

EMERGENCY ACTION PLAN — LESLIE DAM (ID 36) ISSUE: 8.0 — September 2024 Expiry: 1 October 2027

Prepared by Sunwater Limited

Controlled Copy No.

Gated: Yes			Staffed: Yes
Type:	Mass concrete gravit	y dam	
Project:	Leslie Dam EAP		File no.: 08-000372/001
Address: 565 Leslie Dam Road			
Location	: Lat28.214173°	Lon. 151.91991	6°
	28°12′50.94″S	151°55′11.64″E	

Approved by the delegate of the Chief Executive, Department of Local Government, Water and Volunteers until 1 October 2027.

Emergency activation quick reference – Dam Hazards

The Emergency Action Plan (EAP) for Leslie 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.

	Activation levels				
Dam Hazards and section numbers	Alert	Lean Forward	Stand Up	Stand Down	
		Activation trig	gers for dam hazards		
Flood operations See section 5	 EL 472.41 m and rising (FSL, 0.1 m below gate opening) 	 Storage above FSL 472.51 m with inflows (Gate operations commence) 	 Storage above EL 472.70 m (0.29m over FSL) 	 Storage level EL 472.51 m and falling with no forecast increase in EL in 48 hours 	
Overturning/sliding monoliths See section 6	 Indications of movement of monoliths noted such as cracking, increased seepage, or spilling 	 Storage at flood of record, EL 472.70m, OR Increase in movement, pressures, or seepage 	 Obvious displacement of one or more monoliths, OR Evidence of scouring at or near toe of dam, OR Storage level overtopping non-overflow monolith, EL 473.63 m 	 Risk assessment has determined that sliding or overturning risk has reduced 	
Piping: embankment, foundation, or abutments See section 7	 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 8	 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 <i>See section 9</i>	Not applicable	Not applicable	 Possible terrorist activity noticed at dam or threat received Large explosion heard/observed at dam (e.g. bomb explosion, aircraft hit) Failure in progress or likely due to impact or explosion Sufficient water in storage to create a dam hazard 	 Risk assessment has determined that failure risk has reduced 	

Table 1: Emergency activation quick reference

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Emergency activation quick reference – Other Emergency Situations

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

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

Table 1: Emergency activation quick reference (continued)

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Document control

Authorisation of document

Name	Position/role	Signature	Date
_	EAP Program Lead — Prepared for submission		08/01/2025
	Principal Engineer – Dam Safety Compliance — Approved for submission		08/01/2025
	GM Asset Integrity — Approved for submission		14/01/2025
	EGM – Engineering and Water Resources (or delegate) — Dam Owner Authorising Officer		15/01/2025

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Document revision history

Issue	Date	Prepared by	Reason for change	Ref no.
2	Jan 2008		Substantial review of Leslie Dam Emergency Action Plan to reflect Sunwater Management structure and updated inundation maps.	
3	Oct 2011		Significant changes to all sections of Leslie Dam Emergency Action Plan to reflect current Sunwater Management structure and other changes.	HB # 1135657
3C	Sep 2013		Amendments due to new legislative requirements.	HB # 598078
4	Aug 2016		New Emergency Action Plan developed at expiry of 3E approval. Issued for consultation with Relevant Disaster Management Groups.	HB # 1878750
5	October 2017		New EAP with contact list updates and minor amendments.	HB # 2223540
6	September 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).	HB # 2089052
6.1	September 2019		Amended contacts and associated sections, e.g. Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes.	HB # 2471487
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.	HB # 2571779
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 description (2.9) and simplifying FODM role in Activation triggers (5.2.1) including removing para 5.2.2.	HB # 2653194
6.4	September 2022		Amended contacts and associated sections. Minor error corrections and other non-substantive changes. Added new actions and contacts regarding possible closure of Cunningham Highway during a Flood Event. The Chemical Hazard section has been removed as it is not a Dam Safety Hazard and is dealt with in other more relevant documents.	HB # 2726197
7.0	March 2023		Updated inundation maps in Appendix B. Amended wording in Section 3.2 and Table 3 (flood classification triggers). Previous Table 5 removed and replaced with updated data in Appendix C2. Context added for stand- ups in section 5.2.1. Minor error corrections and other non-substantive changes.	HB# 2743828

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Issue	Date	Prepared by	Reason for change	Ref no.
7.1	August 2023		Amended messaging to comply with AWS in communication tables, Emergency Alert request form, and added Annexe. Removed chemical spill from section 2.1. Fatigue management included as section 2.5. Amended section 2.6.1 to include an outline of DSTDM and FODM responsibilities. Minor updates to position holders in section 4. Minor error corrections and other non-substantive changes.	2807612
7.2	September 2024		Wet season preparedness – contact updates	2865449
8.0	October 2024		Full review pending expiry	2869965

Controlled document distribution list

Copy no.	Position	Location		
1.	Storage Supervisor	Sunwater, Leslie Dam		
2.	General Manager–South	Sunwater, Goondiwindi		
3.	3. Emergency Action Plan Lead Sunwater, Brisbane			
Notes: Communication information for each 'Controlled Copy Holder' is attached in Appendix A.				

Electronic document distribution list

Printed electronic copies are considered uncontrolled copies.

Position	Location		
District Disaster Coordinator—Warwick (DDMG 1)	Police, Warwick		
District Disaster Coordinator—Toowoomba (DDMG 2)	Police, Toowoomba		
Senior Flood Forecaster	Bureau of Meteorology, Brisbane		
Local Disaster Coordinator—Local Disaster Management Group (LDMG 1)	Southern Downs Regional Council, Warwick		
Local Disaster Coordinator —Local Disaster Management Group (LDMG 2)	Toowoomba Regional Council, Toowoomba		
Note: Communication information for each 'Electronic Copy Holder' is in Appendix A.			

1. References, abbreviations, and definitions

1.1 References/associated documents

Ref.	Document title	Reference/location
А	Emergency action plan for referable dam guideline version 4 (RDMW 2023)	https://www.resources.qld.gov.au/ data/assets/pdf f ile/0018/84015/eap-guideline.pdf
В	Guidelines on Safety Assessments for Referable Dams (November 2023) version 8	Guidelines on Safety Assessments for Referable Dams (rdmw.qld.gov.au)
С	Guidelines on Consequence Categories for Dams (ANCOLD, 2012)	Hard Copy Only
D	Australian Rainfall and Runoff (ARR) 2016	ISBN 978-1-925848-36-6 http://book.arr.org.au.s3-website-ap-southeast- 2.amazonaws.com/
E	Guideline for Failure Impact Assessment of Water Dams (DNRME 2018)	Guideline for failure impact assessment of water dams (resources.qld.gov.au)
F	Water Act 2000	https://www.legislation.qld.gov.au/view/pdf/inforce/cu rrent/act-2000-034
G	Water Supply (Safety and Reliability) Act 2008 (July 2024)	https://www.legislation.qld.gov.au/view/whole/pdf/inf orce/current/act-2008-034
Н	Queensland Dam Safety Management Guidelines (DNRME August 2024)	https://www.dnrme.qld.gov.au/data/assets/pdf_file/ 0007/78838/dam-safety-management.pdf
I	Professional Engineers Act 2002 (RPEQ) (September 2013)	https://www.legislation.qld.gov.au/view/pdf/inforce/2 013-09-23/act-2002-054
J	Queensland Disaster Management Act 2003 (July 2024)	https://www.legislation.qld.gov.au/view/pdf/inforce/cu rrent/act-2003-091
К	Queensland Emergency Alert Manual – M.1.174 (December 2023)	M.1.174 Queensland Emergency Alert Manual (disaster.qld.gov.au)
L	Queensland Government Communications and systems for public information and warnings	Alerts and warnings Get Ready Queensland
Μ	Guidelines 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
Ν	Sunwater (internal) Strategic Event Procedure	Sunwater Internal document only
0	Queensland Disaster Management Guidelines	Prevention preparedness response and recovery disaster management guideline Disaster Management Queensland Government
Ρ	Queensland Rainfall and River Conditions (BOM-Flood Warning)	www.bom.gov.au
Q	Sunwater (internal) Emergency Alert Protocol	Sunwater Internal document only
R	Sunwater (internal) Leslie Dam Operation and Maintenance Manual	Leslie Dam O&M Manual
S	Sunwater (internal) Leslie Dam Safety Condition Schedule	Sunwater Internal document only
Т	Sunwater Operations (internal) Leslie Dam — Hazard Management Toolkit	Only available with Sunwater internal versions of EAPs
U	Fatigue Management Procedure WHS42 (Sunwater internal)	Fatigue Management Procedure
V	Sunwater (internal) Standing Operating Procedure (SOP) 12 – Dam Logbooks	SOP12 Dam Logbooks Sunwater Internal document only
W	Leslie Dam Failure Impact Assessment	Sunwater Internal document only
Х	FIA Review and 20 Year Dam Safety Review Report (Stantec August 2019)	Sunwater Internal document only



1.2 Abbreviations and acronyms

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 Large	OM	Operator Maintainer
	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 Flood
DDC	District Disaster Coordinator	PWRE	Principal Water Resources Engineer
DDMG	District Disaster Management Group	QDMC	Queensland Disaster Management
DDMP	District Disaster Management Plan		Committee
DDO	Dam Duty Officer	QFD	Queensland Fire Department
DDS	Director Dam Safety	QPS	Queensland Police Service
DSR	Dam Safety Regulator	QR	Queensland Rail
DSSC	Dam Safety Surveillance Coordinator	RB	Right Bank
DSTDM	Dam Safety Technical Decision Maker	RC	Regional Council
EAP	Emergency Action Plan	RCC	Roller Compacted Concrete
EA	Emergency Alert	RDMW	Department of Regional Development,
EER	Emergency Event Report		Manufacturing and Water
EGMO	Executive General Manager Operations	ROC	Regional Operations Centre
EGM E&WR	Executive General Manager Engineering	RPEQ	Registered Professional Engineer of
	& Water Resources		Queensland
EL	Elevation Level	RSL	Reduced Supply Level
FCL	Fixed Crest Level	SCED	Senior Civil Engineer Dams
FODM	Flood Operations Decision Maker	SCTN	Security and Counter Terrorism Network
FSL	Full Supply Level	SDCC	State Disaster Coordination Centre
GM	General Manager	SDF	Sunny Day Failure
IC	Incident Coordinator	SDTE	Senior Dam Technical Engineer
IFHC	Incremental Flood Hazard Category	SES	State Emergency Service
IGEM	Inspector-General Emergency	SMS	Short Message Service
	Management	SMT	Sunwater Media Team
LB	Left Bank	SO	Standby Operator
LDC	Local Disaster Coordinator	SOP	Standing Operating Procedure
LDMG	Local Disaster Management Group	SRT	Strategic Response Team
LDMP	Local Disaster Management Plan	SS	Storage Supervisor
LEC	Local Event Coordinator	SWL	Storage Water Level
MAP	Manager Asset Planning	SWRE	Senior Water Resources Engineer
Max. OL	Maximum Operating Level	TMR	Transport & Main Roads
ME	Manager Environment	U/S	Upstream
MM	Modified Mercalli	WHS	Workplace Health & Safety
0&M	Operation & Maintenance	WQ	Water Quality

1.3 Business terms and definitions

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

Term	Definition		
Terms set out in section 352A of the Water Supply (Safety and Reliability) Act 2008 (Qld) - Amended			
Australian Warning System	A national approach to information and warnings during emergencies like bushfire, flood, storm, extreme heat, and severe weather.		
Dam hazard	 Means a reasonably foreseeable situation or condition that may: cause or contribute to the failure of the dam, if the failure may cause harm to persons or property, OR require an automatic or controlled release of water from the dam, if the release of the water may cause harm to persons or property. 		
Dam hazard event	 Means an event arising from a <i>dam hazard</i> if: persons or property may be harmed because of the event, AND a coordinated response, involving 2 or more of the following relevant entities, is unlikely 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, AND the event is not an emergency event. 		
Disaster management plan	Of a <i>district group</i> or local government, means the group's, or local government's, disaster management plan under the Disaster Management Act.		
District group (District Disaster Management Group)	For an emergency action plan (EAP), means a district group established under the Disaster Management Act, section 22 whose disaster district under that Act could, under the plan, be affected by a <i>dam hazard</i> .		
Emergency event	 Means an event arising from a <i>dam hazard</i> if: persons or property may be harmed because of the event, AND any of the following apply: a coordinated response, involving 2 or more of the following <i>relevant entities</i>, is likely to be required; each <i>local group</i> and <i>district group</i> for the EAP, each local government whose area may be affected, the Chief Executive, another entity the owner of the dam considers appropriate, OR the event may arise because of a disaster situation declared under the Disaster Management Act, OR an entity performing functions under the State <i>disaster management plan</i> may, under that plan, require the owner of the dam to give the entity information about the event. 		
Local group (Local Disaster Management Group)	For an EAP, means a local group established under the Disaster Management Act, 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 1 or category 2 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. 		



