EMERGENCY ACTION PLAN — MOURA OFFSTREAM STORAGE (ID 2033)

ISSUE: 7.4 — September 2022 **Expiry:**

Prepared by **Sunwater Limited**

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Approved by the delegate of the Chief Executive, Department of Regional Development, Manufacturing and Water until 1 October 2023.

Emergency activation quick reference

The Emergency Action Plan (EAP) for Moura Offstream Storage covers four 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.**

Table 1: Emergency activation quick reference

Dam Hazards and section numbers	Activation Levels			
	Alert	**Lean Forward**	**Stand Up**	**Stand Down**
	• Locally managed (DDO)	• Locally managed (DDO and IC)	• Locally managed (DDO and IC) with advice from DSTDM	• Locally managed (DDO and IC) with advice from DSTDM
	Activation triggers for dam hazards			
Flood operations **See section 5**	• EL 125.19m and rising	• Storage above FSL 125.29m	• Storage above EL 126.29m	• Storage level FSL 125.29m
Piping: embankment, foundation, or abutments **See section 6**	• Increasing leakage through an embankment, the foundations, or abutments	• Increasing leakage through an embankment, the foundations, or abutments with cloudy water	• Piping condition has been established	• Risk assessment has determined that failure risk has reduced
Earthquake **See section 7**	• Earthquake reported or felt in the area, AND • Intensity less than 5 Modified Mercalli (MM)	• Earthquake reported or felt in the area, AND • Intensity greater than or equal to 5MM, OR • Intensity less than 5MM and change detected during surveillance inspection	• Earthquake reported or felt in the area, AND • A possible failure path has been identified	• Risk assessment has determined that failure risk has reduced
Terrorist threat/activity or high energy impact **See section 8**	• Not applicable	• Not applicable	• Possible terrorist activity noticed at the 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

CONTINUED NEXT PAGE: EMERGENCY ACTIVATION QUICK REFERENCE

Emergency activation quick reference – Other Emergency Situations

The EAP for Moura Offsite Storage 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.**

Table 1: Emergency activation quick reference (continued)

Other Emergency Situations and section numbers	Activation levels		
	Communications Failure – Dam Site (DDO)	**Communications Failure – Local Area (LEC/ORR)**	**Communications Failure – Brisbane (IC/DSTDM)**
	• Site managed (DDO - becomes LEC)	• Brisbane managed by Incident Coordinator (IC)	• Locally managed by Local Event Coordinator (LEC)
	Activation triggers for other emergency situations		
Comms Failure **See section 9**	• Unable to communicate to or from Dam site	• Unable to communicate to or from Local Area	• Unable to communicate to or from Sunwater Brisbane

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Document control

Authorisation of document

Name	Position/role	Signature	Date
	Emergency Action Plan Coordinator — Error checked and prepared for submission		26 Sep 2022

Document revision history

Version	Date	Prepared by	Reason for change	Hummingbird ref. no.
1	March 2008		Significant changes of Moura Offstream Storage Emergency Action Plan to reflect Sunwater Management structure and other minor changes.	
2			Created but not issued—will be issued as Issue 3, consistent with all 2011 EAPs.	
3	October 2011		Significant changes to all sections of Moura Offstream Storage Emergency Action Plan to reflect current Sunwater Management structure and other changes.	
4	October 2015		New Emergency Action Plan developed at expiry of 3E approval. Issued for consultation with Relevant Disaster Management Groups.	HB # 1820869
5	September 2016		Updates to notification & communication lists and Emergency Alert sections.	HB # 2026781
6	October 2017		New Emergency Action Plan with minor amendments including contact list updates.	HB # 2106041
7	October 2018		Revised and reviewed Emergency Action Plan developed at expiry of approval. Also includes: updates that reflect the Water Legislation (Dam Safety) Amendment Act 2017, implementation of changes to Sunwater management structure, new event management roles and addition of new Emergency Activation section (Other Emergency Situations).	HB # 2288354
7.1	September 2019		Amended contacts and associated sections, e.g., Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes.	HB # 2473055
7.2	September 2020		Amended contacts and associated sections, e.g., Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes.	HB # 2572819
7.3	September 2021		Amended contacts and associated sections, e.g., Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes 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 # 2653213
7.4	September 2022		Amended contacts and associated sections. Minor error corrections and other non-substantive changes. The Chemical Hazard section has been removed as it is not a Dam Safety Hazard and is dealt with in other more relevant documents.	HB # 2726200

Controlled document distribution list

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1.	Operator Maintainer	Sunwater, Theodore
2.	Operations Manager	Sunwater, Biloela
3.	Emergency Action Plan Coordinator	Sunwater, Brisbane
4.	Deputy Local Disaster Coordinator—Local Disaster Management Group (LDMG)	Banana Shire Council, Biloela
5.	Officer in Charge—Theodore (QPS1)	Police, Theodore
6.	Officer in Charge—Moura (QPS2)	Police, Moura
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Senior Flood Forecaster	Bureau of Meteorology, Brisbane
Note: Communication information for each 'Electronic Copy Holder' is in Appendix A.	

