temporarily rise to above the FSL of the storage. 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
 - o 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 Action 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 the Boyne River and other infrastructure in the river such as pump sites
- When the storage height exceeds major flood level (2.60 m over the spillway) EL 283.00 m, 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.

Table 4 below shows flood classification triggers as defined by the Bureau of Meteorology (BOM) at Boondooma Dam.

	Flood level classification	Depth over spillway (m)	Storage elevation (m AHD)
MAJOR 9 8 7 6 6 8 7 8 7 8 7 8 7 8 8 7 8 8 8 7 8 8 9 9 8 9 8 9 8 9 8 9 10 9 10 9 10 10 10 10 10 10 10 10 10 10	Major	2.60	283.00
MODERATE 5 Crops and Grazing 4 MINOR 2	Moderate	2.10	282.50
Below Minor Example of Flood Level Classification	Minor	1.50	281.90

Table 4: Flood classification triggers

Table 5 below depicts historical floods experienced at Boondooma Dam.

Table 5: Historical floods experienced at Boondooma Dam

Flood rank	Date	Peak height EL	Peak height (m over spillway)
1	January 2013	286.56 m	6.16 m
2	January 2011	284.10m	3.70m
3	March 2013	282.74m	2.34m
4	July 1984	281.67m	1.27m
5	July 2022	281.64m	1.24m

Detailed information on downstream flood impacts is presented in Appendix B.

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

In respect of forecast rainfall, as is identified in the roles and responsibilities of the FODM, regard must be had to the OC Procedure (Sunwater internal).

 Table 6: Flood emergency activation trigger summary

EAP Flood Activation Trigger	Trigger Summary	AWS Warning Level
Alert	• Storage EL 280.30 m and rising (0.1 m below FSL)	
Lean Forward	• Storage above FSL 280.40 m	ADVICE
Stand Up 1 — Moderate flooding	 Storage above EL 282.50 m (Moderate flood classification level) 	
Stand Up 2 — Greater than flood of record	 Storage above EL 286.56 m (Flood of record January 2013) 	WATCH AND ACT
Stand Up 3 — Dam Crest Level (inc. wave wall)	 Storage above EL 296.70 m (allowing for Wave Action), OR As advised by DSTDM 	EMERGENCY
Stand Down	• Storage EL 280.50 m and falling with no forecast increase in EL	

While this EAP is not triggered until Boondooma Dam reaches a level of EL 280.30 m AHD, Sunwater, the South Burnett Regional Council and the North Burnett Regional Council LDMGs 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.

The activation of Stand Up 3 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 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 action roles

Table 7 to Table 12 specify emergency actions for the following roles:

- Dam Duty Officer (DDO)
- Local Event Coordinator (LEC)
- Incident Coordinator (IC)
- Dam Safety Technical Decision Maker (DSTDM)
- Flood Operations Decision Maker (FODM).

Table 7: Flood operations — DDO emergency action								
Activation level	Alert	Lean Forward	Stand Up 1 — Moderate flood level	Stand Up 2 — Greater than flood of record	Stand Up 3 — Dam Crest Level (inc. wave wall)	Stand Down		
Activation trigger	 Storage EL 280.30 m and rising (0.1 m below FSL) 	• Storage above FSL 280.40 m	• Storage above EL 282.50 m	• Storage above EL 286.56 m	 Storage above EL 296.70 m (allowing for Wave Action), OR As advised by DSTDM 	• Storage EL 280.50 m and falling with no forecast increase in EL		
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 DSTDM and IC Undertake site preparations including but not limited to checking (if not already): fuel and operation of backup generator communication systems (including backup radio, satellite phones, and internet) Record the Storage Level daily (or as instructed by the DSTDM) using gauge boards and confirm accuracy of gauging station Record rainfall daily Update Dam Logbook as per SOP 12 	 As per previous activation level, AND Continue to inspect the dam daily (or as instructed by the DSTDM) and photograph/video and record using the approved forms and send to DSTDM and IC with particular attention to: visual inspection of flow patterns over spillway and dissipator for evidence of scouring inspect embankment for leaks, deformation, and slumping obvious signs of seepage Report readings or observations to the DSTDM and IC as soon as practical 	 As per previous activation level, AND Inspect the dam twice daily (or as instructed by the DSTDM) and photograph/video and record using the approved forms and send to DSTDM and IC Monitor and record river height at the tailwater gauge twice daily (or as requested) Read dam instrumentation daily (or as instructed by the DSTDM) NOTE: Sandy Creek Saddle Dam is to be monitored at same frequency as Main Dam 	 As per previous activation level, AND Inspect the dam 6- hourly (or as instructed by the DSTDM) and photograph/video and record using the approved forms and send to DSTDM and IC 	 As per previous activation level, AND Remotely inspect the dam four times daily (or as instructed by the DSTDM) and photograph/video and record using the approved forms and send to DSTDM and IC Frequently photograph the discharge areas, and after overtopping of the downstream abutment 	 Inspect the dam for any damage and photograph any damage identified during the event Forward all EER material to IC email as required Update Dam Logbook as per SOP 12 Return to routine surveillance activities and frequencies 		
Notifications	 IC SO DSTDM LEC 	 IC SO DSTDM LEC Camp Manager 	 IC SO DSTDM LEC Camp Manager 	 IC SO DSTDM LEC Camp Manager 	 IC SO DSTDM LEC Camp Manager 	 Inform all previously notified contacts of stand down. 		
AWS Warning Level		ADVICE	WATCH	AND ACT	EMERGENCY			