Term	Definition		
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 dam hazard event or emergency event 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 a dam hazard event or emergency event were to happen the Chief Executive another entity the owner of the dam considers appropriate e.g. the Queensland Police Service. 		
Terms consistent with Qu	ueensland Disaster Management Arrangements		
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. Stand Up: The operational state where resources are mobilised, personnel are activated, and operational activities commenced. 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, DDMGs or Disaster Coordination Centres. 		
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	 The three levels of flooding are: 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.		

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Term	Definition
Dam crest flood	The flood event that causes reservoir levels to reach the lowest point of non-overflow section of a dam.
Dam failure	Dam failure is the physical collapse of all or part of a dam or the uncontrolled release of any of its contents.
Downstream releases	Downstream releases are outflows from the dam made through appurtenant structures such as spillways or outlet works that are in accordance with the design of the dam.
Earthquake	A sudden release of energy in the earth's crust or upper mantle, usually caused by movement along a fault plane or by volcanic activity, resulting in the generation of seismic waves that can be destructive. The potential consequences of an earthquake include:
	 settlement, sliding, or overturning of monoliths in the dam wall initiation of seepage lines in the foundations or abutments that could lead to piping damage and potential inoperability of appurtenant works.
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	Probable maximum flood is the flood resulting from probable maximum precipitation coupled with the worst catchment conditions that can be realistically expected.
Probable maximum precipitation	Probable maximum precipitation is the theoretical greatest depth of precipitation physically possible based on generalised methods.
Probable maximum precipitation flood	Probable maximum precipitation flood is the flood resulting from probable maximum precipitation coupled with standard catchment conditions that can be expected.
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	'Sunny day' dam failure is where the failure occurs at the full supply level and there is no concurrent rain associated flooding.
Terrorist activity	A deliberate attempt to damage or fail or contaminate a dam.

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. Introduction

2.1 Context

Under the *Water Supply (Safety and Reliability) Act 2008* (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 352 H of the Act.

Summary of legal requirements- Section 352H

Section 352 H (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):

- 1. identify the area likely to be affected by a dam hazard event or emergency event arising from the dam hazard; and
- 2. identify each circumstance that indicates a material increase in the likelihood of the dam hazard event or emergency event happening; and
- 3. state when and how the owner of the dam plans to warn persons who may be harmed, or whose property may be harmed by an event caused by the dam hazard, if one happens, and/or there is a material increase in the likelihood of an occurrence, including the order of priority in which the persons or categories of persons are to be warned; and
- 4. state when and how the owner plans to notify the relevant entities for the dam, if a dam hazard event or emergency event happens or, there is a material increase in the likelihood of such an occurrence, including the order of priority in which the relevant entities are to be notified; and
- 5. 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 352 H (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 352 H A 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 352 H B 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 district group for the plan.

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

The local governments whose areas may be affected by a dam hazard for Leslie Dam have been assessed as **Southern Downs Regional Council (SDRC)** and **Toowoomba Regional Council (TRC).** Sunwater has provided the SDRC and TRC with a copy of the draft EAP for assessment.

Section 352 H C of the Act states that a district group may review the EAP for consistency with its disaster management plan. The district groups for Leslie Dam are **Warwick** and **Toowoomba District Disaster Management Groups (DDMGs)**. Sunwater has provided the DDMGs with a copy of the draft EAP for review.



2.2 Purpose

The purpose of this EAP is:

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

It is possible for more than one dam hazard to exist at Leslie 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 Leslie Dam by the owner of the dam (Sunwater) and the communication and notification of dam hazards to the LDMGs, DDMGs and broader community. However, the EAP sits within the broader emergency response framework. This EAP has been assessed and considered to be consistent with the Southern Downs and Toowoomba Local Disaster Management Plans.

2.3 Scope

The Leslie 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
- triggers for activation of a tiered response to dam hazard event and/or emergency event
- roles and responsibilities in responding to a dam hazard event and/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 and/or emergency event, and the management of such hazards.

2.4 Sunwater training

Training of the use and implementation of this EAP document is carried out at various times throughout the year, but specific pre-wet season training is undertaken in the months leading up to the wet season at each dam site.

During this period, Sunwater staff complete instructions for site preparations, and during July to September carry out checks on stores, supplies of fuel, on 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. The 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, but this is 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 is also working towards carrying out a full test once annually 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 Fatigue Management Plan

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

2.6 Principles used in developing this EAP

The LDMGs have principal carriage of managing any disaster situation within the community, with the support of the district and state groups.

Sunwater will aim to inform and support the LDMGs in the Southern Downs and Toowoomba areas.

During a dam hazard that occurs with little or no warning, Sunwater will undertake the following actions to ensure the community is informed as soon as possible:

- maintain an up-to-date list of immediately D/S residents of Leslie Dam. The downstream limit is shown in Appendix B, Figure B3 by the zone labelled *Limit of downstream notification area*.
- provide timely advice to the LDMGs
- notify the immediately D/S residents via SMS
- contact the SDCC to request an Emergency Alert campaign throughout the Leslie Dam Emergency Polygon.

During a dam hazard, the Southern Downs and Toowoomba LDMGs will take the lead role in notifying all relevant persons. Sunwater will support all LDMGs by undertaking the following actions to ensure the community is informed as soon as possible:

- maintain an up-to-date list of immediately D/S residents of Leslie Dam. The downstream limit is shown in Appendix B, Figure B3 by the zone labelled Limit of downstream notification area.
- provide timely advice to the LDMGs
- notify the immediate D/S residents via SMS unless otherwise agreed with LDMGs.

Sunwater will independently inform and support the Warwick and Toowoomba DDMGs.



2.6.1 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.



Figure 1: Sunwater emergency response organisation

Key aspects of the emergency management framework

- 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 managing the dam hazard.
- The IC is responsible for the decision to activate the EAP. Should the IC be unavailable, the Local Event Coordinator (LEC) followed by the Dam Duty Officer (DDO) is responsible for the decision. 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 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.

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- 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.
- Sunwater's in-house engineering and technical staff will provide technical advice to the IC, LEC and DDO on an as needs basis. The Flood Operations Decision Maker (FODM) and Dam Safety Technical Decision Maker (DSTDM) will provide flood and dam engineering advice respectively during a dam hazard. Such advice will be provided within an established framework of Standing Operating Procedures (SOPs), models, standards, and manuals. This is an advisory role only and does not diminish the decision responsibility of the IC, LEC or DDO.
- If unusual circumstances develop during a dam hazard it will be necessary to escalate to either the FODM or DSTDM. These roles are filled by Registered Professional Engineers of Queensland (RPEQ) and are suitably qualified professionals as defined in the Professional Engineers Act of Queensland. These decision-making roles are providing direct engineering supervision to the advisors through the established framework of SOPs, models, standards, and manuals or through direct supervision.

2.7 Community information

Sunwater with the assistance of Southern Downs and Toowoomba Regional Councils will ensure community education around messaging and impacts of the EAP and its related events is undertaken and continually improved.

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

In the event of a dam failure or when required, Sunwater also have the use of the National Emergency Alert System to send a voice message and SMS. This service is provided by Telstra and is managed by the State Disaster Coordination Centre (SDCC) and the process Sunwater follows is documented in Appendix A9.

A copy of all Sunwater approved EAPs are available to the public on the Sunwater website - https://www.sunwater.com.au/community/preparing-for-emergencies/emergency-management/

These copies are redacted to protect people's personal details.

2.8 Lessons Learnt

Sunwater carries out Lessons Learnt workshops as part of its post event management. These Lessons Learnt can result in changes to the EAP. These are captured and if applicable to this document are implemented at the earliest opportunity and are made available in the next EAP update to the regulator 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 RDMW as appropriate.

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



3. Dam details

3.1 General dam information

Location: Leslie Dam is situated on Sandy Creek, 8.5 km from its confluence with the Condamine River, and approx. 13 km west of Warwick. The dam consists of a Main dam, Saddle Dam, and storage lake. The Saddle Dam is located to the southeast of the Main Dam, under the dam access road.

Purpose: Leslie Dam is owned and operated by Sunwater. Sunwater's predecessor, the Irrigation and Water Supply Commission, designed and constructed Leslie Dam to regulate flow in the Condamine River, and to improve the water supply to licensed irrigators and the town of Warwick.

Catchment: Leslie Dam functions as the headworks for the Upper Condamine Water Supply Scheme, which includes many weirs and a pipeline. It takes up to 18 days for water to flow from Leslie Dam to the far end of the Water Supply Scheme Area. The catchment is 603 km².

Storage Capacity: The storage capacity at FSL is 106,250 ML.

Construction: Leslie Dam was constructed in two stages. Stage 1 was completed in October 1965, giving the dam a storage capacity of 47,119 ML. Stage 2 was completed in 1985; it involved the raising of the wall and the installation of seven spillway gates, increasing the storage capacity to 106,250 ML.

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

Description	Specification ¹
Dam type	Mass concrete gravity dam
Full Supply Level (FSL)	EL 472.41 m
Dam Crest Level (DCL)	EL 473.63 m
Flood of Record (Jan 2011 ²)	Max EL 472.698 m (0.288 m above FSL)
Storage capacity at FSL	106,250 ML
Storage area (at FSL)	1,288 ha
Catchment area	603 km ²
Max embankment height	33 m (approx.)
Total length across crest	424 m
Spillway type	Radial gate-controlled ogee crest
Spillway crest level	EL 466.31 m
Spillway—top of closed radial gates	EL 472.83 m (outer section)
	EL 472.67 m (inner section)
Spillway crest width (incl. piers)	109.118 m
Spillway crest width (excl. piers)	92.052 m
Spillway capacity (at DCL)	3,920 m ³ /sec (338,688 ML/d)
Dam Crest Flood (DCF)	1 in 32,500 AEP
Maximum depth in spillway (at DCF)	7.32 m

Table 2: Leslie Dam specifications

¹ All levels are to Australian Height Datum (AHD). Conversion from State Datum is AHD (m) = State Datum RL (feet) x 0.3048 - 0.03m ² First-filling conditions are when the storage level is above the historical maximum, and is rising at a rate of rise equal or greater than 300mm/d. The dam should be inspected at 4-hourly intervals.



Description	Specification ¹
Spillway gates	7 hydraulic operated radial gates, 12.74 m wide x 6.64 m high
Outlet works	2 x 915 mm diameter cone valves 1 x 305 mm inflow low flow outlet
Outlet control	Guard valves and cone dispersion valves
Saddle Dam type	Zoned Earth-fill with upstream facing riprap
Saddle Dam crest level	EL 476 m
Saddle Dam length	366 m
Saddle Dam max. height above foundation	5.5 m

*Refer to Discharge Curve in Appendix C

3.2 Population at risk (PAR)

The following is derived from the Leslie Dam Failure Impact Assessment (ref W) completed by Sunwater in April 2018:

- the PAR for Sunny Day Failure (SDF) event is 136
- the incremental PAR for a PMF (Probable Maximum Flood) event with dam failure is 232 (total PAR 728).

3.3 General arrangement

The general arrangement drawings are in Appendix B.

3.4 Emergency inspections and monitoring

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

3.4.1 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.