1. References, abbreviations, and definitions

1.1 References/associated documents

Ref.	Document title	Reference/location
A	Emergency action plan for referable dam guideline (DRDMW 2021)	https://www.resources.qld.gov.au/__data/assets/pdf_file/0018/84015/eap-guideline.pdf
B	Guidelines on Selection of Acceptable Flood Capacity for Dams (ANCOLD, 2000)	ANCOLD
C	Guidelines on Consequence Categories for Dams (ANCOLD, 2012)	ANCOLD ISBN: 978-0-9808192-5-0
D	Australian Rainfall and Runoff (ARR) 2016	http://book.arr.org.au.s3-website-ap-southeast-2.amazonaws.com/
E	Guideline for Failure Impact Assessment of Water Dams (DNRME 2018)	https://www.resources.qld.gov.au/__data/assets/pdf_file/0005/78836/guidelines-failure-impact-assessment.pdf
F	Water Act 2000	https://www.legislation.qld.gov.au/view/pdf/inforce/current/act-2000-034
G	Water Supply (Safety and Reliability) Act 2008 — Current 08 March 2022	https://www.legislation.qld.gov.au/view/whole/pdf/inforce/current/act-2008-034
H	Queensland Dam Safety Management Guidelines (DNRME October 2020)	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/2013-09-23/act-2002-054
J	Queensland Disaster Management Act 2003 — Current 08 April 2022	https://www.legislation.qld.gov.au/view/pdf/inforce/current/act-2003-091
K	Queensland Emergency Alert Manual – M.1.174 (February 2022)	https://www.disaster.qld.gov.au/dmg/st/Documents/M1174-Queensland-Emergency-Alert-Manual.pdf
L	Queensland Government Communications and systems for public information and warnings	https://www.disaster.qld.gov.au/dmg/Response/Pages/5-6.aspx
M	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
N	Sunwater (internal) Strategic Event Procedure	Strategic Event Procedure
O	Queensland State Disaster Management Plan 2018 (Queensland's Disaster Management Committee)	https://www.disaster.qld.gov.au/cdmp/Documents/Queensland-State-Disaster-Management-Plan.pdf
P	Queensland Disaster Management Guidelines	https://www.disaster.qld.gov.au/dmg/Pages/DM-Guideline.aspx
Q	Queensland Rainfall and River Conditions (BOM-Flood Warning)	http://www.bom.gov.au/qld/flood/index.shtml?ref=hdr
R	Sunwater (internal) Emergency Alert Protocol	eDOCS# 2156253
S	Sunwater (internal) Moura Offstream Storage Operation and Maintenance Manual	Moura OS O&M Manual

Ref.	Document title	Reference/location
T	Sunwater (internal) Moura Offstream Storage Safety Condition Schedule	eDOCS# 1740572
U	Sunwater (internal) Moura Offstream Storage Failure Impact Assessment 2017	eDOCS# 2219650

1.2 Abbreviations and acronyms

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

1.3 Business terms and definitions

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

Term	Definition
Terms defined with reference to the *Water Supply (Safety and Reliability) Act 2008* (ref G)	
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 *dam hazard* 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 *district group* 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 *dam hazard*.

Emergency event	Means an event arising from a *dam hazard* 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 *relevant entities*, is likely to be required; each *local group* and *district group* for the EAP, each local government whose area may be affected, the chief executive, another entity the owner of the dam considers appropriate, OR
	  ○ the event may arise because of a disaster situation declared under the Disaster Management Act, OR
	  ○ an entity performing functions under the State *Disaster Management Plan* 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 *dam hazard*.
Notice response	A dam owner's written response to a notice following an assessment of an EAP by a local government or *district group*.

Term	Definition
Referable dam	A dam, or a proposed dam after its construction, will be a referable dam if: • a failure impact assessment of the dam, or the proposed dam, is carried out under the 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.
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 farm land 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 *Queensland Disaster Management Guidelines* (ref O)	
Activation levels	The four levels of EAP activation are: • **Alert:** A heightened level of vigilance due to the possibility of an event occurring. No further action may be required; however, the situation should be monitored by someone capable of assessing the potential of the threat. Moving to an Alert level indicates the dam owner is getting ready to activate the Lean Forward level of the EAP if the situation deteriorates. • **Lean Forward:** An operational state characterised by a heightened level of situational awareness of an impending disaster event and a state of operational readiness. Disaster coordination centres are on standby and prepared but not activated. • **Stand Up:** The operational state where resources are mobilised, personnel are activated, and operational activities commenced. Disaster coordination centres are activated. The dam owner needs to provide an Emergency Event Report (EER) in accordance with the provision of the Act. • **Stand Down:** Transition from responding to an event back to normal core business and/or continuance of recovery operations. There is no longer a requirement to respond to the event and the threat is no longer present. The movement through these levels of activation is not necessarily sequential. It should be applied with flexibility and adaptability and be tailored to the location and event. Triggering one of these levels of activation may not necessarily mean a similar activation of LDMGs or DDMGs.