Table 8: Flood operations — LEC emergency action									
Activation Level	Alert	Lean Forward	Stand Up 1 — Moderate flood level	Stand Up 2 — Greater than flood of record	Stand Up 3 — Dam Crest Level (inc. wave wall)	Stand Down			
Activation Trigger	• Storage EL 280.30 m and rising (0.1 m below FSL)	• Storage above FSL 280.40 m	• Storage above EL 282.50 m	• Storage above EL 286.56 m	 Storage above EL 296.70 m (allowing for wave action), OR As advised by DSTDM 	 Storage EL 280.50 m and falling with no forecast increase in EL 			
Actions	 Record all communication Develop/implement staff roster Note: IC to carry out LEC actions unless LDMG is Stood Up 	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level	 Forward all EER material to IC email as required Return to routine activities 			
Notifications	 DDO IC LDMG 1 LDMG 2 	 DDO IC LDMG 1 LDMG 2 	 DDO IC LDMG 1 LDMG 2 	 DDO IC LDMG 1 LDMG 2 	 DDO IC LDMG 1 LDMG 2 	 Inform all previously notified contacts of stand down. 			
AWS Warning Level		ADVICE	WATCH AND ACT		EMERGENCY				

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

Table 9: Flood operations — IC emergency action								
Activation level	Alert	Lean Forward	Stand Up 1 — Moderate flood level	Stand Up 2 — Greater than flood of record	Stand Up 3 — Dam Crest Level (inc. wave wall)	Stand Down		
Activation trigger	 Storage EL 280.30 m and rising (0.1 m below FSL) 	• Storage above FSL 280.40 m	 Storage above EL 282.50 m 	 Storage above EL 286.56 m 	 Storage above EL 296.70 m (allowing for wave action), OR As advised by DSTDM 	 Storage EL 280.50 m and falling with no forecast increase in EL 		
Actions	 Record all communication Liaise with Sunwater Media on-call, LDMGs, FODM and/or DSTM to send appropriate messaging and email D/S residents and phone those without mobiles Obtain catchment conditions from the DDO Create Incident Report record Update Sunwater intranet with EAP status 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 Consider the need to appoint a Sunwater Recovery Coordinator. The Sunwater Recovery Coordinator is responsible for the follow through on actions to close out all matters and works outstanding after the initial emergency is over. Confirm EAs and other messages are prepared in advance – if required. 	As per previous activation level	As per previous activation level	 As per previous activation level, AND IC to trigger Paradise Dam EAP for flows over secondary spillway 	 Deactivate EAP Complete all notifications Compile EER and deliver to DSR if required Close Incident Report record Update Sunwater intranet with EAP status Return to routine activities 		
Notifications	 FODM DDO LEC/ORR DSTDM SMT D/S Residents LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS SRT 	 FODM DDO LEC/ORR DSTDM SMT D/S Residents LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS SRT 	 FODM DDO LEC/ORR DSTDM SMT D/S Residents LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS SRT 	 FODM DDO LEC/ORR DSTDM SMT D/S Residents LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS SRT 	 FODM DDO LEC/ORR DSTDM SMT D/S Residents SDCC LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS SRT 	 Inform all previously notified contacts of stand down. The SDCC does not require notification. 		
AWS Warning Level		ADVICE	WATCH	AND ACT	EMERGENCY			

Table 10: Flood operations — LEC and IC external communication plan						
Activation Level	Trigger for Communications	Group to Contact	Method	Message Text	AWS Warning Level	
Alert	 Storage EL 280.30 m and rising (preparedness) 	 D/S Residents LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS 	 SMS Email Phone (for those without mobiles) Phone 	 Liaise with Sunwater Media on-call, LDMGs, FODM and/or DSTM to send appropriate messaging. Refer to Annexe for sample message. Describe current situation with dam — What is the event? What is the status? Advise of current storage level 		
Lean Forward • QPS • Storage above FSL 280.40 m • D/S Residents • SMS • Email • Phone (for those witho mobiles) • LDMG 1 • Phone		 SMS Email Phone (for those without mobiles) Phone 	 Liaise with Sunwater Media on-call, LDMGs, FODM and/or DSTM to send appropriate messaging. Refer to Annexe for sample message. Describe current situation with dam — What is the event? 	ADVICE		
		 LDMG 2 DDMG 1 DDMG 2 QPS 		 What is the status? Advise of current storage level and whether any flood releases are due to commence Discuss any potential road/bridge closures 		
Stand Up 1 – Moderate Flood Level	 Storage above EL 282.50 m 	D/S Residents	 SMS Email Phone (for those <u>without</u> mobiles) 	 Liaise with Sunwater Media on-call, LDMGs, FODM and/or DSTM to send appropriate messaging. Refer to Annexe for sample message. 		
		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS 	• Phone	 Describe current situation with dam — What is the event? What is the status? (storage is greater than moderate flood level) Advise of current storage level Advise of any forecasts you are aware of 	WATCH AND ACT	
Stand Up 2 – Greater than flood of record	 Storage above EL 286.56 m 	D/S Residents	 SMS Email Phone (for those without mobiles) 	 Liaise with Sunwater Media on-call, LDMGs, FODM and/or DSTM to send appropriate messaging. Refer to Annexe for sample message. 		
		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS 	• 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 Advise of any forecasts you are aware of 		

Table 10: Flood operations — LEC and IC external communication plan						
Activation Level	Trigger for Communications	Group to Contact	Method	Message Text	AWS Warning Level	
	 Storage above EL 296.70 m (allowing for wave action), OR As advised by DSTDM 	D/S Residents	 SMS Email Phone (for those <u>without</u> mobiles) 	 Liaise with Sunwater Media on-call, LDMGs, FODM and/or DSTM to send appropriate messaging. Refer to Annexe for sample message. 		
Stand Up 3 – Dam Failure Likely		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS 	• Phone	 Describe current situation with dam — What is the event? What is the status? (Dam Failure Likely) Advise of current storage level Advise of any forecasts you are aware of 	EMERGENCY	
		SDCC	• Phone	 Complete Emergency Alert Request Form as per instructions (copies in Appendix A8) and email to the SDCC to send to D/S Residents. 		
	 Storage EL 280.50 m and falling with no forecast increase in EL 	• D/S Residents	 SMS Email Phone (for those without mobiles) 	 Liaise with Sunwater Media on-call, LDMGs, FODM and/or DSTM to send appropriate messaging. Refer to Annexe for sample message. 		
Stand Down		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS 	• Phone	 Describe current situation with dam — What is the event? What is the status? Advise of current storage level Advise EAP has been deactivated 		