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4. Roles and responsibilities

Roles and responsibilities	Position holder
 Owner Liaise with the Board and Minister Activate Sunwater Strategic Response and Business Continuity Plans, if required Ensure necessary resources are available to manage any dam hazard and emergency events Record communications, notifications and observations as required At all times, aim to provide timely advice and support to the local disaster management groups (LDMGs) in the affected local government areas and the district disaster management groups (DDMGs) in the affected disaster districts. 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: o notify the residents listed in Appendix A4 via SMS o 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) 	CEO EGMO EGM E&WR
 Owner'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 Ensure requirements of the Dam Condition Schedule 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 Undertake and prepare the five yearly Comprehensive Inspection Reports with suitably qualified personnel within the time specified in the Condition Schedule and that work orders are created for recommendations and work is undertaken as required Undertake Annual Inspections and prepare reports within the time frames specified in the Condition Schedule and that work orders are created for recommendations and work is undertaken as required Review the Dam Safety Instrumentation Database and evaluate data to verify the structural integrity of the dams on a regular basis and maintain a spread sheet for verification for audit and quality control Record communications, notifications and observations as required 	GM Asset Integrity GM Asset Management
 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 Ensure necessary resources are available to manage any dam hazard and emergency events Undertake the role of LEC as required Ensure all work orders, work instructions and lesson learned outcomes are fully implemented Preced communications, potifications and characterizes as required 	GM South OS

	Roles and responsibilities	Position holder
Strate		
•	Facilitate the assessment, escalation and notification and management of strategic response and recovery for a high or extreme risk, or impact, event	
٠	Initial and ongoing assessment of event status and requirements	
٠	Development, and revision of, strategic objectives based on requirements	CDT
٠	Identifying, managing, and monitoring strategic risks	SRI
•	Monitor media and stakeholder/customer impacts	
•	Managing/overseeing event communications including media, stakeholder, customer, and internal communications	
•	Record communications, notifications and observations as required	
Techn	ical Advisor	
•	Analyse the situation and provide expert technical advice	
•	Discuss issue with peers and other technical experts and make sound decisions to mitigate the risk	GM Environment
•	Determine response to incidents and emerging issues	
•	Record communications, notifications and observations as required	
Dam S	afety Technical Decision Maker (DSTDM)	
٠	Maintain current RPEQ accreditation	
٠	Analyse the situation and provide expert technical advice in relation to Dam Safety	
•	Discuss Dam Hazard with peers and other technical experts and make sound decisions to mitigate the risk	Various personnel
٠	Determine response to incidents and emerging issues	as per DSTDM
٠	Issue warning on dam failure and advise on protective measures	roster
•	Ensure the EAP is implemented appropriately and carry out the DSTDM role as required	
٠	Liaise with Regulator as required	
•	Record communications, notifications and observations as required	
Flood	Operations Decision Maker (FODM)	
•	Maintain current RPEQ accreditation	
•	Provide hydrological advice in relation to predicted and actual dam outflows including assessment of weather and flood warnings, and other related matters as identified in the OC Procedure (Sunwater internal)	Various personnel
•	Interpret and apply rainfall data in accordance with the OC Procedure, including, as required under the OC Procedure, liaising with BOM	as per FODM roster
•	Ensure the EAP is implemented appropriately and carry out the FODM role as required	
•	Record communications, notifications and observations as required	
Opera	tions Centre Duty Officer (OCDO)	
٠	Decide if a flood is imminent and record modes of operation	
٠	Extract data relative to the event from available sources	
•	Utilise this data in predictive flood models and determine results from these models for approval by FODM	Various personnel as per OC roster
•	Liaise with the FODM or IC to update current flood situation and routing data	
•	Record communications, notifications and observations as required	
Sunwater Media Team (SMT)		
•	Analyse sensitive issues, discuss with the Owner and issue media releases	Various personnel
•	Handle public and customer comments (including social media) and advise the Owner if necessary	as per Media Team roster
٠	Liaise with the IC and update SDMG of flood events	
•	Record communications, notifications and observations as required	

Roles and responsibilities	Position holder
 Incident Coordinator (IC) Notify LDMG/s, or council/s if LDMG not Stood Up, of intent to use the Emergency Alert (EA) Activate the EAP 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
 Local Event Coordinator (LEC) Liaise with the Local Disaster Coordinator or proxy Activate the EAP, when necessary Ensure the EAP is implemented appropriately and carry out the LEC role as required Record communications, notifications and observations as required 	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 Take direction from the DSTDM and IC as requested Arrange immediate site inspection and make informed assessment of the situation Escalate any issue not covered in the EAP or where actions are not clear Record communications, notifications and observations as required 	SS OM
Councils (Southern Downs and Toowoomba Regional Councils) Council has legislated local government functions, as per Section 80 of the Disaster Management Act (2003). These include: Ensure it has a disaster response capability Approve its Local Disaster Management plan Ensure information about an event or a disaster in its area is promptly given to the District Disaster Coordinator for the disaster district in which area it is situated Perform other functions given to the local government under the Act And as per Section 352HB of the Water Legislation (Dam Safety) Amendment Act (2017): Must assess (in consultation with its LDMG) the EAP for consistency with the Local Disaster	
Queensland Police Service (QPS) Manage the initial situation based on local operational procedures; including but not limited to: • Conduct emergency operations • Coordinate and support Sunwater during a declared emergency at the dam • Liaise with relevant organisations • Evacuation of persons if required • Control of essential traffic • Security of specific area	Local Police

Roles and responsibilities	Position holder
Disaster Management Groups/Personnel – (In addition to requirements outlined in the Disaster Management Act (2003)).	
LDMG	
 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 	
 Work with Councils and Sunwater to ensure the EAP is regularly exercised 	
 Identify and coordinate the use of resources and support services that may be required for an EAP event, noting that for safety events unique to the dam Sunwater will approach council to initiate 	LDMG
 Identify and provide advice to DDMG about support services required by the LDMG to manage an EAP event 	DDMG
 Provide reports and make recommendations to the relevant DDMG about matters relating to EAP events and any support required 	QPS
QPS	
 Work with dam owner and LDMG to ensure Emergency Alerts polygons are prepared, stored and tested at the State Disaster Coordination Centre 	
DDMG	
May review EAP for consistency with the District Disaster Management Plan	
SCTN (Security and Counter Terrorism Network) Coordinator	
 Identifies areas of concern during the preparation of disaster plans and provides advice during counter terrorism emergency events 	
Dam Safety Regulator (DSR)	
Liaise with relevant Minister on necessary actions	
Approve this document as required under legislation	DDS
• Liaise with Chief Executive as required in administering (regulating) the Water Supply (Safety and Reliability) Act 2008	



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 Leslie Dam to FSL (472.41 m) and the rate of inflow exceeds the capacity of the outlet works, or when the storage level reaches 100 mm above FSL (472.51 m) at which time the spillway will discharge water downstream into the Sandy Creek. These flood flows can create a dam hazard. Inflows will also cause the storage to temporarily rise to above the full supply level of the storage. Note:
 - \circ $\;$ The greater the rate of inflow, the higher the storage will rise
 - o The higher the storage level rises, the greater the loads on the dam structure
 - Although unlikely, the greater the loading, the higher the likelihood of a dam failure.

Typically, the level of surveillance is increased during flood operations (refer tables in this section).

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

- For small flows, the water will be contained within the Sandy Creek and will not create an emergency event.
- As the rate of discharge increases there will be an impact on low-level road crossings of Sandy Creek and other infrastructure in the river such as pump sites. Detailed information on downstream flood impacts, including tables and maps, is presented in Appendix B.
- Outflows from Leslie Dam have the potential to affect Leslie Dam Road, Cunningham Highway and the Queensland Rail (QR) Crossing at Sandy Creek. Details of the approximate flow magnitude that impacts these crossings is included in the Sunwater Internal Flood Directive Report.

	Flood Classification Level	Tailwater Gauge Height (m)
MAJOR 9 8 7 6 6 6 6 6 7 6 8 7 7 6 8 7 7 7 8 7 7 8 8 7 7 8 8 7 7 8 8 7 7 8 8 7 7 8 8 7 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 7 8 9 7 8 9 7 7 8 9 7 7 8 9 7 7 8 9 7 7 8 9 7 7 8 9 7 7 8 9 7 7 8 9 7 7 8 9 7 7 7 8 9 7 7 8 9 7 7 8 9 7 7 8 9 7 7 8 9 7 7 8 9 7 7 8 9 7 7 8 9 7 7 7 7 7 8 9 7 7 7 7 7 7 8 9 7 7 7 7 7 7 7 8 7 7 7 7 7 7 7 7 7 7 7 7 7	Major	3.0
MODERATE 5 Crops and Grazing MINOR 3	Moderate	2.8
Below Minor Example of Flood Level Classification	Minor	2.5

Table 3: Flood classification triggers

Source: Bureau of Meteorology



The following table shows historical floods experienced at Leslie Dam.

Flood rank	Date	Peak Height (EL m AHD)	Peak Height (m over FSL)
1	Jan 2011	472.70	0.29
2	Apr 2022	472.69	0.28
3	May 2022	472.62	0.21
4	Sep 1988	472.61	0.20
5	Dec 2021	472.58	0.17

Table 4: Historical floods experienced at Leslie Dam

5.2 Emergency actions

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

5.2.1 Activation triggers

Table 5: Flood	emergency	activation	trigger summary
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EAP Flood Activation Trigger	Trigger Summary	AWS Warning Level
Alert	 EL 472.41 m and rising (FSL, 0.1m below gate opening) 	
Lean Forward 1	 Storage above FSL 472.51 m with inflows (Gate operations commence) 	Advice
Lean Forward 2	 Storage above EL 472.59 (Likely impact to Cunningham Highway) 	
Stand Up 1 – flood of record	• Storage above EL 472.70 m (0.29 m over FSL)	Watch and Act
Stand Up 2 – dam crest level	• Storage above EL 473.63 m (1.22m over FSL)	Emergency
Stand Down	 Storage level EL 472.51m and falling with no forecast increase in EL in 48 hours 	

While this EAP is not triggered until Leslie Dam reaches a level of EL 472.41 m, Sunwater and Southern Downs and Toowoomba Regional Councils will work cooperatively and will endeavour to share intelligence of any rainfall event as and when either organisation becomes aware of a situation that could result in the activation of the EAP.

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



5.2.2 Emergency actions

Table 6 to Table 10 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 6: Flood operations—DDO emergency action

			5,			
Activation level	Alert	Lean Forward 1	Lean Forward 2	Stand Up 1 – flood of record	Stand Up 2 - dam crest level	Stand Down
Activation trigger	 EL 472.41 m and rising (FSL, 0.1 m below gate opening) 	 Storage above FSL 472.51 m with inflows (Gate operations commence) 	 Storage above EL 472.59 m (Likely impact to Cunningham Highway) 	 Storage above EL 472.70 m (0.29 m over FSL) 	 Storage above EL 473.63 m (1.22 m over FSL) 	• Storage level EL 472.51 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 Undertake site preparations including but not limited to: check fuel and operation of backup generator check operations of sump pump check communication systems (including backup radio, satellite phones and internet) check gate control systems as per O&M Manual* Switch gate controls to Automatic* on the main control console Unit 120 Fuel up and park a 4x4 vehicle on the Warwick side of the crest Record the Storage Level twice daily (or as instructed by the DSTDM) Record rainfall daily Update Dam Logbook as per SOP 12 Close the 225 mm butterfly valve in the lower gallery to prevent tail water build-up Liaise with IC to ensure that they have notified the Southern Downs Regional Council to close Sandy Creek Crossing 	 As per previous activation level, AND During the daily inspection attention will be given to: visual inspection of flow patterns over spillway and dissipater for evidence of scouring check the seepage in the galleries and record the level of V-notch weirs obvious signs of seepage the foundation pressure gauge readings Monitor to ensure gate operations occur as per O&M Manual* 	 As per previous activation level, AND Inspect the dam 6 hourly (or as instructed by the DSTDM) 	 As per previous activation level, AND Inspect the structures & abutments When approaching EL 473.46 m, evacuate any plant and/or vehicles to higher ground NOTE: at 473.06 the final gate step commences. Switch the gate selector to Manual* on the main console Unit 120 and raise the gates to max opening position AND Isolate electrical power to spillway piers (make sure all gates are up before isolating power) NOTE: At storage level 472.70 m – EAP activated for overturning or sliding of monoliths at Lean Forward (Section 6) 	 As per previous activation level, NOTE: at storage level 473.63m – EAP activated for overturning or sliding of monoliths at Stand Up 1 	 Return to routine surveillance activities and frequencies— inspect the dam for any damage identified during the event Forward all EER material to IC email as required Update Dam Logbook as per SOP 12
Notifications	• IC • SO • LEC	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level	 As per previous activation level, AND DSTDM (at end of event)
AWS Warning Level		Advice		Watch and Act	Emergency	

* For gate operations issues refer to the following sections in the Leslie Dam O&M Manual:

Automatic gate operation faults — O&M, 7.3.5.4.1

Troubleshooting Gate Issues — Spill Manual, 7.0

SCADA faults — Spill Manual, 7.3



ALL ACTION MUST BE TAKEN WHEN IT IS SAFE TO DO SO e.g. taking photographs/video, dam inspections, instrument readings FSL — 472.41m

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Table 7: Flood operations—LEC emergency action

Activation level	Alert	Lean Forward 1	Lean Forward 2	Stand Up 1 – flood of record	Stand Up 2 - dam crest level	Stand Down
Activation trigger	• EL 472.41 m and rising (FSL, 0.1 m below gate opening)	 Storage above FSL 472.51 m with inflows (Gate operations commence) 	 Storage above EL 472.59 m (Likely impact to Cunningham Highway) 	 Storage above EL 472.70 m (0.29 m over FSL) 	• Storage above EL 473.63 m (1.22 m over FSL)	• Storage level EL 472.51 m and falling with no forecast increase in EL
Actions	 Record all communication Develop/implement staff roster Ensure all abnormal observations or damage have been reported to DSTDM NOTE 1: IC to contact LDMGs unless LDMG1 is Stood Up 	As per previous activation level	As per previous activation level	 As per previous activation level, AND NOTE: At storage level 472.70 m —EAP activated for overturning or sliding of monoliths at Lean Forward (Section 6) 	 As per previous activation level, AND When approaching EL 473.46 m, ensure staff are relocated to a safe location NOTE: At storage level 473.63m —EAP activated for overturning or sliding of monoliths at Stand Up 1 (Section 6) 	 Forward all EER material to IC email as required Return to routine activities
Notifications	 DDO IC LDMG 1 LDMG 2 	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level
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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Table 8: Flood operations—IC emergency action

Activation level	Alert	Lean Forward 1	Lean Forward 2	Stand Up 1 – flood of record	Stand Up 2 - dam crest level	Stand Down
Activation trigger	 EL 472.41m and rising (FSL, 0.1m below gate opening) 	• Storage above FSL 472.51m with inflows (Gate operations commence)	 Storage above EL 472.59m (Likely impact to Cunningham Highway) 	 Storage above EL 472.70m (0.29m over FSL) 	 Storage above EL 473.63m (1.22m over FSL) 	 Storage level EL 472.51m and falling with no forecast increase in EL
Actions	 Record all communication Liaise with Sunwater Media on-call, FODM and/or DSTDM to send SMS to D/S residents Create Incident Report Record Update Sunwater Intranet with dam status NOTE 1: IC to contact LDMGs unless LDMG1 is Stood Up 	 As per previous activation level, AND Liaise with DDO to confirm correct gate operation Escalate any erroneous operations 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 NOTE: At storage level 472.70m — EAP activated for overturning or sliding of monoliths at Lean Forward (Section 6) 	 As per previous activation level NOTE: At storage level 473.63m — EAP activated for overturning or sliding of monoliths at Stand Up 1 (Section 6) 	 Deactivate EAP Compile EER and organise delivery to the DSR if required Close Incident Report Record Update Sunwater Intranet with dam status Return to routine activities
Notifications	 D/S Residents LDMG 1 LDMG 2 DDMG 1 TMR QR DDO LEC/ ORR DSTDM SMT SRT 	• As per previous activation level	As per previous activation level	 As per previous activation level 	 As per previous activation level, AND SDCC 	 Inform previous notifications of deactivation as required
AWS Warning Level		Advice		Watch and Act	Emergency	

FSL — 472.41m

Leslie — i8.0

sunwater

Table 9: Flood operations—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text	AWS Warning Level
	• EL 472.41 m and rising (0.1 m below FSL)	 D/S Residents 	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Media On-Call, LDMGs, FODM and/or DSTDM to send appropriate messaging Refer to Annexe for sample message	
Alert		 LDMG 1 LDMG 2 DDMG 1 TMR QR 	• Phone	Describe current situation with dam—What is the event? What is the status? Advise of current storage level	
	 Storage above FSL 472.51 m with inflows (gates operations commence) 	D/S Residents	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Media On-Call, LDMGs, FODM and/or DSTDM to send appropriate messaging Refer to Annexe for sample message.	
Lean Forward 1		 LDMG 1 LDMG 2 DDMG 1 TMR QR 	• Phone	Describe current situation with dam—What is the event? What is the status? Advise of current storage level Advise if Cunningham Highway is likely to be cut or not.	Advice
Los Commeda	 Storage above EL 472.59 m (Likely impact to Cunningham Highway) 	• D/S Residents	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Media On-Call, LDMGs, FODM and/or DSTDM to send appropriate messaging Refer to Annexe for sample message Determine message in consultation with TMR and SDRC	
Lean Forward 2		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 	• 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	
Stand Up 1 –	 Storage above EL 472.70 m (0.29 m over FSL) 	D/S Residents	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Media On-Call, LDMGs, FODM and/or DSTDM to send appropriate messaging Refer to Annexe for sample message	
flood of record		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 	• Phone	Describe current situation with dam—What is the event? What is the status? Advise of current storage level Advise of any forecasts you are aware of	watch and Act



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



Table 9 (Continued): Flood operations—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text	AWS Warning Level	
	 Storage above EL 473.63 m (1.22 m over FSL) 	D/S Residents	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Media On-Call, LDMGs, FODM and/or DSTDM to send appropriate messaging Refer to Annexe for sample message		
Stand Up 2 – dam crest level		• SDCC	Email & Phone	Complete Emergency Alert Request Form as per instructions (copies in Appendix A9) and email to the SDCC to send.	ies in Appendix Emergency	
		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 	• Phone	Describe current situation with dam—What is the event? What is the status? (water level has reached dam crest level) Advise of current storage level Advise of any forecasts you are aware of		
Stand Davim	 Storage level EL 472.51 m and falling with no forecast increase in EL 	D/S Residents	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Media On-Call, LDMGs, FODM and/or DSTDM to send appropriate messaging Refer to Annexe for sample message		
Stanu Down		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 	• Phone	Describe current situation with dam—What is the event? What is the status? (storage is greater than minor flood level, as set by BOM) Advise of current storage level Advise EAP has been deactivated		

13 15 89 Sunwater Customer Support 24-hour contact line



FSL — 472.41m

Leslie — i8.0

Table 10: Flood of	perations—DSTDM	emergency action
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Activation level	Alert	Lean Forward 1	Lean Forward 2	Stand Up 1 – flood of record	Stand Up 2 – dam crest level	Stand Down
Activation trigger	• EL 472.41 m and rising (FSL, 0.1 m below gate opening)	 Storage above FSL 472.51 m with inflows (Gate operations commence) 	 Storage above EL 472.59 m (Likely impact to Cunningham Highway) 	 Storage above EL 472.70 m (0.29 m over FSL) 	 Storage above EL 473.63 m (1.22 m over FSL) 	• Storage level EL 472.51 m and falling with no forecast increase in EL
Action	 Record all communication Provide technical advice to DDO and IC on a needs basis Review surveillance reports and determine if any additional responses are required 	As per previous activation level	As per previous activation level	 As per previous activation level NOTE: At storage level 472.70 m —EAP activated for overturning or sliding of monoliths at Lean Forward (Section 6) 	 As per previous activation level NOTE: At storage level 473.63 m —EAP activated for overturning or sliding of monoliths at Stand Up 1 (Section 6) 	 Forward all EER material to IC email as required Return to routine activities
Notifications	DDOICDSR	As per previous activation level	 As per previous activation level, AND CEO 	As per previous activation level	As per previous activation level	As per previous activation level
AWS Warning Level		Advice		Watch and Act	Emergency	


FSL — 472.41m

Leslie — i8.0

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Activation level	Alert	Lean Forward 1	Lean Forward 2	Stand Up 1 – flood of record	Stand Up 2 – dam crest level	Stand Down
Activation trigger	• EL 472.41 m and rising (FSL, 0.1m below gate opening)	 Storage above FSL 472.51 m with inflows (Gate operations commence) 	 Storage above EL 472.59m (Likely impact to Cunningham Highway) 	 Storage above EL 472.70m (0.29m over FSL) 	 Storage above EL 473.63m (1.22m over FSL) 	• Storage level EL 472.51 m and falling with no forecast increase in EL
Action	 Extract data from available sources Update flood models as per OC Procedure Update and issue flood operations report Liaise with BOM Update IC and DSTDM re: current flood situation and PFRM results Record all communication 	 As per previous activation level, AND Issue a Flood Situation Report daily 	As per previous activation level	 As per previous activation level NOTE: At storage level 472.70 m — EAP activated for overturning or sliding of monoliths at Lean Forward (Section 6) 	 As per previous activation level NOTE: At storage level 473.63 m — EAP activated for overturning or sliding of monoliths at Stand Up 1 (Section 6) 	 Forward all EER material to IC email as required Return to routine activities
Notifications	ICDSTDMDDO	 As per previous activation level 	As per previous activation level	 As per previous activation level 	 As per previous activation level 	 Inform all previously notified contacts of stand down
AWS Warning Level		Advice		Watch and Act	Emergency	

6. Dam hazard—overturning or sliding of monoliths

6.1 Overview

The emergency action described in this section relates to a potential dam hazard due to overturning or sliding of one or more of the concrete monoliths.

If one or more monoliths become unstable, a dam failure may result. If movement is detected early, remedial actions may be possible depending on the nature of the damage.

The overturning and sliding activation triggers in this section are based on the most recent stability assessment of the concrete main dam (Stantec, 2019 ref X) which states:

- Spillway monolith 14 has a sliding factor of safety of 1.3 at a reservoir level of EL 474.86 m. Higher water levels were not modelled to determine the reservoir level corresponding to a factor of safety of 1.0.
- Abutment monolith 18 has a sliding factor of safety of 1.5 at a reservoir level of EL 475.20 m. The factor of safety is 0.58 for a reservoir level of EL 475.30 m.

Considering this information the following standup trigger levels were adopted:

- Stand up 1 Overtopping of the non-overflow abutments EL 473.63 m. When this occurs there is likely to be some scour that may start to occur at the toe of these abutments.
- Stand Up 2 When spillway monolith 14 reaches factor of safety 1.3 EL 474.86 m. This level was chosen based on current available stability assessment information.

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

Notes: Definitions for Concurrent Flooding and Downstream Releases are provided in Section 1.3

The stability of the dam in its current configuration has been fully evaluated. Overturning or sliding of a monolith may be possible for the levels outlined in the Emergency Action Tables.

If the DSTDM forms the view that significant scouring is occurring, then the need for evacuations should be considered by disaster management authorities.

6.1.1 Assessment of circumstances that indicates an increase in the likelihood of overturning or sliding

An earthquake is a circumstance that could indicate an increased likelihood of overturning or sliding. Inspections following an earthquake would identify if any movement had taken place which is the alert status for overturning/sliding.

An increase in seepage is a circumstance that could indicate an increased likelihood of overturning or sliding. This circumstance is the alert status for overturning/sliding.

An increase in lake level beyond flood of record (EL 472.70 m) is a circumstance that could indicate an increase likelihood of overturning/sliding. This circumstance is the trigger for the lean forward status for overturning or sliding.