Term	Definition
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.
Chemical spill/toxic condition	The contamination of water in the storage of the dam that could create a dam hazard.
Concurrent Flooding	Flood flows downstream of a dam that are not a result of dam outflows, for instance those from adjacent catchments or from the sea, and which occur in the same period as downstream releases or flooding from the dam.
Dam crest (ref B)	The lowest elevation of the non-overflow crest section of the dam excluding handrails, parapets or wave walls that have not been designed to store water.
Dam crest flood (ref B)	The flood event which, when routed through the reservoir, results in a still water reservoir level equivalent to the lowest dam crest level.
Dam failure	Dam failure is the physical collapse of all or part of a dam or the uncontrolled release of any of its contents.
Downstream releases	Downstream releases are outflows from the dam made through appurtenant structures such as spillways or outlet works that are in accordance with the design of the dam.
Earthquake	A sudden release of energy in the earth's crust or upper mantle, usually caused by movement along a fault plane or by volcanic activity, resulting in the generation of seismic waves that can be destructive. The potential consequences of an earthquake include: • settlement, sliding, or overturning of monoliths in the dam wall • initiation of seepage lines in the foundations or abutments that could lead to piping damage and potential inoperability of appurtenant works.
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 to 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 (ref H)	The flood resulting from the probable maximum precipitation coupled with the worst flood-producing catchment conditions that can be realistically expected in the prevailing meteorological conditions.
Probable maximum precipitation (ref H)	The theoretical greatest depth of precipitation for a given duration that is physically possible over a particular drainage basin.

Term	Definition
Probable maximum precipitation design flood (ref D)	The flood resulting from the probable maximum precipitation coupled with typical catchment conditions.
Stability, main embankment	High foundation pore pressure peaks may reduce the Factor of Safety against slip circle failure to an unacceptable level.
'Sunny day' failure	'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 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 352H of the Act.

Summary of legal requirements – Section 352H

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

and for each of these dam hazard types (e.g., flood operations, or chemical spill/toxic conditions):

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

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

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

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

The local government whose area may be affected by a dam hazard for Moura Offsite Storage has been determined as **Banana Shire Council (BSC)**. Sunwater has provided the BSC with a copy of the draft EAP for assessment.

Section 352HC of the Act states that a district group may review the EAP for consistency with its disaster management plan. The district group for Moura Offsite Storage is **Gladstone Police District Disaster Management Group (DDMG)**. Sunwater has provided the DDMG 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 event or emergency event for the dam happens
- to identify dam hazards that could occur at Moura Offstream Storage 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 Moura Offstream Storage 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 Moura Offstream Storage by the owner of the dam (Sunwater) and the communication and notification of dam hazards to the LDMGs, DDMGs and broader community. However, the EAP sits within the broader emergency response framework. This EAP has been developed to be consistent with and support the objectives of the Banana Local Disaster Management Plan.

2.3 Scope

The Moura Offstream Storage EAP covers:

- dam hazards evaluated within Sunwater's Dam Safety Management Program
- details about the dam that are relevant to a dam hazard
- identification of circumstances that indicates a material increase in the likelihood of a dam hazard event and/or emergency event happening
- triggers for activation of a tiered response to dam hazard event 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.