Table 11: Flood operations — DSTDM emergency action									
Activation level	Alert	Lean Forward	Stand Up 1 — Moderate flood level	Stand Up 2 — Greater than flood of record	Stand Up 3 — Dam Crest Level (inc. wave wall)	Stand Down			
Activation trigger	 Storage EL 280.30 m and rising (0.1 m below FSL) 	 Storage above FSL 280.40 m 	• Storage above EL 282.50 m	• Storage above EL 286.56 m	 Storage above EL 296.70 m (Allowing for Wave Action), OR As advised by DSTDM 	 Storage EL 280.50 m and falling with no forecast increase in EL 			
Action	 Record all communication Provide technical advice to DDO and IC on a need's basis Review surveillance reports and determine if any additional responses are required (i.e., make assessment on likely impacts to Paradise Dam) Review instrumentation data and determine if any additional responses are required Advise DSR of EAP activation 	As per previous activation level	As per previous activation level	• As per previous activation level	As per previous activation level	 Forward all EER material to IC email as required Return to routine activities 			
Notifications	ICDDODSR	ICDDODSR	ICDDODSR	ICDDODSR	 IC DDO DSR CEO – if time permits 	 Inform all previously notified contacts of stand down. 			
AWS Warning Level		ADVICE	WATCH /	AND ACT	EMERGENCY				

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

Table 12: Flood operations — FODM emergency action								
Activation level	Alert	Lean Forward	Stand Up 1 — Moderate flood level	Stand Up 2 — Greater than flood of record	Stand Up 3 — Dam Crest Level (inc. wave wall)	Stand Down		
Activation trigger	• Storage EL 280.30 m and rising (0.1 m below FSL)	• Storage above FSL 280.40 m	 Storage above EL 282.50 m 	Storage above EL 286.56 m	 Storage above EL 296.70 m (allowing for wave action), OR As advised by DSTDM 	• Storage EL 280.50 m and falling with no forecast increase in EL		
Action	 Record all communication Extract relevant data from available sources Update flood models as per OC Procedure (Sunwater internal) Update and issue flood operations report Update DSTDM and IC re: current flood situation and PFRM results 	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level	 Forward all EER material to IC email as required Return to routine activities 		
Notifications	ICDSTDMBOM	ICDSTDMBOM	ICDSTDMBOM	ICDSTDMBOM	ICDSTDMBOM	 Inform all previously notified contacts of stand down. 		
AWS Warning Level		ADVICE	WATCH	AND ACT	EMERGENCY			

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

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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. Due to the rockfill nature of the embankment, seepage may also be clear yet still could indicate a potential issue.

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 B 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 Sunny Day Failure (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 Probable Maximum Flood (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.

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 occurrence 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. Cloudy water may also not be present, yet seepage still indicates a potential issue.

6.2 Emergency action roles

Table 13 to Table 17 specify emergency actions for the following roles:

- Dam Duty Officer (DDO)
- Local Event Coordinator (LEC)
- Incident Coordinator (IC)
- Dam Safety Technical Decision Maker (DSTDM).

Risk reduced: No

Figure 2: Piping: embankment, foundation, or abutments flowchart



Table 13: Piping: embankment, foundation, or abutments — DDO emergency action							
Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down		
Activation trigger	 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 	 Failure underway 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	 Record all communication Monitor flows every 6 hours (or as otherwise instructed by the DSTDM) Photograph/video the piping from a safe point and record using approved forms and send to DSTDM and IC Update Dam Logbook as per SOP 12 	As per previous activation level	 As per previous activation level, AND Support/supervise remedial works as required Close any affected roads as 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 Vacate the immediate vicinity of the piping condition 	 Inspect the dam for any damage and photograph any damage identified during the event Forward all EER material to IC email as required Update Dam Logbook as per SOP 12 Return to routine surveillance activities and frequencies 		
Notifications	 DSTDM IC SO LEC 	 DSTDM IC SO LEC 	 DSTDM IC SO LEC 	 DSTDM IC SO LEC 	 Inform all previously notified contacts of stand down 		

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Table 14: 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 an embankment, the foundations, or abutments 	 Increasing leakage through an embankment, the foundations, or abutments WITH cloudy water 	 Piping condition has been established 	 Failure underway 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	 Record all communication 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 relevant council(s) regarding potential road/bridge closures 	As per previous activation level	 Forward all EER material to IC email as required Return to routine activities 		
Notifications	 DDO IC LDMG 1 LDMG 2 	 DDO IC LDMG 1 LDMG 2 	 DDO IC LDMG 1 LDMG 2 	 DDO IC LDMG 1 LDMG 2 	 Inform all previously notified contacts of stand down 		

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

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Table 15: Piping: embankment, foundation, or abutments — IC emergency action								
Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down			
Activation trigger	 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 	 Failure underway 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	 Record all communication Create Incident Report record Update Sunwater intranet with EAP status Note: IC to carry out LEC actions unless LDMG is Stood Up 	 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 Sunwater Recovery Coordinator. The Sunwater 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. Confirm EAs and other messages are prepared in advance – if required. 	 As per previous activation level, AND Mobilise resources to undertake remedial works if directed by DSTDM 	 As per previous activation level, AND IC to trigger Paradise EAP for flows over secondary spillway 	 Deactivate EAP Complete all notifications Compile EER and deliver to DSR if required Close out Incident Report record Update Sunwater intranet with EAP status Return to routine activities 			
Notifications	 DSTDM DDO LEC/ORR SMT SRT 	 DSTDM DDO LEC/ORR SMT SRT DDMG 1 DDMG 2 QPS 	 D/S Residents SDCC DDMG 1 DDMG 2 DSTDM DDO LEC/ORR SMT SRT 	 D/S Residents SDCC DDMG 1 DDMG 2 DSTDM DDO LEC/ORR SMT SRT 	 Inform all previously notified contacts of stand down. The SDCC does not require notification. 			