6.2 Emergency action roles

Table 12 to Table 16 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 2: Overturning or sliding of monoliths flowchart



Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	 Indications of movement of monoliths noted such as cracking, increased seepage, or spilling 	 Storage at flood of record, EL 472.70 m, OR Increase in movement, pressures, or seepage 	 Obvious displacement of one or more monoliths, OR Evidence of scouring at or near toe of dam, OR Storage Level overtopping non-overflow monolith, EL 473.63 m 	 Failure in progress or likely due to sliding or overturning, OR Storage Level at stability factor of safety 1.3, EL 474.86 m 	 Risk assessment has determined that sliding or overturning risk has reduced
Actions	 Record all communication Measure, record and report foundation drain pressures to IC & DSTDM Monitor dam every 6 hours (or as otherwise instructed by the DSTDM) until a decreasing trend is observable or as directed by the IC Photograph/video the damage from a safe point and record using approved forms and send to IC & DSTDM Update Dam Logbook as per SOP 12 	As per previous activation level	 As per previous activation level, AND Support/supervise remedial works as required Lower the storage if directed Close any affected roads if not already closed by others Maintain surveillance of area immediately downstream of dam (if safe to do so) and move on any members of the public 	 As per previous activation level, AND Lower reservoir level if directed Vacate the immediate vicinity of the dam 	 Forward all EER material to IC email as required Update Dam Logbook as per SOP 12 Return to routine activities
Notifications	 DSTDM IC SO LEC 	 As per previous activation level 	As per previous activation level	As per previous activation level	As per previous activation level



Table 13: Overturning or sliding of monoliths—LEC emergency action

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	 Indications of movement of monoliths noted such as crackling, increased seepage, or spilling 	 Storage at flood of record, EL 472.70 m, OR Increase in movement, pressures, or seepage 	 Obvious displacement of one or more monoliths, OR Evidence of scouring at or near toe of dam, OR Storage Level overtopping non-overflow monolith, EL 473.63 m 	 Failure in progress or likely due to sliding or overturning, OR Storage Level at stability factor of safety 1.3, EL 474.86 m 	 Risk assessment has determined that sliding or overturning risk has reduced
Actions	 Record all communication Note: IC to carry out LEC actions unless LDMG 1 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, AND Liaise with IC and LDMGs re: potential for evacuations 	 Forward all EER material to IC email as required Return to routine activities
Notifications	 IC DDO LDMG 1 LDMG 2 	 As per previous activation level 	 As per previous activation level 	 As per previous activation level 	 As per previous activation level





Table 14: Overturning or sliding of monoliths—IC emergency action	
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Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	 Indications of movement of monoliths noted such as crackling, increased seepage, or spilling 	 Storage at flood of record, EL 472.70 m, OR Increase in movement, pressures, or seepage 	 Obvious displacement of one or more monoliths, OR Evidence of scouring at or near toe of dam, OR Storage Level overtopping non- overflow monolith, EL 473.63 m 	 Failure in progress or likely due to sliding or overturning, OR Storage Level at stability factor of safety 1.3, EL 474.86 m 	 Risk assessment has determined that sliding or overturning risk has reduced
Actions	 Record all communication Create Incident Report Record Update Sunwater intranet with dam status NOTE: IC to carry out LEC actions unless LDMG 1 is Stood Up 	 As per previous activation level, AND Place machinery operators on standby if directed by 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, AND Mobilise resources to undertake remedial works if directed by DSTDM 	 As per previous activation level, AND Liaise with DDO and LEC re: potential for evacuations 	 Deactivate EAP Compile EER and organise delivery to the DSR if required Close Incident Report Record Update Sunwater intranet with dam status Return to routine activities
Notifications	 DDO DSTDM LEC/ ORR SMT SRT 	 As per previous activation level, AND DDMG 1 	 As per previous activation level, AND D/S Residents SDCC DDMG 2 	As per previous activation level	 Inform previous notifications of deactivation as required





Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	 Indications of movement of monoliths noted such as crackling, increased seepage, or spilling 	LDMG 1LDMG 2	• Phone	Describe current situation with dam—What is the event? <i>(unconfirmed instability of dam)</i> What is the status? (under investigation) Advise current storage level Advise of any forecasts you are aware of Confirm EAP has been activated
Lean Forward	 Storage at flood of record, EL 472.70 m, OR Increase in movement, pressures, or seepage 	LDMG 1LDMG 2DDMG 1	• Phone	Describe current situation with dam—What is the event? (unconfirmed instability of dam) What is the status? (under investigation) Advise current storage level Advise of any forecasts you are aware of Confirm EAP has been activated
	 Obvious displacement of one or more monoliths, OR Evidence of scouring at or near toe of dam, OR Storage Level overtopping non-overflow monolith, EL 473.63 m 	D/S Residents	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Media On-Call, LDMGs and DSTDM to send appropriate messaging Refer to Annexe for sample message
Stand Up 1		• SDCC	Phone & Email	Complete Emergency Alert Request Form as per instructions (copies in Appendix A9) 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? (possible failure of dam due to instability caused by overtopping scour) What is the status? (prepare for possible evacuations) Advise current storage level Advise of any forecasts you are aware of Discuss any potential road/ bridge closures

Table 15: Overturning or sliding of monoliths—LEC and IC communication plan





Activation level	Trigger for communications	Group to contact	Method	Message text
	 Failure in progress or likely due to sliding or overturning, OR Storage Level at stability factor of safety 1.3, EL 474.86 m 	D/S Residents	• SMS (Phone for those without mobiles)	Liaise with Sunwater Media On-Call, LDMGs and DSTDM to send appropriate messaging Refer to Annexe for sample message
		• SDCC	Phone & Email	Complete Emergency Alert Request Form as per instructions (copies in Appendix A9) and email to the SDCC to send.
Stand Up 2		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 	• Phone	Describe current situation with dam—What is the event? (dam failure likely or in progress) What is the status? (prepare coordinated evacuation) Advise of current storage level Advise of any forecasts you are aware of
	• Dam failure in progress	• D/S Residents	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Media On-Call, LDMGs and DSTDM to send appropriate messaging Refer to Annexe for sample message
		• SDCC	Phone & Email	Complete Emergency Alert Request Form as per instructions (copies in Appendix A9) 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? (dam failure) What is the status? (dam failure in progress move to higher ground—LDMG coordinate evacuation of affected downstream residents) Advise of current storage level Advise of any forecasts you are aware of

Table 15 (continued): Overturning or sliding of monoliths—LEC and IC communication plan





Activation level	Trigger for communications	Group to contact	Method	Message text
	 Risk assessment has determined that sliding or overturning risk has reduced 	 D/S Residents (if from Stand Up) 	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Media On-Call, LDMGs and DSTDM to send appropriate messaging Refer to Annexe for sample message
Stand Down		 LDMG 1 (if from Lean Forward) LDMG 2 (if from Lean Forward) DDMG 1 (if from Lean Forward) DDMG 2 (if from Stand Up) 	• 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 16: Overturning or sliding of monoliths—DSTDM emergency action

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	 Indications of movement of monoliths noted such as crackling, increased seepage, or spilling 	 Storage at flood of record, EL 472.70 m, OR Increase in movement, pressures, or seepage 	 Obvious displacement of one or more monoliths, OR Evidence of scouring at or near toe of dam, OR Storage Level overtopping non-overflow monolith, EL 473.63 m 	 Failure in progress or likely due to sliding or overturning, OR Storage Level at stability factor of safety 1.3, EL 474.86 m 	 Risk assessment has determined that sliding or overturning risk has reduced
Action	 Record all communication Review surveillance inspection of the dam and assess its condition as soon as possible Determine if there are possible failure paths from reported damage Arrange an inspection of the dam and assess its condition as soon as possible, when safe to do so 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 (if the storage is required to be drawn down then the DSTDM needs to assess the maximum rate of draw down based on latest available data and advise in writing to IC and DDO. Supervise remedial repairs (if applicable). Supervise means to provide technical oversight to the work. It does necessarily mean on-site supervision 	 As per previous activation level, AND Liaise with the IC and advise on need to recommend evacuations 	 Forward all EER material to IC email as required Return to routine activities
Notifications	DDOICDSR	As per previous activation level	As per previous activation level	 As per previous activation level, AND CEO 	As per previous activation level





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

7.1 Overview

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

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

The flood outlines in Appendix 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.

Notes: Definitions for Concurrent Flooding and Downstream Releases are provided in Section 1.3

7.1.1 Assessment of circumstances that indicates an increase in the likelihood of piping

An increase in seepage or a new area of seepage is a circumstance that could indicate an increased likelihood of piping. This circumstance is the trigger for the Alert status for piping.

Cloudy seepage water is a circumstance that could indicate an increased likelihood of piping. This circumstance is the trigger for the Lean Forward status for piping.

7.2 Emergency action roles

Table 17 to Table 21 specify emergency actions for the following roles:

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



Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down	
Activation trigger	 Increasing leakage through the embankment, the foundations, or abutments 	 Increasing leakage through the embankment, the foundations, or abutments with cloudy water 	 Piping condition has been established 	 Failure in progress or likely due to piping, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has determined that piping risk has reduced 	
Actions	 Record all communication Monitor flows every 6 hours (or as otherwise instructed by the DSTDM) until a decreasing trend is observable, or as directed by the IC Photograph/video the piping from a safe point and record using approved forms and send to IC & DSTDM Update Dam Logbook as per SOP 12 	As per previous activation level	 As per previous activation level, AND Support/supervise remedial works as required Lower the storage if directed Close any affected roads if not already closed by others Maintain surveillance of area immediately downstream of dam (if safe to do so) and move on any members of the public 	 As per previous activation level, AND Vacate the immediate vicinity of the piping condition 	 Forward all EER material to IC email as required Update Dam Logbook as per SOP 12 Return to routine activities 	
Notifications	DSTDMICSOLEC	 As per previous activation level 	 As per previous activation level 	 As per previous activation level 	 As per previous activation level 	



Table 18: Piping: embankment, foundation, or abutments—LEC emergency action

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	 Increasing leakage through the embankment, the foundations, or abutments 	 Increasing leakage through the embankment, the foundations, or abutments with cloudy water 	 Piping condition has been established 	 Failure in progress or likely due to piping, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has determined that piping risk has reduced
Actions	 Record all communication Note: IC to carry out LEC actions unless LDMG 1 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	 IC DDO LDMG 1 LDMG 2 	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level



Table 19: Piping: embankment	, foundation, or abutments—IC	Cemergency action
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Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	 Increasing leakage through the embankment, the foundations, or abutments 	 Increasing leakage through the embankment, the foundations, or abutments with cloudy water 	 Piping condition has been established 	 Failure in progress or likely due to piping, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has determined that piping risk has reduced
Actions	 Record all communication Create Incident Report Record Update Sunwater intranet with dam status Note: IC to carry out LEC actions unless LDMG 1 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 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	 Deactivate EAP Compile EER and deliver to DSR if required Close Incident Report Record Update Sunwater intranet with dam status Return to routine activities
Notifications	 DSTDM DDO LEC/ ORR SMT SRT 	 As per previous activation level, AND DDMG 1 	 As per previous activation level, AND D/S Residents SDCC DDMG 2 	As per previous activation level	 Inform previous notifications of deactivation as required



Table 20: Piping: embankment,	, foundation, or abutments—LEC	and IC communication plar

Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	 Increase in 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 advice
Lean Forward	 Increase in leakage through an embankment, the foundations, or abutments with cloudy water 	 LDMG 1 LDMG 2 DDMG 1 	Phone	Describe current situation with dam—What is the event? (Unconfirmed piping risk) What is the status? (Unconfirmed leakage—Investigation continues) Advise of current storage level Advise any issues you are aware of Standby for further advice
	 Piping condition has been established LDMG 1 LDMG 2 DDMG 1 DDMG 1 DDMG 2 	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		
Stand Up 1		SDCC	Email & Phone	Complete Emergency Alert Request Form as per instructions (copies in Appendix A9) and email to the SDCC to send.
		D/S Residents	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Media On-Call, LDMGs and DSTDM to send appropriate messaging Refer to Annexe for sample message



Table 20 (continued): Piping: embankment, foundation, or abutments—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Stand Up 2	 Failure likely due to piping, AND Sufficient water in storage to create a dam hazard 	 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? (Possible Dam Failure) Advise of current storage level Prepare coordinated evacuations
		SDCC	Phone & Email	Complete Emergency Alert Request Form as per instructions (copies in Appendix A9) and email to the SDCC to send.
		D/S Residents	SMS(Phone for those without mobiles)	Liaise with Sunwater Media On-Call, LDMGs and DSTDM to send appropriate messaging Refer to Annexe for sample message
	Dam failure in progress	 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 In Progress) Advise of current storage level Coordinate evacuations of affected Downstream Residents and move people to higher ground
		SDCC	Phone & Email	Complete Emergency Alert Request Form as per instructions (copies in Appendix A9) and email to the SDCC to send.
		D/S Residents	SMS(Phone for those without mobiles)	Liaise with Sunwater Media On-Call, LDMGs and DSTDM to send appropriate messaging Refer to Annexe for sample message
Stand Down	 Risk assessment has determined that piping risk has reduced 	 LDMG 1 (if from Lean Forward) LDMG 2 (if from Lean Forward) DDMG 1 (if from Lean Forward) DDMG 2 (if from Stand Up) 	• 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
		 D/S Residents (if from Stand Up) 	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Media On-Call, LDMGs and DSTDM to send appropriate messaging Refer to Annexe for sample message



Table 21: 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 the embankment, the foundations, or abutments 	 Increasing leakage through the embankment, the foundations or abutments with cloudy water 	 Piping condition has been established 	 Failure in progress or likely due to piping, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has determined that piping risk has reduced 	
Action	 Arrange an inspection of the dam to assess its condition as soon as possible, when safe to do so Determine if piping condition has been established Monitor situation and assess risks Record all communication 	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 provide technical oversight to the work. It does not necessarily mean on-site supervision Monitor situation and assess risks 	 As per previous activation level, AND Liaise with the IC and advise on need to recommend evacuations 	 Forward all EER material to IC email as required Return to routine activities 	
Notifications	DDOICDSR	As per previous activation level	As per previous activation level	As per previous activation level, ANDCEO	As per previous activation level	

8. Dam hazard—earthquake

8.1 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 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. 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 earthquake 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 earthquake and concurrent flooding or downstream releases are occurring or expected to occur.