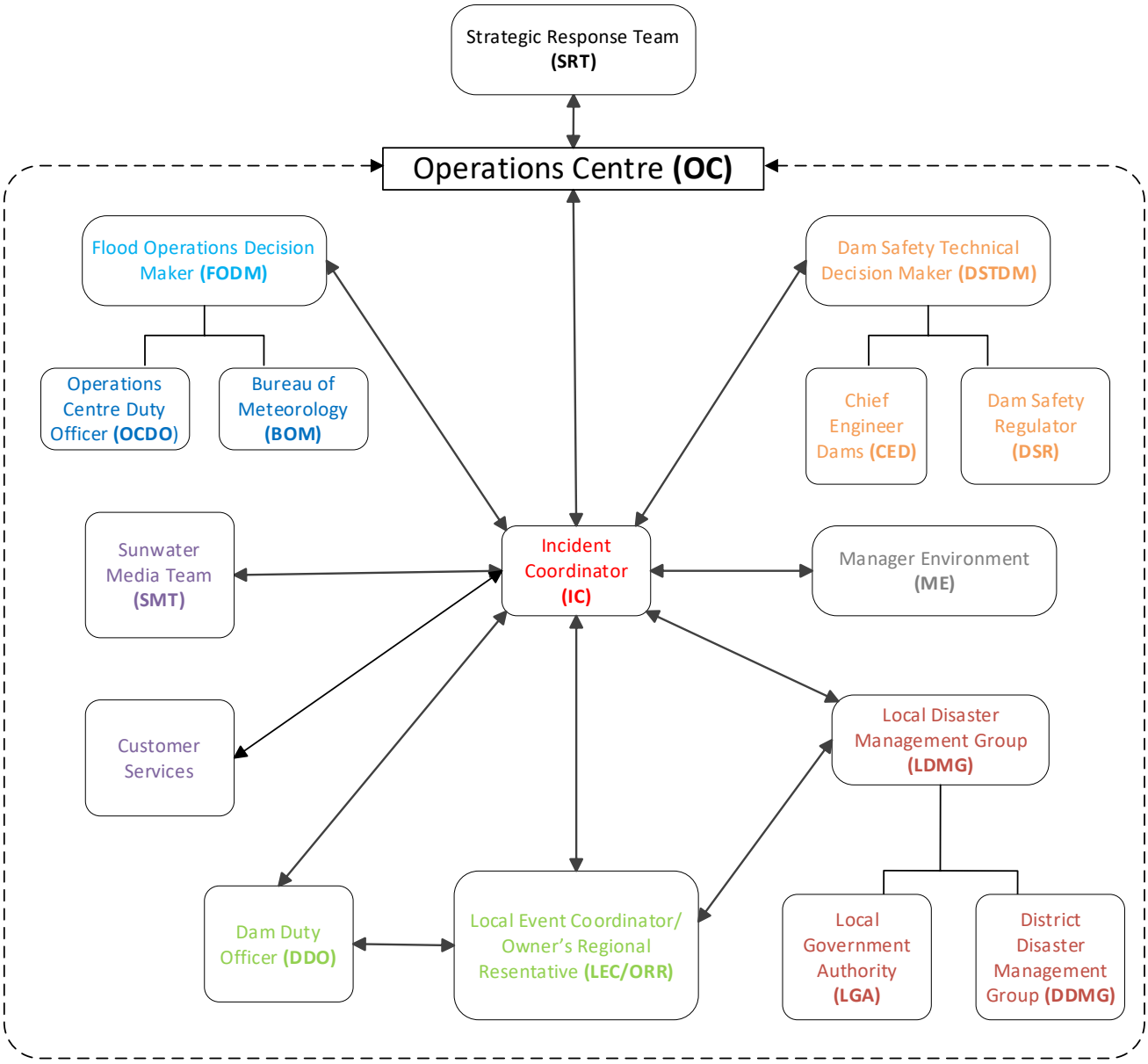
2.4 Sunwater provides training

- Training of the use and implementation of this EAP document is carried out at various times throughout the year, but specific pre- wet season training is undertaken in the months leading up to the wet season at each dam site.
- During this time Sunwater staff have work 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. This on-site training is presented to relevant Sunwater staff (DDO's, LECs and ICs) and disaster management stakeholders. DSTDM information sessions are carried out once a year with the same walkthrough of new changes and Q & A but this is not specific to any one Dam. New employees to these various roles would also have a walkthrough of the EAP to understand after they start at Sunwater.
- 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 SDCC and include the (non- live) testing of Emergency Alerts. The test results relating to numbers of alerts generated will be shared with local authority and disaster management stakeholders.

2.5 Dam emergency organisation 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 are:

- Central to the framework is the role of Incident Coordinator (IC) for any dam hazard at a dam. The IC will maintain overall responsibility for 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.

- 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.

2.6 Community information

- Sunwater with the assistance of Banana Shire Council will ensure community education around messaging and impacts of the EAP and its related events is undertaken and continually improved by incorporating actions from Lessons learnt (section 2.7).
- Sunwater currently provides information externally to customers, downstream 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, Twitter, the Sunwater web page, Sunwater App and at several regional show/field days across regional Queensland where Sunwater may have stalls and information available.
- Immediately D/S residents of Moura Offstream Storage are also provided information in text message/phone calls in the event of an activation of this EAP.
- In the event of an emergency event or when otherwise required, Sunwater and the affected Local government also have the use of the National Emergency Alert System to send a voice message and SMS. This service is provided by Telstra and managed by the State Disaster Coordination Centre. The process Sunwater follows is documented in Appendix A7.
- 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.

2.7 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 DRDMW as appropriate.
- In addition, Sunwater requests any post event learnings be communicated regarding operational effectiveness and areas for improvement.

2.8 Downstream notifications lists

- Sunwater has compiled the notification lists through an iterative process. At least every three years Sunwater writes to all lot on plan landholders that are impacted in the downstream zones. In addition to individual letters, advertisements are placed yearly in local papers to capture any new residents in the areas. All year, applicable individuals can register to receive notifications for this EAP and are able to register either through the Sunwater website or by calling Sunwater Customer Enquiries on 13 15 89.

3. Dam details

3.1 General dam information

Location: Moura Offstream Storage is situated approximately 8 km southwest of Moura and approximately 2 km from the right bank of Dawson River. It consists largely of an 800 m long embankment, with a maximum height of 10.5 m above the natural surface. There is also a spillway at the northern end of the embankment or right abutment and is a 50 m wide un-gated concrete crest flow control structure.