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

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Table 16: 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 1LDMG 2	• 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 information 		
Lean Forward	 Increasing leakage through an embankment, the foundations, or abutments with cloudy water 	 LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS 	• 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 information 		
	 Piping condition has been established 	D/S Residents	 SMS Email Phone (for those without mobiles) 	 Liaise with Sunwater Media on-call, LDMGs and/or DSTM to send appropriate message. Refer to Annexe for sample message. 		
Stand Up 1		• SDCC	• Email & Phone	 Complete Emergency Alert Request Form as per instructions (copies in Appendix A8) and email to the SDCC to send. Develop messages in consultation with DSTDM 		
		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS 	• 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 		
	 Failure likely due to piping; AND Sufficient water in storage to croate a dam bazard 	• D/S Residents	 SMS Phone (for those without mobiles) 	 Liaise with Sunwater Media on-call, LDMGs and/or DSTM to send appropriate messaging. Refer to Annexe for sample message. 		
		• SDCC	Email & Phone	 Complete Emergency Alert Request Form as per instructions (copies in Appendix A8) and email to the SDCC to send. 		
Stand Up — 2		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS 	• 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 		
	Dam failure underway	D/S Residents	 SMS Phone (for those without mobiles) 	 Liaise with Sunwater Media on-call, LDMGs and/or DSTM to send appropriate messaging. Refer to Annexe for sample message. 		
		• SDCC	 Email & Phone 	 Complete Emergency Alert Request Form as per instructions (copies in Appendix A8) and email to the SDCC to send. 		
		LDMG 1 LDMG 2 DDMG 1 DDMG 2	• Phone	 Describe current situation with dam — What is the event? (Confirmed piping risk) What is the status? (Dam Failure Underway) Advise of current storage level Coordinate evaluations of affected downstream recidents and move people to higher ground 		
				Coordinate evaluations of affected downstream residents and move people to higher ground		

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Table 16: Piping: embankment, foundation, or abutments — LEC and IC external communication plan							
Activation level	Trigger for communications	Group to contact	Method	Message text			
	 Risk assessment has determined that failure risk has reduced 	D/S residents	 SMS Phone (for those without mobiles) 	 Liaise with Sunwater Media on-call, LDMGs and/or DSTM to send appropriate messaging. Refer to Annexe for sample message. 			
Stand Down		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS 	• 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 piping risk has reduced, and EAP has been deactivated 			

Emergency Action Plan

Table 17: Piping: embankment, foundation, or abutments — DSTDM emergency action								
Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down			
Activation trigger	 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 	 Failure underway 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	 Record all communication 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 	As per previous activation level	 As per previous activation level, AND Assess risk and determine if failure likely or in progress Determine if remedial repairs are practical Determine if risks can be reduced by lowering storage Supervise remedial repairs (if applicable). Supervise means to provide technical oversight to the work. It does not necessarily mean on-site supervision. 	 As per previous activation level, AND Liaise with the IC and LEC and advise on need to recommend evacuations Make assessment on likely impacts to Paradise Dam 	 Forward all EER material to IC email as required Return to routine activities 			
Notifications	DDOICDSR	 DDO IC DSR 	 DDO IC LEC/ORR DSR 	 DDO IC LEC/ORR DSR CEO – if time permits 	 Inform all previously notified contacts of stand down 			

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

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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. Damage could take the form of cracking or slumping of the embankment, deformation or land slip, or increased seepage.

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 B are there to provide indicative outlines of the maximum potentially affected area of a dam hazard caused by earthquake damage. 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 damage 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 damage and concurrent flooding or downstream releases are occurring or expected to occur.

7.2 Emergency action roles

Table 18 to Table 22 specify emergency actions for the following roles:

- Dam Duty Officer (DDO)
- Local Event Coordinator (LEC)
- Incident Coordinator (IC)
- Dam Safety Technical Decision Maker (DSTDM).

Earthquake



Table 18: Earthquake — DDO emergency action								
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 underway 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	 DDO to assess magnitude (MM scale) at dam location Record all communication Inspect the dam wall, spillway structure, abutments, and Saddle Dam in daylight hours (if safe to do so); photograph/video and record using approved forms and send to DSTDM and IC Check for leaks, deformation, erosion, and concrete damage Update Dam Logbook as per SOP 12 	 As per previous activation level, AND Unless completed in the Alert Stage, <u>immediately</u> inspect the dam wall, spillway structure, abutments, and Saddle Dam (if safe to do so); photograph/video and record using approved forms and send to DSTDM and IC 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 as directed Maintain surveillance of area immediately downstream of dam or Saddle Dam (if safe to do so) and move on any members of the public Record/photograph the damage from a safe point 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 	 Inspect the dam for any damage and photograph any damage identified during the event Forward all EER material to IC email as required Update Dam Logbook as per SOP 12 Return to routine surveillance activities and frequencies 			
Notifications	DSTDM IC LEC SO	DSTDM IC LEC SO	DSTDM IC LEC SO	DSTDM IC LEC SO	 Inform all previously notified contacts of stand down 			

*'Confirmed' 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.

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

Table 19: Earthquake — LEC emergency action									
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 underway 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	 Record all communication 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 DDO and relevant council(s) regarding potential road/bridge closures 	As per previous activation level	 Forward all EER material to IC email as required Return to routine activities 				
Notifications	 DDO IC LDMG 1 LDMG 2 	DDO IC LDMG 1 LDMG 2	 DDO IC LDMG 1 LDMG 2 	 DDO IC LDMG 1 LDMG 2 	 Inform all previously notified contacts of stand down 				

*'Confirmed' 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.