Notes: Definitions for Concurrent Flooding and Downstream Releases are provided in Section 1.3

8.2 Emergency action roles

Table 22 to Table 26 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: Earthquake flowchart



Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down	
Activation trigger	 Earthquake confirmed* (by DSTDM) or felt in the area, AND Intensity less than 5MM 	 Earthquake confirmed* (by DSTDM) or felt in the area, AND Intensity greater than or equal to 5MM, OR Intensity less than 5MM and change detected during surveillance inspection 	 Earthquake confirmed* (by DSTDM) or felt in the area, AND A possible failure path has been identified 	 Failure in progress or likely due to earthquake, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has been determined that failure risk has reduced 	
Actions	 DDO to assess magnitude (MM scale) at dam location as per the HMT Record all communication Inspect the dam wall, spillway structure and abutments in daylight hours (if safe to do so) and report to the DSTDM and IC—photograph/video and record using approved forms and send to IC & DSTDM Check for leaks, deformation, scour, and concrete damage Update Dam Logbook as per SOP 12 	 As per previous activation level, AND Inspect the dam wall, spillway structure and abutments (if safe to do so) and report to the DSTDM and IC (unless inspection completed in Alert Stage) — photograph/video and record using approved forms and send to IC & DSTDM Repeat the inspection as directed Provide inspection report to DSTDM 	 As per previous activation level, AND Support/supervise remedial work as required Lower the storage if directed Close any affected roads, if not already closed by others Maintain surveillance of area immediately downstream of dam or Saddle Dam (if safe to do so) and move on any members of the public Sound siren Record/photograph the damage from a safe point Vacate the immediate vicinity of the embankment 	As per previous activation level	 Forward all EER material to IC email as required Update Dam Logbook as per SOP 12 Return to routine activities 	
Notifications	DSTDMICSOLEC	 As per previous activation level 	 As per previous activation level 	 As per previous activation level 	 As per previous activation level 	



Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	 Earthquake confirmed* (by DSTDM) or felt in the area, AND Intensity less than 5MM 	 Earthquake confirmed* (by DSTDM) or felt in the area, AND Intensity greater than or equal to 5MM, OR Intensity less than 5MM and change detected during surveillance inspection 	 Earthquake confirmed* (by DSTDM) or felt in the area, AND A possible failure path has been identified 	 Failure in progress or likely due to earthquake, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has been determined that failure risk has reduced
Actions	 Record all communication Note: IC to carry out LEC actions unless LDMG 1 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	 IC DDO LDMG 1 LDMG 2 	As per previous activation level	As per previous activation level	As per previous activation level	As per previous activation level



Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	 Earthquake confirmed* (by DSTDM) or felt in the area, AND Intensity less than 5MM 	 Earthquake confirmed* (by DSTDM) or felt in the area, AND Intensity greater than or equal to 5MM, OR Intensity less than 5MM and change detected during surveillance inspection 	 Earthquake confirmed* (by DSTDM) or felt in the area, AND A possible failure path has been identified 	 Failure in progress or likely due to earthquake, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has been determined that failure risk has reduced
Actions	 Record all communication Create Incident Report Record Update Sunwater intranet with dam status Note: IC to carry out LEC actions unless LDMG 1 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 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 DDO and relevant council(s) regarding potential road/bridge closures Mobilise resources to undertake remedial works if directed by DSTDM 	As per previous activation level	 Deactivate EAP Compile EER and deliver to DSR if required Close Incident Report Record Update Sunwater intranet with dam status Return to routine activities
Notifications	 DDO DSTDM LEC/ ORR SMT SRT 	 As per previous activation level, AND DDMG 1 	 As per previous activation level, AND D/S Residents SDCC DDMG 2 	As per previous activation level	 Inform previous notifications of deactivation as required





Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	 Earthquake confirmed* (by DSTDM) 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 damage) What is the status? (Under investigation) Advise of current storage level Advise EAP has been activated Stand by for further information
Lean Forward	 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 	LDMG 1LDMG 2DDMG 1	• Phone	Describe current situation with dam—What is the event? (Dam Safety Risk— Earthquake damage) What is the status? (Under investigation) Advise of current storage level Advise EAP has been activated Stand by for further information
Stand Up 1	 Earthquake confirmed* (by DSTDM) or felt in the area, AND A possible failure path has been identified 	D/S Resident	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Media On-Call, LDMGs and DSTDM to send appropriate messaging Refer to Annexe for sample message
		• SDCC	• Email & Phone	Complete Emergency Alert Request Form as per instructions (copies in Appendix A9) and email to the SDCC.
		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 	• Phone	Describe current situation with dam—What is the event? (Dam Safety Risk— Earthquake felt or reported in area) What is the status? (Possible earthquake damage to dam) Advise of current storage level. Discuss any potential road/bridge closures Activate emergency response

Table 25: Earthquake—LEC and IC 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 (Phone for those without mobiles) 	Liaise with Sunwater Media On-Call, LDMGs and DSTDM to send appropriate messaging Refer to Annexe for sample message
		• SDCC	Phone & Email	Complete Emergency Alert Request Form as per instructions (copies in Appendix A9) and email to the SDCC to send.
Stand Up 2		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 	• 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 Up1) Prepare coordinated evacuation
	Dam failure in progress	D/S Residents	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Media On-Call, LDMGs and DSTDM to send appropriate messaging Refer to Annexe for sample message
		• SDCC	Phone & Email	Complete Emergency Alert Request Form as per instructions (copies in Appendix A9) 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? (Dam Safety Risk— Earthquake damage) What is the status? (Dam Failure In Progress) Advise of current storage level Coordinate evacuation of Downstream Residents and move people to higher ground
Stand Down	Risk assessment has determined that failure risk has reduced	 D/S Residents (if from Stand Up) 	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Media On-Call, LDMGs and DSTDM to send appropriate messaging Refer to Annexe for sample message
		 LDMG 1 (if from Lean Forward) LDMG 2 (if from Lean Forward) DDMG 1 (if from Lean Forward) DDMG 2 (if from Stand Up) 	• 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

Table 25 (continued): Earthquake—LEC and IC communication plan



Table 26: Earthq	uake—DSTDM	emergency	action
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Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	 Earthquake confirmed* (by DSTDM) or felt in the area, AND Intensity less than 5MM 	 Earthquake confirmed* (by DSTDM) or felt in the area, AND Intensity greater than or equal to 5MM, OR Intensity less than 5MM and change detected during surveillance inspection 	 Earthquake confirmed* (by DSTDM) or felt in the area, AND A possible failure path has been identified 	 Failure in progress or likely due to earthquake, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has been determined that failure risk has reduced
Action	 Record all communication Monitor situation and assess risks 	 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 (if the storage is required to be drawn down then the DSTDM needs to assess the maximum rate of draw 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 not necessarily mean on-site supervision Monitor situation and assess risks 	As per previous activation level	 Forward all EER material to IC email as required Return to routine activities
Notifications	• DDO	As per previous activation level	 As per previous activation 	As per previous activation level	As per previous activation level
	• IC		level, AND		
	• DSR		CEO		



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

9.1 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 Leslie Dam to a terrorist attack is low.

The flood outlines in Appendix B are there to provide indicative outlines of the maximum potentially affected area of a dam hazard caused by terrorist threat/activity or high energy impact. 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 terrorist threat/activity or high energy impact 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 terrorist threat/activity or high energy impact and concurrent flooding or downstream releases are occurring or expected to occur.

Notes: Definitions for Concurrent Flooding and Downstream Releases are provided in Section 1.3

9.1.1 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 a terrorist threat. If this were specific enough to name a dam, this circumstance would trigger Stand Up 1 activation level.

9.2 Emergency action roles

Table 27 to Table 31 specify emergency actions for the following roles:

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



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



Table 28: Terrorist threat/activity or high energy impact—LEC emergency action

Activation level	Alert/Lean Forward	Stand Up 1	Stand Up 2	Stand Up 3	Stand Down
Activation trigger	 Not applicable 	 THREAT Possible terrorist activity/suspicious behaviour noticed at the dam, OR Threat received 	 EVENT Large explosion heard/observed at dam (e.g. bomb explosion, aircraft hit) 	 RESPONSE Failure in progress or likely due to impact or explosion, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has determined that failure risk has reduced
Actions	• Not applicable	 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 1 is Stood Up 	As per previous activation level	 As per previous activation level, AND Liaise with DDO and LDMG 1 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 	As per previous activation level	As per previous activation level	As per previous activation level



Table 29: Terrorist threat/activity or high energy impact—IC emergency action

Activation level	Alert/Lean Forward	Stand Up 1	Stand Up 2	Stand Up 3	Stand Down
Activation trigger	 Not applicable 	 THREAT Possible terrorist activity/suspicious behaviour noticed at the dam, OR Threat received 	 EVENT Large explosion heard/observed at dam (e.g. bomb explosion, aircraft hit) 	 RESPONSE Failure in progress or likely due to impact or explosion, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has determined that failure risk has reduced
Actions	• Not applicable	 Record all communication Contact National Security If Police appoint Incident Manager support and follow instructions Create Incident Report Record Update Sunwater intranet with dam status 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. Note: IC to carry out LEC actions unless LDMG 1 is Stood Up 	As per previous activation level	 As per previous activation level, AND Liaise with DDO, DSTDM and LEC re: potential for evacuations Mobilise resources to undertake remedial works if directed by DSTDM 	 Deactivate EAP Compile EER and deliver to DSR if required Close Incident Report Record Update Sunwater intranet with dam status Return to routine activities
Notifications	Not applicable	 CTG DDMG DDO DSTDM LEC/ ORR SMT SRT 	 As per previous activation level, AND D/S Residents SDCC 	As per previous activation level	 Inform previous notifications of deactivation as required





Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	ALERT NOT APPLICABLE			
Lean Forward	LEAN FORWARD NOT APPLICABLE			
Stand Up 1	 THREAT Possible terrorist activity/suspicious behaviour notice at the dam, OR Threat received 	 LDMG 1 LDMG 2 DDMG 1 DDMG 2 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
Stand Up 2	 EVENT Large explosion heard/observed at dam (e.g. bomb explosion, aircraft hit) 	D/S Residents	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Media On-Call, LDMGs and DSTDM to send appropriate messaging Refer to Annexe for sample message
		• SDCC	Phone & Email	Complete Emergency Alert Request Form as per instructions (copies in Appendix A9) and email to the SDCC
		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 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





Table 30 (continued): Terrorist threat/activity or high energy impact—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Stand Up 3	 RESPONSE Failure in progress or likely due to impact or explosion, AND Sufficient water in storage to create a dam hazard 	D/S Residents	 SMS (Phone for those without mobiles) 	Liaise with Sunwater Media On-Call, LDMGs and DSTDM to send appropriate messaging Refer to Annexe for sample message
		• SDCC	 Phone & Email 	Complete Emergency Alert Request Form as per instructions (copies in Appendix A9) and email to the SDCC
		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 	• Phone	Describe current situation with dam—What is the event? (Dam Safety Risk—Security threat/impact/explosion, etc.) What is the status? (Dam Failure Likely/In Progress) Initiate evacuations
Stand Down	 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 DSTDM to send appropriate messaging Refer to Annexe for sample message
		 LDMG 1 LDMG 2 DDMG 1 DDMG 2 	• Phone	Describe current situation with dam—What is the event? (Dam Safety Risk—Security threat/ impact/explosion, etc.) What is the status? (Dam Hazard Stood Down) Advise that failure risk has been reduced and EAP has been deactivated



Activation level	Alert/Lean Forward	Stand Up 1	Stand Up 2	Stand Up 3	Stand Down
Activation trigger	Not applicable	 THREAT Possible terrorist activity/suspicious behaviour noticed at the dam, OR Threat received 	 EVENT Large explosion heard/observed at dam (e.g. bomb explosion, aircraft hit) 	 RESPONSE Failure in progress or likely due to impact or explosion, AND Sufficient water in storage to create a dam hazard 	 Risk assessment has determined that failure risk has reduced
Action	• Not applicable	 Record all communication Assess risks 	 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 work. It does not necessarily mean on-site supervision Monitor situation and assess risks 	 As per previous activation level, AND Liaise with the IC and DDO and advise on need to recommend evacuations 	 Forward all EER material to IC email as required Return to routine activities
Notifications	Not applicable	ICDDOSRTDSR	As per previous activation level	As per previous activation level	As per previous activation level

10. Other emergency situation—communications failure

10.1 Overview

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

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

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

10.2 Emergency actions

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

10.2.1 Activation triggers

Table 52. communications failure energency 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 or ORR) 	
Comms Failure – Brisbane	 Unable to communicate to or from Sunwater Brisbane (could affect DSTDM or FODM & will affect IC) 	

Table 32: Communications failure emergency activation trigger summary

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

The Operations Centre Duty Officer (OCDO) will assess the weather and flood warnings daily in accordance with the Operations Centre (OC) SOP (Sunwater internal). The OCDO will escalate to the Flood Operations Decision Maker (FODM) any warnings that have the potential to cause a significant communications failure.