Purpose: Moura Offstream Storage was built to supplement the Moura Weir pond, for the benefit of 'Queensland Nitrates Pty Ltd' who pumps from the weir. The Storage is a part of a water harvesting system. This system conveys water from the Dawson River via a pumped rising main to an Offstream storage in periods of high river flow or flood conditions, and returns the water under gravity, when required, during low flows in the river for distribution downstream via the river system.

Catchment: The catchment area of Moura Offstream Storage is 11.1 km^2.

Storage Capacity: The storage capacity at FSL is 2,820 ML.

Construction: The construction of Moura Offstream Storage was completed in January 1999. The spillway is an ungated, broad crested weir, with a grassed chute located on the right bank.

Specification: The table below lists general specifications of Moura Offstream Storage.

Table 2: Moura Offstream Storage specifications

Description	Specification
Dam type	**Central core earthfill embankment**
Full Supply Level (FSL)	EL 125.29m
Embankment Crest Level (DCL)	EL 127.29m
Historical recorded storage	N/A
Storage capacity at FSL	2,820ML
Storage area at FSL	75ha
Catchment area	11.1km^2
Max. embankment height	10.5m
Total length of dam	770m
Crest width	3.5m
Spillway type	Uncontrolled broad crest
Spillway crest level	EL 126.25m
Spillway crest length	50m
Spillway design capacity (AEP 1 in 100)	33m^3/s (2,851ML/d)
DCF spillway capacity	85m^3/s (7,344ML/d)
Outlet conduit	Outlet pipe size: 750mm, MSCL encased in concrete connected to 900mm dia. rising main
Rising main	2 x 660mm MSCL at pump station, joining to 900mm RC, length: 2,010m
Return line	10m long 200mm dia. DICL pipe and 6m long 200mm dia. UPVC pipe

All levels are to Australian Height Datum (AHD).
Conversion for Moura Offstream Storage is AHD = State Datum + 0.093m

3.2 Population at risk

The FIA study (ref U) showed that flood induced embankment overtopping in the Probable Maximum Flood (PMF) was found to be the critical failure event with an incremental Population at Risk (PAR) of 17. As more than 2, but fewer than 100 people are at risk under Dam Failure, Moura Offstream Storage is designated as a 'Category 1' referable dam under the *Water Act (2000)*.

3.3 Spillway adequacy

The hydrologic modelling undertaken for the FIA study (ref U) demonstrated that the current configuration of the dam can safely pass flood events up to an annual exceedance probability (AEP) of between 1 in 2,000 and 10,000 with initial storage levels at FSL and the spillway crest respectively. Further improvements to increase the flood capacity of the dam are currently being considered as part of Sunwater's Dam Improvement Program.

3.4 General arrangement

The general arrangement drawings are in Appendix B.

3.5 Emergency inspections and monitoring

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

3.5.1 Inspections

The following inspections are to be carried out:

- **Routine Visual Inspection**: Conducted as per the ANCOLD guidelines or as directed by the DSTDM
- **Detailed Inspection:** Conducted annually
- **Comprehensive Inspection**: Conducted 5-yearly

3.5.2 Instrumentation and monitoring

A level sensor at the storage measures the storage level, and data is automatically relayed back to the Theodore Office. To confirm the structural behaviour and safety of the embankment, the following instrumentation was installed, and is monitored, at Moura Offstream Storage.

- **Settlement/movement measurement**

- 5 surface settlement points along the axis and 3 survey control stations.

The instrumentation layout drawings are in Appendix B.

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 event • Record communications, notifications and observations as required	CEO EGMO EGME&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 Log Books, SOPs, Data Books, and EAPs are reviewed annually as per the Condition Schedule • Undertake and prepare the 5 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	SCED PDSE CED MAP
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 • Undertake the role of LEC as required • Ensure all work orders, work instructions and lesson learned outcomes are fully implemented. • Record communications, notifications and observations as required	OCO OMGR OS
Technical 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 • Determine response to incidents and emerging issues • Record communications, notifications and observations as required	ME

Roles and responsibilities	Position holder
Dam Safety Technical Decision Maker (DSTDM) • Maintain current RPEQ accreditation • Analyse the situation and provide expert technical advice in relation to Dam Safety • Discuss Dam Hazard with peers and other technical experts and make sound decisions to mitigate the risk • Determine response to incidents and emerging issues • Issue warning on dam failure and advise on protective measures • Ensure the EAP is implemented appropriately and carry out the DSTDM role as required • Liaise with Regulator as required • Record communications, notifications and observations as required	Various personnel as per DSTDM roster
Flood Operations Decision Maker (FODM) • Maintain current RPEQ accreditation. • Provide hydrological advice in relation to predicted and actual dam outflows including assessment of weather and flood warnings and other related matters as identified in the OC SOP. • Interpret and apply rainfall data in accordance with the OC SOP, including, as required under the OC SOP, liaising with BOM. • Ensure the EAP is implemented appropriately and carry out the FODM role as required. • Record communications, notifications and observations as required.	Various personnel as per FODM roster
Operations Centre Duty Officer (OCDO) • Decide if a flood is imminent and record modes of operation • 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 • Liaise with the FODM or IC to update current flood situation and routing data • Record communications, notifications and observations as required	Various personnel as per OC roster
Sunwater Media Team (SMT) • Analyse sensitive issues, discuss with the Owner and issue media releases • Handle public and customer comments (including social media) and advise the Owner if necessary • Liaise with the IC and update SDMG of flood events • Record communications, notifications and observations as required	Various personnel as per Media Team roster
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