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

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Table 20: Earthquake — IC emergency action							
Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down		
Activation trigger • Earthquake confirmed* or felt in the area, AND • Earthquake confirmed* or felt in the area, AND • Intensity less than 5MM • I		 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 underway 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	 Record all communication Create Incident Report Record Update intranet with EAP status Note: IC to carry out LEC actions unless LDMG is Stood Up 	 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 Sunwater Recovery Coordinator. The Sunwater 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. Confirm EAs and other messages are prepared in advance – if required. 	 As per previous activation level, AND Liaise with Sunwater Media on- call, LDMGs and/or DSTM to send appropriate message and email 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 IC to trigger Paradise Dam EAP for flows over secondary spillway 	 Deactivate EAP Complete all notifications Compile EER and deliver to DSR if required Close Incident Report record Update intranet with EAP status Return to routine activities 		
Notifications	 DDO LEC/ORR DSTDM SMT SRT 	 DDMG 1 DDMG 2 QPS DDO LEC/ORR DSTDM SMT SRT 	 D/S Residents SDCC DDMG 1 DDMG 2 DDO LEC/ORR DSTDM SMT SRT 	 D/S Residents SDCC DDMG 1 DDMG 2 DDO LEC/ORR DSTDM SMT SRT 	 Inform all previously notified contacts of stand down. The SDCC does not require notification. The SDCC does not require notification. 		

* 'Confirmed' 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.



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Table 21: Earthquake — LEC and IC external communication plan						
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 1LDMG 2	• Phone	 Describe current situation with dam — What is the event? (Dam Safety Risk — Earthquake felt or reported in area) 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 	 LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS 	• Phone	 Describe current situation with dam — What is the event? (Dam Safety Risk — Earthquake felt or reported in area) What is the status? (Under investigation) Advise of current storage level Stand by for further information 		
Stand Up — 1	 Earthquake confirmed* or felt in the area, AND A possible failure path has been identified 	D/S Residents	 SMS Email Phone (for those <u>without</u> mobiles) 	 Liaise with Sunwater Media on-call, LDMGs and/or DSTM to send appropriate messaging Refer to Annexe for sample message. 		
		• SDCC	• Phone & Email	 Complete Emergency Alert Request Form (copies in Appendix A8) and email to the SDCC to send to D/S Residents. 		
		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS 	• 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 current storage level. Discuss any potential road/ bridge closures Activate emergency response 		

* 'Confirmed' 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.

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

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Table 21: Earthquake — LEC and IC external communication plan						
Activation level	Trigger for communications	Group to contact	Method	Message text		
	 Failure likely due to earthquake, AND Sufficient water in storage to create a dam hazard 	 D/S Residents 	 SMS Email Phone (for those without mobiles) 	 Liaise with Sunwater Media on-call, LDMGs and/or DSTM to send appropriate messaging. Refer to Annexe for sample message. 		
		• SDCC	• Email & Phone	 Complete Emergency Alert Request Form (copies in Appendix A8) and email to the SDCC to send to D/S Residents. 		
Stand Up — 2		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS 	• 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 (if not discussed at Stand Up 1) Prepare coordinated evacuation 		
	• Dam Failure Underway	D/S Residents	 SMS Email Phone (for those <u>without</u> mobiles) 	 Liaise with Sunwater Media on-call, LDMGs and/or DSTM to send appropriate messaging. Refer to Annexe for sample message. 		
		• SDCC	• Email & Phone	• Complete Emergency Alert Request Form (copies in Appendix A8) and email to the SDCC to send to D/S Residents.		
		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS 	• Phone	 Describe current situation with dam — What is the event? (Dam Safety Risk — Earthquake damage) What is the status? (Dam Failure Underway) Advise of current storage level Coordinate evacuation of Downstream Residents and move people to higher ground 		
Stand down	 Risk assessment has been determined and failure risk has reduced 	D/S Residents	 SMS Phone (for those without mobiles) 	 Liaise with Sunwater Media on-call, LDMGs and/or DSTM to send appropriate messaging Refer to Annexe for sample message. 		
		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 OPS 	• 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 		

*'Confirmed' 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.



Table 22: Earthquake — DSTDM emergency action								
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 underway 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	 Record all communication Monitor situation and assess risks Advise DSR of EAP activation 	 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 Determine if remedial repairs are practical Determine if risks can be reduced by lowering storage Supervise remedial repairs (if applicable). Supervise means provide technical oversight to the work. It does not necessarily mean on-site supervision. 	 As per previous activation level Liaise with the IC and LEC and advise on need to recommend evacuations Make assessment on likely impacts to Paradise Dam 	 Forward all EER material to IC email as required Return to routine activities 			
Notifications	DDOICDSR	DDO IC DSR	DDOICDSR	DDOICDSR	 Inform all previously notified contacts of stand down 			

*'Confirmed' 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.

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

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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 or activity or a high energy impact on the dam such as a plane crash or meteorite.

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

The flood outlines in Appendix B2 are there to provide indicative outlines of the maximum potentially affected area of a dam hazard caused by a terrorist attack. 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 attack 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 attack and concurrent flooding or downstream releases are occurring or expected to occur.

8.1.1 Assessment of circumstances that indicates an increase in the likelihood of terrorist 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 23 to Table 27 specify emergency actions for the following roles.

- Dam Duty Officer (DDO)
- Local Event Coordinator (LEC)
- Incident Coordinator (IC)
- Dam Safety Technical Decision Maker (DSTDM).

Figure 4: Terrorist threat/activity or high energy impact flowchart



	Table 23: Terrorist threat/activity or high energy impact — DDO emergency action						
Activation level	Alert/Lean Forward	Stand Up 1 — Threat	Stand Up 2 — Event	Stand Up 3 — Response	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 underway 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 and if instructed or if threat received, complete the following: Inspect dam (if safe) and ensure all security measures are in place (locked gates, etc.) Photograph/video suspicious items from a safe point and record using approved forms and send to DSTDM and IC 	 As per previous activation level, AND Vacate the immediate vicinity of the affected area 	 As per previous activation level, AND Lower reservoir level, if directed by DSTDM 	 Inspect the dam for any damage and photograph any damage identified during the event Forward all EER material to IC email as required Update Dam Logbook as per SOP 12 Return to routine surveillance activities and frequencies 		
		 If Police appoint incident Manager, support and follow instructions Close any affected roads as directed and move on any members of the public Update Dam Logbook as per SOP 12 					
Notifications	Not applicable	 #000 Emergency DSTDM IC SO LEC 	 #000 Emergency DSTDM IC SO LEC 	 #000 Emergency DSTDM IC SO LEC 	 Inform all previously notified contacts of stand down 		