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

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

10.2.3 Emergency action roles

Table 33 to Table 38 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 33: Communications failure—DDO emergency action

Activation level	Comms Failure – Local Area	Comms Failure – Brisbane
Activation trigger	Unable to communicate to local area including LEC or 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 by all means noting the following: Mobile phone – try texting instead of voice, much higher probability of success Satellite phone – needs to access open sky unless external antenna fitted 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 by all means noting the following: Mobile phone – try texting instead of voice, much higher probability of success Satellite phone – needs to access open sky unless external antenna fitted 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




Table 34: Communications failure—LEC emergency action

Activation level	Comms Failure – Dam Site	Comms Failure – Brisbane
Activation trigger	Unable to communicate to dam site	Unable to communicate to Sunwater Brisbane including IC or DSTDM or FODM
Actions	 Continue tasks in accordance with any other current emergency action Every hour, attempt communications by all means noting the following: Mobile phone - try texting instead of voice, much higher probability of success Satellite phone - needs to access open sky unless external antenna fitted 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 	 Issue Sunwater Incident Alert Every hour, attempt communications by all means noting the following: Mobile phone - try texting instead of voice, much higher probability of success Satellite phone - needs to access open sky unless external antenna fitted Social media - e.g. Facebook (Internet may be available via landline) Record all communication and attempts Liaise with the DDO and assume IC role As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action
Notifications	 IC DSTDM SO LDMG 1 LDMG 2 	 DDO DSTDM SO LDMG 1 LDMG 2 DDMG 1 DDMG 2





Table 35: 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 and ORR
Actions	 Issue Sunwater Incident Alert Every hour, attempt communications by all means noting the following: Mobile phone - try texting instead of voice, much higher probability of success Satellite phone - needs to access open sky unless external antenna fitted 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 by all means noting the following: Mobile phone - try texting instead of voice, much higher probability of success Satellite phone - needs to access open sky unless external antenna fitted 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 DSTDM SO DDMG 1 DDMG 2 	 DDO DSTDM SO LDMG 1 LDMG 2 DDMG 1 DDMG 2





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 	• Phone	Describe current situation with dam communications. What is the status – estimated time to restore communications?				
		IC to send Sunwater Incident and Ne	ar Miss Alert	EAP Alert Notification—Leslie 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 DDM 1 DDMG 2 	• Phone	Describe current situation with dam communications. What is the status – estimated time to restore communications?				
		IC to send Sunwater Incident and Ne	ar Miss Alert	EAP Alert Notification—Leslie 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 	• Phone	Describe current situation with dam communications. What is the status – estimated time to restore communications?				
		LEC to send Sunwater Incident and N	lear Miss Alert	EAP Alert Notification—Sunwater Brisbane Communications Failure				

Table 36: Communications failure—LEC and IC communication plan





Table 37: Communications failure—DSTDM emergency action

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





Table 38: 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	ICLECDSTDM	ICDDODSTDM



Appendix A Notification and communication lists

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

Appendix A1 to Appendix A7 have been redacted



Appendix A9: Dam failure emergency alert request

Queensland emergency alert request guidelines

An Emergency Alert Request form should be completed, if required (see Sections 5 to 9 for actions), and sent to the SDCC to activate the Leslie Dam Emergency Polygon.

Instructions

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

Filename:	Voice Message:	SMS:
Leslie_Dam_ Emergency_Polygon	FLOOD EMERGENCY WARNING from Sun water. People downstream of Leslie Dam including Pratten and river side of Warwick must LEAVE IMMEDIATELY. Leslie Dam possible failure/is failing. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. Ingle wood and Al lore rah are safe. Get full warnings and what you should do at Southern Downs Regional Council at disaster dot es dee are see dot que el dee dot guv dot ay you	Flood emergency warning from Sunwater: People downstream of Leslie Dam including Pratten & riverside of Warwick must leave immediately. Leslie Dam possible failure/is failing. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. Inglewood and Allora are safe. Get full warnings and what you should do at Southern Downs Regional Council http://disaster.sdrc.qld.gov.au/

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

and	BEING DEVELOPED							
	EMERGE	NCY ALERT REQU	EST					
<u> SERT</u>	Location of Alert: Leslie Dam (e.g. Suburb, Town)		Date:					
Queensland Government	LGA/Agency requesting:		Time:					
Requesting Officer (e. Name: Agency/Position:	g. Disaster Coordinator/Incident Controller)	Telephone: (SDCC Watch	n Desk may telephone you)					
Email:								
Advised LDC/L	.DMG: YES DDC/DDMG: [YES Neighbouring LDMG/LG	A: YES N/A					
Send Alert	/ / : hrs							
Event Type	Cyclone Storm Bushfire Fire Ir Tsunami (Sent as Location Based T Other (please specify): Catastrophic	Tide Flash Flood ncident Smoke / Toxic Plume ext Message ONLY) c Dam Failure	☐ Flood ☐ Chemical Spill					
Distributed by: (Channel)	☑ Voice ☑ SMS (Landline only) (Location)	 Location Based SMS of phone at time of distribution) (Register 	5 – Service Address Based ered billing address)					
Message Severity	Emergency Warning (Activates SEV	VS) Uwatch & Act Advie	се					
Threat Direction Requ (e.g. Fire, Dam Spill)	Jired? ☐ YES	Threat location indicated on map? Only For Emergency Warning Voice & Service A	☐ YES					
EA Messaging Filenar	me (Doc, Pdf):	Polygon Filename, (Kml, Kmz, Gml, Geo	DJSON):					
		Number of polygons (if multiple, a	ttach list in order of priority)					
Supplied via: DM F	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 W LEAVE IMMEDIATELY. I place away from the flo Regional Council at dis	ARNING from Sun water. People downst Leslie Dam possible failure/is failing. Maj pod. Ingle wood and Al lore rah are safe. aster dot es dee are see dot que el dee d	ream of Leslie Dam including Pratten and riv or flooding is happening now. Your life is at Get full warnings and what you should do a ot guv dot ay you	rer side of Warwick must risk. Go now to a safe at Southern Downs					
SMS: Type or handwri	te, use capitals for clarity, max 612 chara	cters incls spaces. <mark>(Ideally should be < 160</mark> d	characters incl. spaces)					
Flood emergency warning from Sunwater: People downstream of Leslie Dam including Pratten & riverside of Warwick must leave immediately. Leslie Dam possible failure/is failing. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. Inglewood and Allora are safe. Get full warnings and what you should do at Southern Downs Regional Council http://disaster.sdrc.qld.gov.au/								
Remove EA from websites:	☐ 12 hrs ☐ 24 hrs ☐ 48 hrs	Specify Date & Time: Check	back in 12 hrs:					
Requesting Officer:	Replace previous EA message	/ / : nrs Contact #:	Date: / /					
Send	to	to cont	firm receipt					
FOR USE BY SDCC								
EA Request Form com	pleted by: SDCC Watch Desk 📋 R							
EA User Name:		Emergen	cy Alert No:					
Signature:		Date: / /						
Authorising Officer Nan	ne:	EMS EA	Campaign Report ID:					
Signature:		Date: / /						
Report provided to Req	uestor on EA outcomes: YES		saster ald gov ou					
THE EA WAT	uai, LA QUICK NEIEIEIICE GUIUE, LA REUL	aust onn remplate ale avallable at www.ul	sasier.yu.yuv.au					

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 Inundation maps and emergency control measures

- B1 Drawings
- B2 Flood impact—downstream
- B3 Inundation maps
- B4 Locality plan
- B5 Catchment area

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



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PILLAR 101

Subtract 0.184m to convert to AHD based on PM 16788 = EL 475.147 (AHD Registered)

	X	Y	Z
1	3851.579	8119.051	473.804
	3851.113	8134.489	473.805
Ī	3850.678	8149.552	473.802
	3850.424	8158.228	473.800
Ī	3849.749	8180.919	473.805
	3850.879	8195.008	473.810
1	3847.787	8204.695	475.022
	3847.261	8219.925	475.007
	3846.817	8235.099	475.019
1	3846.211	8248.492	475.015
	3846.058	8263.781	475.019
	3845.545	8278.972	475.021
	3845,133	8295.937	475.007
	3844.631	8309.449	475.026
	3847.282	8318.060	473.806
	3845.123	8337.536	473.807
	3844.854	8346.403	473.812
	3844.519	8357.571	473.802
	3844.213	8368.209	473.799
	3843.739	8383.796	473.813
l	3843.420	8394.660	473.809
	3843.031	8407.869	473.813
	3842.507	8425.501	473.806
	3842,073	8440.273	473.813

DAM SAFETY INVESTIGATIONS INSTRUMENTATION LAYOUT

FOUNDATION PRESSURE GAUGES

No	MONO	OFFSET
NU	MUNU	FROM AXIS
1	13	1.2
2		3.0
3	140	7.6
4		15.2
5	<u>. (0</u> .)	24.4
6	14	1.2
7	(H)	3.0
8		7.6
9		15,2
10		24.4
11	17	1.2
12	(#C)	3.0
13	(#)	7.6
14	14	15.2
15		24.4
16	21	1.2
17	M :	3.0
18	W C	7.6
19	*	15.2
20		0.9 FROM TOE

CONTRACT NUMBER

DRAWING NUMBER

236360

DATE APR 2010



Appendix B2: Flooding impact—downstream

A Failure Impact Assessment was completed by Sunwater on Leslie dam in April 2018, <u>HB# 2306329</u> (Sunwater internal link).

Flood Impact Mapping

The next page is a map of the downstream notification area for outflows from Leslie dam.