Roles and responsibilities	Position holder
Dam Duty Officer (DDO) • Complete accreditation to operate and maintain relevant storage • Ensure the EAP is implemented appropriately and carry out the DDO role as required • Take direction from the DSTDM and IC as requested • Arrange immediate site inspection and make informed assessment of the situation • Escalate any issue not covered in the EAP or where actions are not clear • Record communications, notifications and observations as required	SOM SS OM
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 Management Plan	
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 • Identify and provide advice to DDMG about support services required by the LDMG to manage an EAP event • Provide reports and make recommendations to the relevant DDMG about matters relating to EAP events and any support required QFES • Work with dam owner and LDMG to ensure Emergency Alerts polygons are prepared, stored and tested at the State Watch Desk DDMG • May review EAP for consistency with the District Disaster Management Plan	LDMG QFES DDMG
Dam Safety Regulator (DSR) • Liaise with relevant Minister on necessary actions • Approve this document as required under legislation • Liaise with chief executive as required in administering (regulating) the Water Supply (Safety and Reliability) Act 2008	DDS

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 Moura Offstream Storage to Full Supply Level (FSL) 125.29m and the rate of inflow exceeds the capacity of the outlet works. The most recent Flood Impact Assessment (ref X) found that flooding downstream is likely to be confined to the gully to the north of the storage. The failure path breaches toward the Northeast toward the Dawson Highway. For more information regarding the flood impact extent, refer to the maps in Appendix B of this EAP. These flood flows can create a dam hazard. Inflows will also cause the storage to temporarily rise to above the FSL of the storage. Note:
  - The greater the rate of inflow, the higher the storage will rise.
  - The higher the storage level rises, the greater the loads on the dam structure.
  - Although unlikely, the greater the loading, the higher the likelihood of a dam failure.

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

- Spillway discharge from the dam where there have been no indications that a dam failure may be initiating or in progress.

The area likely to be affected by this emergency event is described as:

- As the rate of discharge increases, there will be an impact on low-level road crossings of Dawson River and other infrastructure in the river such as pump sites.

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 3: Flood emergency activation trigger summary

Alert	• EL 125.19m and rising (0.1m below FSL)
Lean Forward	• Storage above FSL 125.29m
Stand Up—1	• Storage above EL 126.29m (spillway crest level)
Stand Up—2	• Storage above EL 126.79m (0.5 below dam crest level)
Stand Up—3	• Storage above EL 127.29m (dam crest level)
Stand Down	• Storage FSL 125.29m and falling

While this EAP is not activated until Moura Offstream Storage reaches EL 125.19m, Sunwater and Banana Shire Council 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 SOP.

5.2.2 Emergency action roles

Table 4 to Table 8 specify emergency actions for the following roles:

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

Table 4: Flood operations—DDO emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Up—3	Stand Down
Activation trigger	• EL 125.19m and rising (0.1m below FSL)	• Storage above FSL 125.29m	• Storage above EL 126.29m	• Storage above EL 126.79m	• Storage above EL 127.29m	• Storage level FSL 125.29m and falling
Actions	• Inspect the dam tri-weekly (or as instructed by the DSTDM), and photograph/video and record using the approved forms in Appendix D and send to IC and DSTDM • Monitor catchment conditions • Record the storage level tri-weekly (or as instructed by the DSTDM) using gauge boards • Record all communication • Log Book entries as per SOP 12	• As per previous activation level, AND • When storage level is above Max. OL (FSL125.29) release water into the river through the return line until FSL is achieved • Notify the SO (who will be available for duty for the duration of a flood or Emergency Event)	• As per previous activation level, AND • Inspect the dam daily or as instructed by the DSTDM), and photograph/video and record using the approved forms in Appendix D and send to IC and DSTDM. Attention will be given to: – visual inspection of flow patterns over spillway and dissipater for evidence of scouring – inspect embankment for leaks, deformation, and erosion – obvious signs of seepage • Report any unusual readings or observations to the DSTDM and IC as soon as practical • Photograph spillway and DS face at regular intervals	• As per previous activation level	• As per previous activation level, AND • Remotely inspect the dam twice daily or as instructed by the DSTDM), and photograph/video and record using the approved forms in Appendix D and send to IC and DSTDM	• Return to routine surveillance activities and frequencies—inspect the dam for any damage and photograph any damage identified • Forward information for EER to IC email • Update Dam Log Book as per SOP 12
Internal notifications	1. IC 2. SO	• 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
External notifications	• As required	• As required	• As required	• As required	• As required	• As per previous activation level