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

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ndooma — i9.0	Terrorism/impact
	Table 24: Terrorist threat/activity or high energy impact — LEC emergency action

Activation level	Alert/Lean Forward	Stand Up 1 — Threat	Stand Up 2 — Event	Stand Up 3 — Response	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 underway 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 If Police appoint Incident Manager, support and follow instructions Monitor situation and assess risks Liaise with relevant council(s) regarding possible road/bridge closures 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 DDO, DSTDM, and LDMG re: potential for evacuations 	 Forward all EER material to IC email as required Return to routine activities
Notifications	Not applicable	 DDO IC LDMG 1 LDMG 2 	 DDO IC LDMG 1 LDMG 2 	 DDO IC LDMG 1 LDMG 2 	As required

Table 25: Terrorist threat/activity or high energy impact — IC emergency action					
Activation level	Alert/Lean Forward	Stand Up 1 — Threat	Stand Up 2 — Event	Stand Up 3 — Response	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 underway 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 Contact National Security If Police appoint Incident Manager, support and follow instructions Monitor situation and assess risks Create Incident Report record Update Sunwater intranet with EAP status Note: IC to carry out LEC actions unless LDMG is Stood Up 	 As per previous activation level, AND Liaise with Sunwater Media on- call, LDMGs and/or DSTM to send appropriate messaging and email to D/S residents and phone those without mobiles Consider the need to appoint a Sunwater Recovery Coordinator. The Sunwater 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. Confirm EAs and other messages are prepared in advance – if required. 	 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 IC to trigger Paradise Dam EAP for flows over secondary spillway 	 Deactivate EAP Complete all notifications Compile EER and deliver to DSR if required Close Incident Report Record Update Sunwater intranet with EAP status Return to routine activities
Notifications	• Not applicable	 CTG DDMG 1 DDMG 2 QPS DDO LEC/ORR DSTDM SMT SRT 	 D/S Residents SDCC CTG DDMG 1 DDMG 2 DDO LEC/ORR DSTDM SMT SRT 	 D/S Residents SDCC CTG DDMG 1 DDMG 2 DDO LEC/ORR DSTDM SMT SRT 	 Inform all previously notified contacts of stand down. The SDCC does not require notification.

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

Table 26: 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	ALERT NOT APPLICABLE			
Lean Forward	LEAN FORWARD NOT APPLICABL	E		
Stand Up — 1	THREAT • Possible terrorist activity/suspicious behaviour noticed at the dam, OR • Threat received	 LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS CTG 	• 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
	EVENT • Large explosion heard/observed at dam (e.g. bomb explosion, aircraft hit)	D/S residents SDCC	 SMS Email Phone (for those without mobiles) Phone & Email 	 Liaise with Sunwater Media on-call, LDMGs and/or DSTM to send appropriate messaging Refer to Annexe for sample message. Complete Emergency Alert Request Form as per instructions (copies in Appendix A8) and email to the SDCS to conduct DS Paridumeter
Stand Up — 2		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS CTG 	• 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
	RESPONSE Failure underway or likely due to impact or explosion, AND 	• D/S Residents	 SMS Email Phone (for those without mobiles) 	 Liaise with Sunwater Media on-call, LDMGs and/or DSTM to send appropriate messaging Refer to Annexe for sample message.
Stand Up — 3	 Sufficient water in storage to create a dam hazard 	SDCC LDMG 1	Email & Phone Phone	 Complete Emergency Alert Request Form in Appendix A8 and email to the SDCC to send to D/S Residents. Liaise with Sunwater Media on-call, LDMGs and/or DSTM to send appropriate message Refer to Annexe for sample message. Describe current situation with dam — What is the event? (Dam Safety Risk — Security threat/
		 LDMG 2 DDMG 1 DDMG 2 QPS CTG 		 impact/ explosion, etc.) What is the status? (Dam Failure Likely/In Progress) Initiate evacuations

Table 26: Terrorist threat/activity or high energy impact — LEC and IC external communication plan					
Activation level	Trigger for communications	Group to contact	Method	Message text	
Steed Deven	 Risk assessment has determined that failure risk has reduced 	D/S Residents	 SMS Email Phone (for those without mobiles) 	 Liaise with Sunwater Media on-call, LDMGs and/or DSTM to send appropriate messaging Refer to Annexe for sample message. 	
Stand Down		 LDMG 1 LDMG 2 DDMG 1 QPS 	• Phone	 Describe current situation with dam — What is the event? (<i>Dam Safety Risk — Security threat/impact/explosion, etc.</i>) What is the status? (<i>Dam hazard Stood Down</i>) Advise that failure risk has been reduced and EAP has been deactivated 	



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Table 27: Terrorist threat/activity or high energy impact — DSTDM emergency action					
Activation level	Alert/Lean Forward	Stand Up 1 — Threat	Stand Up 2 — Event	Stand Up 3 — Response	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 underway 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	 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 Monitor situation, assess risks, and determine if failure likely or in progress 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). Supervise means provide technical oversight to the work. It does necessarily mean on-site supervision. 	 As per previous activation level, AND Liaise with the IC and LEC and advise on need to recommend evacuations Make assessment on likely impacts to Paradise Dam 	 Forward all EER material to IC email as required Return to routine activities
Notifications	Not applicable	 IC DDO SRT DSR 	 IC DDO SRT DSR 	 IC DDO LEC/ORR SRT DSR 	As required



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9. Other emergency situation — communications failure

9.1 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.

9.2 Emergency actions

Due to the large number of different possible scenarios, Table 28 below only covers the most common or likely conditions.

9.2.1 Activation triggers

Table 28: Communications failure emergency activation trigger summary

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/ORR)	
Comms Failure – Brisbane	 Unable to communicate to or from Sunwater Brisbane (could affect DSTDM or FODM and will affect IC) 	

9.2.2 Emergency action roles

Table 29 to Table 34 specify emergency actions for the following roles.