DRAWING No. 250717 B

Appendix B3: Inundation maps

Drawings:

- Keymap
- Sunny Day Failure
- Probable Maximum Flood

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

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						MAP INFORMATION Projected Coordinate System: Manning Grid of Australia	SCALE	S (A3	SIZE	Ξ)					DRAWN MB	DESIGNED		L
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VISI	28/10/22	С	LOCAL GOVERNMENT AREA BOUNDARY	LH	MGH			4		0	12	10	20 km	1.400.000		WiGIT		IN
RE	25/10/22	В	UPDATED TO 2022 FORMAT	LH	MGH	REFERENCE DRAWINGS						_		1.400,000	AFFROVED			
	10/12/18	A	ISSUED FOR USE	IDH	MGH	250835 - Sunny Day Failure									M.G. HU	GHES	©SUNWATER LIMITED	ĸ
	DATE		REMARKS	CKD	PSD	250836 - Probable Maximum Flood									19/11/2024	RPEQ: 18351	ACN 131 034 985	





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M.G. HUGHES

RPEQ: 18351

19/11/2024

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CKD PSD 250834 - Keymap



MAIN EMBANKMENT **INUNDATION PLAN**

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Appendix B4: Locality plan

Figure B3: Leslie Dam locality plan



Appendix B5: Catchment area

Figure B4: Leslie Dam declared catchment boundary plan





APPENDIX C Equipment and technical information

- C1 List of equipment available during an emergency
- C2 Leslie Dam combined rating curve
- C3 Leslie Dam storage curve
- C4 Leslie Dam storage data discharge curve
- C5 Leslie Dam discharge curve

Appendix C1 has been redacted



Storage	Sten No	Gate nu	mber and	gate opei	Discharge in	Discharge in					
AHD	Step No.	1 2		3	4	5	6	7	ML/day	m³/s	
472.51	1	0	0	0	0.1	0	0	0	760	8.8	
472.52	1	0	0	0.1	0.1	0.1	0	0	2281	26.4	
472.53	1	0	0.1	0.1	0.1	0.1	0.1	0	3805	44.0	
472.54	1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	5332	61.7	
472.55	2	0.1	0.1	0.1	0.3	0.1	0.1	0.1	6864	79.4	
472.56	2	0.1	0.1	0.3	0.3	0.3	0.1	0.1	9929	115	
472.57	2	0.1	0.3	0.3	0.3	0.3	0.3	0.1	12,998	150	
472.58	2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	16,072	186	
472.59	3	0.3	0.3	0.3	0.5	0.3	0.3	0.3	17,606	204	
472.6	3	0.3	0.3	0.5	0.5	0.5	0.3	0.3	20,665	239	
472.61	3	0.3	0.5	0.5	0.5	0.5	0.5	0.3	23,728	275	
472.62	3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	26,797	310	
472.63	4	0.5	0.5	0.5	0.8	0.5	0.5	0.5	29,092	337	
472.64	4	0.5	0.5	0.8	0.8	0.8	0.5	0.5	33,668	390	
472.65	4	0.5	0.8	0.8	0.8	0.8	0.8	0.5	38,251	443	
472.66	4	0.8	0.8	0.8	0.8	0.8	0.8	0.8	42,842	496	
472.67	5	0.8	0.8	0.8	1.2	0.8	0.8	0.8	45,890	531	
472.68	5	0.8	0.8	1.2	1.2	1.2	0.8	0.8	51,960	601	
472.69	5	0.8	1.2	1.2	1.2	1.2	1.2	0.8	58,041	672	
472.7	5	1.2	1.2	1.2	1.2	1.2	1.2	1.2	64,133	742	
472.71	6	1.2	1.2	1.2	1.6	1.2	1.2	1.2	67,187	778	
472.72	6	1.2	1.2	1.6	1.6	1.6	1.2	1.2	73,248	848	
472.73	6	1.2	1.6	1.6	1.6	1.6	1.6	1.2	79,321	918	
472.74	6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	85,405	988	
472.75	7	1.6	1.6	1.6	2.1	1.6	1.6	1.6	89,120	1031	

Appendix C2: Spillway gate automatic gate operating sequence and discharge

sunwater

Storage	Step No.	Gate nu	mber and	gate opei	Discharge in	Discharge in				
AHD		1	2	3	4	5	6	7	ML/day	m³/s
472.76	7	1.6	1.6	2.1	2.1	2.1	1.6	1.6	96 <i>,</i> 485	1117
472.77	7	1.6	2.1	2.1	2.1	2.1	2.1	1.6	103,867	1202
472.78	7	2.1	2.1	2.1	2.1	2.1	2.1	2.1	111,263	1288
472.79	8	2.1	2.1	2.1	2.71	2.1	2.1	2.1	115,765	1340
472.8	8	2.1	2.1	2.71	2.71	2.71	2.1	2.1	124,684	1443
472.81	8	2.1	2.71	2.71	2.71	2.71	2.71	2.1	133,623	1547
472.82	8	2.71	2.71	2.71	2.71	2.71	2.71	2.71	142,582	1650
472.83	9	2.71	2.71	2.71	3.32	2.71	2.71	2.71	147,011	1702
472.84	9	2.71	2.71	3.32	3.32	3.32	2.71	2.71	155,749	1803
472.85	9	2.71	3.32	3.32	3.32	3.32	3.32	2.71	164,509	1904
472.86	9	3.32	3.32	3.32	3.32	3.32	3.32	3.32	173,291	2006
472.87	10	3.32	3.32	3.32	4.01	3.32	3.32	3.32	178,105	2061
472.88	10	3.32	3.32	4.01	4.01	4.01	3.32	3.32	187,580	2171
472.89	10	3.32	4.01	4.01	4.01	4.01	4.01	3.32	197,082	2281
472.9	10	4.01	4.01	4.01	4.01	4.01	4.01	4.01	206,612	2391
472.91	11	4.01	4.01	4.01	4.81	4.01	4.01	4.01	211,856	2452
472.92	11	4.01	4.01	4.81	4.81	4.81	4.01	4.01	222,149	2571
472.93	11	4.01	4.81	4.81	4.81	4.81	4.81	4.01	232,477	2691
472.94	11	4.81	4.81	4.81	4.81	4.81	4.81	4.81	242,840	2811
472.95	12	4.81	4.81	4.81	5.61	4.81	4.81	4.81	247,736	2867
472.96	12	4.81	4.81	5.61	5.61	5.61	4.81	4.81	257,275	2978
472.97	12	4.81	5.61	5.61	5.61	5.61	5.61	4.81	266,854	3089
472.98	12	5.61	5.61	5.61	5.61	5.61	5.61	5.61	276,472	3200
472.99	13	5.61	5.61	5.61	6.51	5.61	5.61	5.61	281,444	3257
473.00	13	5.61	5.61	6.51	6.51	6.51	5.61	5.61	291,075	3369
473.01	13	5.61	6.51	6.51	6.51	6.51	6.51	5.61	300,758	3481
473.02	13	6.51	6.51	6.51	6.51	6.51	6.51	6.51	310,493	3594

sunwater

Storage Level AHD	Step No.	Gate nu	mber and	gate opei	Discharge in	Discharge in				
		1	2	3	4	5	6	7	ML/day	m³/s
473.03	14	6.51	6.51	6.51	7.49	6.51	6.51	6.51	315,356	3650
473.04	14	6.51	6.51	7.49	7.49	7.49	6.51	6.51	324,693	3758
473.05	14	6.51	7.49	7.49	7.49	7.49	7.49	6.51	334,098	3867
473.06	14	7.49	7.49	7.49	7.49	7.49	7.49	7.49	343,573	3977

Appendix C3: Leslie Dam discharge rating curve

Figure C1: Leslie Dam combined rating curve







Appendix C4: Leslie Dam storage curve



Figure C2: Leslie Dam storage curve

Appendix C5: Leslie Dam storage data

Figure C3: Leslie Dam storage data

															-
Г	EL (M)	AFEA (HA)	VOLUME (ML)	EL (M)	AREA (HA)	VOLUM	E (ML)	EL (M)	AREA (HA)	VOLUME (ML)	EL (M)	AREA (HA)	VOLU	ME (ML)	
L			TOTAL COMM			TDTAL	CDMM			TOTAL COMM			TOTAL	COMM	
	480.00	2214	238367	470.00	1046	73146		460.00	318	13860	450.00	24	507		
	479.80	2190	233965	469.80	1026	75074		459.80	308	13234	449.80	22	460		
	479.60	2165	229013	469.40	989	72045		459.40	290	12027	449.00	20	377		
	479.20	2115	221057	469.20	971	70086	1	459.20	281	11467	449.20	18	339		
	479.00	2090	216854	469.00	952	63163		459.00	271	10915	449.00	17	303		
	478.80	2065	212700	468.80	935	65276		458.80	262	10362	448.80	16	270		
	478.60	2040	208596	468.60	917	64425	1	458.60	253	9867	448.60	15	239		
	478.40	2015	204542	468.40	900	62608		456.40	244	9370	448.40	14	211		
	478.20	1989	196589	468.00	866	59076	1	458.00	227	8428	448.20	12	160		
	477.80	1939	192687	467.80	849	57361		457.80	217	7985	447.80	11	138		
	477.60	1914	188836	467.60	833	55679		457.60	209	7559	447.60	10	117		
1	477.40	1889	165034	467.40	816	54031		457.40	200	7150	447.40	9	99		
	477.20	1864	181283	467.20	800	52415		457.20	192	6758	447.20	8	- 83		
1	477.00	1837	177583	467.00	762	49287		456 80	184	6021	447.00	é l	59		
1	476.60	1011	170343	465.60	748	47774	1	456.60	169	5676	445.50	5	46		
	476.40	1759	166801	466.40	732	46294		456.40	162	5345	446.40	4	37	1	
	476.20	1734	163310	466.20	716	44847		456.20	156	5027	446.20	4	29	{	
	476.00	1709	159868	466.00	700	43432		456.00	148	4723	446.00	з	22		
	475.80	1684	156475	465.80	684	42049	1	455.80	140	4436	445.80	3	16		
	475.60	1660	153133	465.40	654	39375		455.40	132	3905	445.60	2	11		
	475.40	1635	149839	465.20	639	38083		455.20	121	3658	445.20	1	á		
	475.00	1586	143399	465.00	624	36821	1	455.00	116	3420	445.00	1	1	1	
	474.80	1562	140251	464.80	610	35587		454.80	112	3192	444.80	0	1		
1	474.60	1539	137151	464.60	595	34383		454.60	107	2974	444.60	0	0		
	474.40	1515	134098	464.40	581	33208	1	454.40	100	2766	444.40	2	0		
	474.20	1492	131092	464.20	552	32061		454.20	92	2396	444.20		0		
	474.00	1468	128132	463.80	538	29853		453.80	80	2231	443.80	ő	ŏ		
	473.60	1421	122356	463.60	524	28791		453.60	74	2077					
	473.40	1398	119538	463.40	511	27756		453.40	69	1934					
	473.20	1375	116765	463.20	498	26747		453.20	65	1800					
	473.00	1353	114038	463.00	485	25764		453.00	60	1676					
	472.80	1331	111355	462.60	460	23877	1	452.60	53	1451					
	472.50	1309	108/15	462.40	448	22969		452.40	49	1349					
	472.20	1267	103564	462.20	436	22085		452.20	46	1254					
	472.00	1246	101051	462.00	424	21226	1	452.00	43	1165					
	471.80	1226	98579	461.80	412	20390		451.80	41	1081					
	471.60	1205	96149	461.60	389	195/9		451.60	39	1002					
	471.40	1185	93760	461.20	378	18024	1	451.20	35	856					
	471.00	1105	91410	461.00	368	17278		451.00	33	789					
	470.80	1126	86829	460.80	357	16554	1	450.80	31	725					
	470.60	1106	84598	460.60	347	15851	1	450.60	59	666					
	470.40	1086	82408	460.40	337	15168		450.40	27	609					
	470.20	1066	80257	460.20	327	14504	ì	450.20	26	556					
_															
State	Datum: -	AHD - PM167	88 @ EL 475.162m AHD (Left bank w	a11)					SANDY CREEK	BASIN 422				
Comput	ted usin	g DTM produ	ced from 1994 echosoun	dings, fiel	d surveys			14 State 1 State	22.23	LESLIE DAM 8	3.4 Km			A3-205:	135
ang 15 Stage	II FSL	EL 472.410	m AHO [1263 ba:	106,250 ML	1	1				TOTAL STORAGE			L		
Latitude: 28 13 08 Longitude: 151 55 01															
sacchi	actic are	a. 603 80	кш			11+	1.15			le topter				A 19/06/97	′
Revision: - A 19/03/2001 - Level Datum new Reference PSD Drod/S SIURAGE DATA															



Appendix D Interaction with local government and district groups

Appendix D has been redacted

Annexe — Leslie 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. Leslie Dam is releasing excess water into the Upper Condamine River. People downstream of Leslie Dam should STAY INFORMED and MONITOR CONDITIONS. Water flows from Leslie 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 releasing from Leslie Dam into the Upper Condamine River has increased significantly. Water flows from Leslie Dam may contribute to dangerous/widespread flooding downstream. Expect increased river flows in 6-12 hours/later today/overnight/tomorrow. People downstream of Leslie 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 Leslie Dam including Pratten and riverside of Warwick must LEAVE IMMEDIATELY. Leslie Dam possible failure/is failing. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. Inglewood and Allora are safe. Get full warnings and what you should do at Southern Downs Regional Council http://disaster.sdrc.qld.gov.au/