Table 5: Flood operations—LEC emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Up—3	Stand Down
Activation trigger	• EL 125.19m and rising (0.1m below FSL)	• Storage above FSL 125.29m	• Storage above EL 126.29m	• Storage above EL 126.79m	• Storage above EL 127.29m	• Storage level FSL 125.29m and falling
Actions	• Liaise with LDMG re: situation • Develop/implement staff roster • Record all communication	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• Forward information for EER to IC email • Return to routine activities
Internal notifications	1. IC 2. DDO	• 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
External notifications	3. LDMG	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level

Table 6: Flood operations—IC emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Up—3	Stand Down
Activation trigger	• EL 125.19m and rising (0.1m below FSL)	• Storage above FSL 125.29m	• Storage above EL 126.29m	• Storage above EL 126.79m	• Storage above EL 127.29m	• Storage level FSL 125.29m and falling
Actions	• **Liaise with Sunwater Customer Support to send SMS to D/S residents** • Obtain catchment conditions from the DDO • Liaise with the DSTDM • Record all communication • Create Incident Report Record • **Update Sunwater Intranet with dam status** **NOTE**: IC to carry out LEC actions unless LDMG is stood up	• As per previous activation level, AND • Ensure all abnormal observations or damage has been reported to DSTDM	• As per previous activation level	• As per previous activation level	• 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
Internal notifications	5. DDO 6. DSTDM 7. LEC/ORR 8. SMT 9. SRT	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• Inform previous notifications of deactivation as required
External notifications	1. D/S Residents 2. QPS1 3. QPS2 4. DDMG	• As per previous activation level	• As per previous activation level,	• As per previous activation level, AND • SDCC Watch Desk	• As per previous activation level	• As per previous activation level

Table 7: Flood operations—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	• When EL 125.19m and rising (0.1m below FSL)	• **LDMG** • QPS1 • QPS2 • DDMG	• Phone	Describe current situation with dam—What is the event? What is the status? Advise of current storage level
Lean Forward	• Storage above FSL 125.29m	• **LDMG** • QPS1 • QPS2 • DDMG	• Phone	Describe current situation with dam—What is the event? What is the status? Advise of current storage level
Stand Up—1	• Storage above EL 126.29m	• **LDMG** • QPS1 • QPS2 • DDMG	• Phone	Describe current situation with dam—What is the event? What is the status? Advise of current storage level and whether any flood releases are due to commence Discuss any potential road/bridge closures Advise of any forecasts you are aware of
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Customer Support to send SMS:** SUNWATER EMERGENCY NOTIFICATION DAM: MOURA OS EVENT: FLOOD STATUS: STORAGE SPILLING ACTION: ACTIVATE YOUR FLOOD PLAN

Table 7 (Continued): Flood operations—LEC and IC Communication Plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Stand Up—2	• Storage above EL 126.79m	• **LDMG** • QPS1 • QPS2 • DDMG	• 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
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Customer Support to send SMS:** SUNWATER EMERGENCY NOTIFICATION DAM: MOURA OS EVENT: FLOOD STATUS: STORAGE SPILLING ACTION: LISTEN TO ABC OR LOCAL RADIO
Stand Up—3	• Storage above EL 127.29m	• **LDMG** • QPS1 • QPS2 • DDMG	• 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
		• SDCC Watch Desk	• Phone & Email	**Complete Emergency Alert Request Form as per instructions (copies in Appendix A7 and Appendix D) and email to SDCC Watch Desk to send to D/S Residents.** **SMS text as follows:** IMMINENT FAILURE OF MOURA OFFSTREAM STORAGE TAKE ACTION TO PROTECT LIFE AND LEAVE NOW. AREAS AROUND MOURA ARE AT RISK. INFO ON ABC RADIO. MOURA IS SAFE.
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Customer Support to send SMS:** IMMINENT FAILURE OF MOURA OFFSTREAM STORAGE TAKE ACTION TO PROTECT LIFE AND LEAVE NOW. AREAS AROUND MOURA ARE AT RISK. INFO ON ABC RADIO. MOURA IS SAFE.
Stand Down	• Storage level FSL 125.29m and falling	• **LDMG** • QPS1 • QPS2 • DDMG	• Phone	Describe current situation with Dam—What is the event? What is the status? Advise of current storage level Advise EAP has been deactivated
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Customer Support to send SMS:** SUNWATER EMERGENCY NOTIFICATION DAM: MOURA OS EVENT: FLOOD STATUS: DAM HAZARD STOOD DOWN ACTION: NONE

Table 8: Flood operations—DSTDM emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Up—3	Stand Down
Activation trigger	• EL 125.19m and rising (0.1m below FSL)	• Storage above FSL 125.29m	• Storage above EL 126.29m	• Storage above EL 126.79m	• Storage above EL 127.29m	• Storage level FSL 125.29m and falling
Action	• Provide technical advice to DDO and IC on a needs basis • Record all communication • Review surveillance reports and determine if any additional responses are required • Notify DSR	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• Forward information for event report to IC email • Return to routine activities
Internal notifications	1. DDO 2. IC	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level, AND • CEO—if time permits	• As per previous activation level
External notifications	3. DSR	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level

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

6.1 Overview

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

If a pipe is established and progresses, then a dam failure may result. If a potential pipe is detected early, remedial repairs maybe 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

6.1.1 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 increase likelihood of piping. This circumstance is the trigger for the alert status for piping.