- Dam Duty Officer (DDO)
- Local Event Coordinator (LEC)
- Incident Coordinator (IC)
- Dam Safety Technical Decision Maker (DSTDM)
- Flood Operations Decision Maker (FODM).

Table 29: Communications failure — DDO emergency					
Activation level	Comms Failure – Local Area	Comms Failure – Brisbane			
Activation trigger	Unable to communicate to local area including LEC/ORR	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 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 Social media – e.g. Facebook (Internet may be available via landline) Record all communication and attempts via Dam Logbook entries as per SOP 12 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 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 Social media – e.g. Facebook (Internet may be available via landline) Record all communication and attempts via Dam Logbook entries as per SOP 12 and communications log if EAP event is current 			
Notifications	• IC • SO	• LEC • SO			

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Table 30: 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, DSTDM or FODM			
Actions	 Every hour, attempt communications 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 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 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 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 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 IC as much as practicable As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action 			
Notifications	 IC DSTDM SO LDMG 1 LDMG 2 	 DDO DSTDM SO LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS 			

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	Table 31: 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 LEC/ORR 				
Actions	 Issue Sunwater Incident Alert Every hour, attempt communications 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 Social media – e.g. Facebook (Internet may be available via landline) Record all communication and attempts As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action 	 Issue Sunwater Incident Alert Every hour attempt communications 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 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 				
Notifications	 LEC/ORR DSTDM SO DDMG 1 DDMG 2 QPS 	 DDO DSTDM SO LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS 				

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Table 32: Communications failure — LEC and IC communication plan				
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 LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS 	• Phone	 Describe current situation with dam communications. What is the status – estimated time to restore communications?
		IC to create Incident Report record		EAP Alert Notification — Boondooma Dam — Site Communications Failure
Comms Failure – Local Area	 Unable to communicate to or from local area including LEC and ORR 	 DDO DSTDM SO LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS 	• Phone	 Describe current situation with dam communications. What is the status – estimated time to restore communications?
		IC to create Incident Report record		EAP Alert Notification — Boondooma Dam — Local Area Communications Failure
Comms Failure – Brisbane	Unable to communicate to or from Sunwater Brisbane	 DSTDM LDMG 1 LDMG 2 DDMG 1 DDMG 2 QPS 	• Phone	 Describe current situation with dam communications. What is the status – estimated time to restore communications?
		LEC to create Incident Report record		EAP Alert Notification — Sunwater Brisbane Communications Failure

Table 33: 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	 Record all communication Provide technical advice to IC/LEC on a needs basis As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action 	 Record all communication Provide technical advice to IC on a needs basis 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 		
Notifications	 IC LEC SRT DSR 	 IC DDO SRT DSR 		

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Table 34: 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	 Record all communication As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action 	 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
Notifications	 IC LEC DSTDM 	ICDDODSTDM

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APPENDIX A Notification and communication lists

Appendix A1: Sunwater regional notification list

Appendix A2: Sunwater Brisbane notification list

Appendix A3: External notification list

- Appendix A4: D/S residents' notification list
- Appendix A5: Other D/S residents' notification list (outside area requested messaging)
- Appendix A6: Non-D/S residents' notification list
- Appendix A6: Other reference contacts
- Appendix A7: Emergency alert polygon
- Appendix A8: Dam failure emergency alert request

Appendix A1 to Appendix A6 have been redacted



SunWater makes no While every care is taken to ensure the accuracy of this product,

APPENDIX A8: DAM FAILURE EMERGENCY ALERT REQUEST

Queensland emergency alert request guidelines

An Emergency Alert (EA) Request form should be completed, if required (see dam hazard sections for actions) and sent to the SDCC to activate the Boondooma Dam Emergency Polygon.

Instructions

- 1. EA Request forms are not to be used for flood UNLESS a flood has triggered an Emergency Event.
- 2. Log on to the Sunwater area of the Disaster Management Portal in the EA area to complete the appropriate MS Word format form for Boondooma Dam.
- 3. Telephone the EA for an Emergency Event for Boondooma Dam.
 - a. A Polygon for this dam is stored in the Sunwater area of the Disaster Management Portal in the EA area. Ask the SDCC operative to locate the polygon. It will be a KML file called
 - b. Give them your phone number, confirm their name, and end the call after advising the form/s will be sent shortly.
- 4. IC and DSTDM will work together to craft a message relevant to the hazard and discuss with the LDMG if there is time. If time does not permit use approved pre-filled form/s on the Disaster Management Portal.
- Send filled out EA form/s and the Boondooma Threat Direction polygon to the
 The form/s MUST be sent from a Sunwater email address and come from the IC, DSTDM, or member of the Sunwater Executive.
- 6. Phone back the SDCC to check that the message has been sent and ask for email confirmation.
- 7. Create an Incident Report Record to advise of completion of EA campaign.

The following text is a copy of that contained in the prefilled EA request/s:

Filename:	Voice Message:	SMS:
	FLOOD EMERGENCY WARNING from Sunwater. People downstream of Boon Doom Mah Dam including Core Run Gah and Mun Dubb Bruh must LEAVE IMMEDIATELY. Boon Doom Mah 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. Eids Vold is safe. Get full warnings and what you should do at North Burnett, or South Burnett Regional Council websites.	FLOOD EMERGENCY WARNING from Sunwater. People downstream of Boondooma Dam including Cooranga and Mundubbera must LEAVE IMMEDIATELY. Boondooma 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. Eidsvold is safe. Get full warnings and what you should do at North Burnett Regional Council http://emergency.northburnett.qld.gov.au and South Burnett Regional Council http://dashboard.southburnett.qld.gov.au

The next two pages contain a pre-filled copy of the Boondooma Dam EA Request form:

5 Auto	PHONE THE – ADVISE EA IS BEING DEVELOPED					
	EMERGENCY ALERT REQUEST					
	Location of Alert: Boondooma Dam (e.g. Suburb, Town)		Date:			
Queensland Government	LGA/Agency requesting:		Time:			
Requesting Officer (e.	g. Disaster Coordinator/Incident Controller)	Telephone:				
Name: Agency/Position:		(SDCC Watch De	sk mav telephone vou)			
Email:						
Advised LDC/L	.DMG: YES DDC/DDMG: [YES Neighbouring LDMG/LGA:	YES N/A			
Send Alert	Immediately: YES	Scheduled: YES Date & Time /	/ : hrs			
	Cyclone Storm	Tide Flash Flood	Flood			
Event Type	Bushfire Fire Ir	ncident Smoke / Toxic Plume	Chemical Spill			
	Tsunami (Sent as Location Based T	ext Message ONLY)				
	Other (please specify): Catastrophic	Dam Failure				
Distributed by: (Channel)	X VoiceX SMS(Landline only)(Location)	 Location Based SMS – S of phone at time of distribution) (Registered 	Service Address Based billing address)			
Message Severity	Emergency Warning (Activates SEV	VS) Uwatch & Act Advice				
Threat Direction Requ (e.g. Fire, Dam Spill)	iired? YES	Threat location indicated on map? Only For Emergency Warning Voice & Service Addr	⊠YES ress SMS □N/A			
EA Messaging Filenar	me (Doc, Pdf):	Polygon Filename, (Kml, Kmz, Gml, GeoJS	ON):			
		Number of polygons (if multiple, attac	h list in order of priority)			
Supplied via: DM P	Portal 🗌 Email 🗌 Verbal 🗌 Other	Supplied via: DM Portal Email	Verbal Other			
Voice: Type or handw	rite, max 4000 characters incls spaces. (I	deally message should be < 450 characters)				
FLOOD EMERGENCY	WARNING from Sun water. People down	nstream of Boon Doom Mah Dam including Core	e Run Gah, and Mun			
Dubb Bruh, must LEAV at risk. Go now to a safe	E IMMEDIATELY. Boon Doom Mah Dam e place away from the flood. Fids Vold is	possible failure/is failing. Major flooding is happ safe. Get full warnings and what you should do	ening now. Your life is at North Burnett, or			
South Burnett Regional	Council websites.	Sale. Get fail warnings and what you should do	at North Dufficit, of			
SMS: Type or handwri	te use capitals for clarity max 612 chara	cters incls spaces (Ideally should be < 160 cha	racters incl_spaces)			
FLOOD EMERGENCY	WARNING from Sunwater. People dowr	istream of Boondooma Dam including Cooranga	a and Mundubbera			
must LEAVE IMMEDIA	TELY. Boondooma Dam possible failure/	is failing. Major flooding is happening now. You	r life is at risk. Go now			
to a safe place away fro	om the flood. Eldsvold is safe. Get full wa purnett.gld.gov.au and South Burnett Red	rnings and what you should do at North Burnett ional Council http://dashboard.southburnett.gld.	dov.au			
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Remove EA from	☐ 12 hrs ☐ 24 hrs ☐ 48 hrs	Specify Date & Time: Check bac	k in 12 hrs:			
websites:	Replace previous EA message	/ / : hrs Contact #:				
Requesting Officer:	Signate	ure:	Date: / /			
Send t	<u>0</u>	to confirm	receipt			
FOR USE BY SDCC	pleted by: SDCC Watch Desk 🔲 R					
Notification of any delay	vs provided to Requestor:					
EA User Name:			Alert No:			
Signature:		Date: / /				
Authorising Officer Name: EMS EA Campaign Report ID:						
Signature: Date: / /						
Report provided to Requestor on EA outcomes: YES NO						
The EA Man	ual, EA Quick Reference Guide, EA Requ	uest Form Template are available at: www.disas	ter.qld.gov.au			
	EA Request Form – F.1.177 Las	t Updated: 31 October 2022 Version: 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.	Sunwater Polygons are all in *.kml format. Check applicable box.	
STEP 4.	Sunwater Messaging/spatial data is always supplied via DMportal. 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 B Drawings and Maps

Appendix B1: Downstream notification area

Appendix B2: Inundation maps

Appendix B3: Catchment Plan

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.



any particular purpose.

DRAWING No. 250707 C

downstream of the dam (not shown here).

APPENDIX B2: INUNDATION MAPS

The following drawings are derived from Comprehensive Risk Assessment 2022, (ref Z).

Drawings:

- Key Map
- Sunny Day Failure
- Probable Maximum Flood

Inundation mapping includes concurrent downstream flooding assumptions from the Comprehensive Risk Assessment (2022, (ref Z).

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.



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APPENDIX B3: CATCHMENT PLAN

Figure B5: Boondooma Dam declared catchment boundary plan



APPENDIX C Equipment and technical information

Appendix C1: List of equipment available during an emergency

Appendix C2: Boondooma Dam discharge curve

Appendix C3: Boondooma Dam storage curve

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APPENDIX D INTERACTION WITH LOCAL GOVERNMENT AND DISTRICT GROUPS

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Annexe — Boondooma Dam SMS Messages

Advice

Stay informed



Watch and Act

Prepare to leave



Emergency

Leave immediately

To be issued in consultation with council



SMS ADVICE from Sunwater. Boondooma Dam is spilling excess water into Boyne River. People downstream of Boondooma Dam should STAY INFORMED and MONITOR CONDITIONS. Water flows from Boondooma 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

FLOOD WATCH AND ACT from Sunwater. Excess water spilling from Boondooma Dam into Boyne River has increased significantly. Water flows from Boondooma Dam may contribute to flooding downstream. Expect increased river flows in 6-12 hours / later today / overnight / tomorrow. People downstream of Boondooma Dam must PREPARE TO LEAVE in case the flood 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 Boondooma Dam including Cooranga and Mundubbera must LEAVE IMMEDIATELY. Boondooma 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. Eidsvold is safe. More information here: North Burnett Regional Council http://emergency.northburnett.qld.gov.au and South Burnett Regional Council http://dashboard.southburnett.qld.gov.au