Cloudy seepage water is a circumstance that could indicate an increase likelihood of piping. This circumstance is the trigger for the lean forward status for piping.

6.2 Emergency action roles

Table 9 to Table 13 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: Piping: embankment, foundation, or abutments flowchart

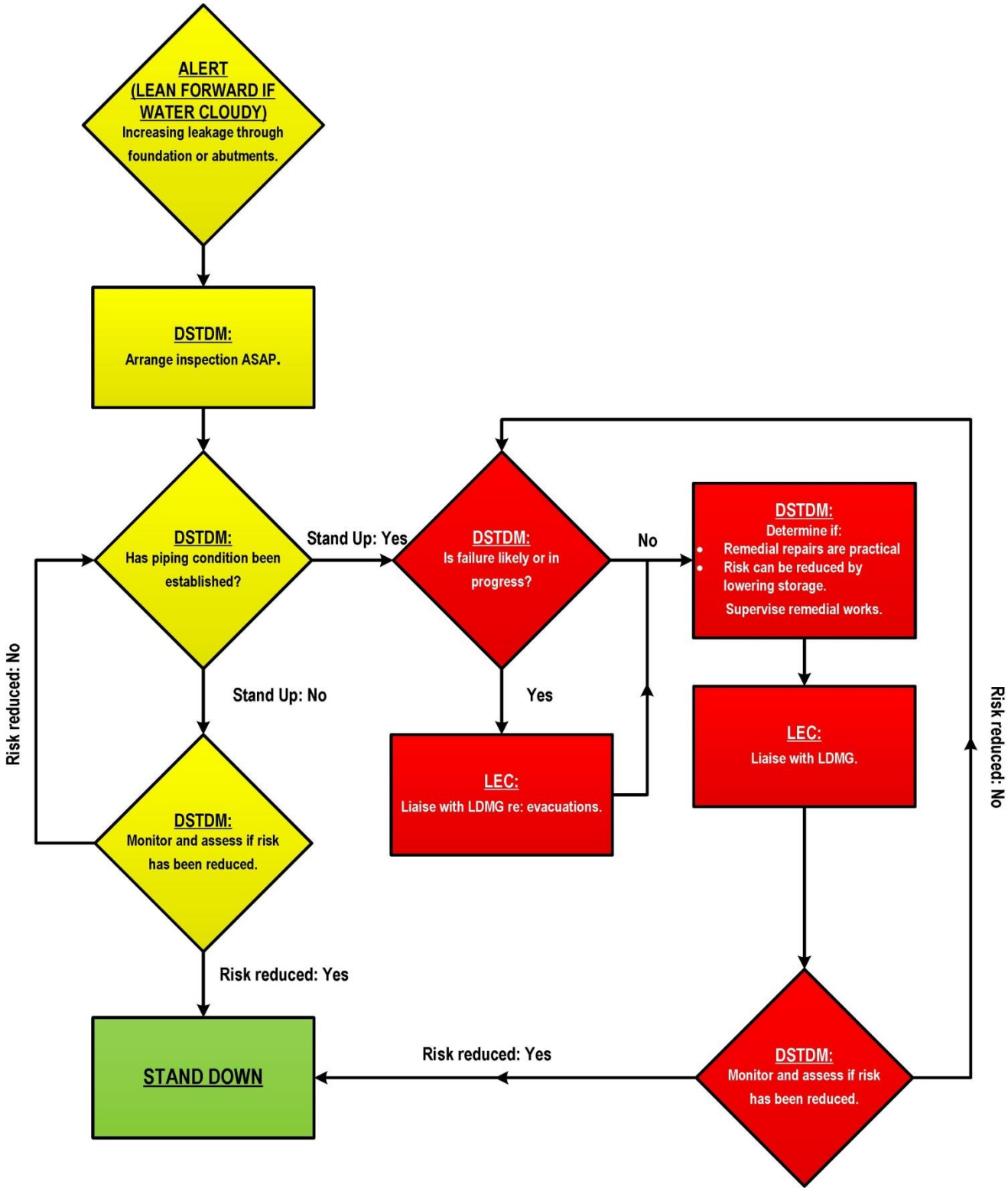


Table 9: Piping: embankment, foundation, or abutments—DDO emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Increasing leakage through 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	• Monitor flows every 6 hours or until a decreasing trend is observable, or as directed by the DSTDM • Photograph/video the piping from a safe point and record using the approved forms in Appendix D and send to IC and DSTDM • Notify SO • Update Dam Log Book as per SOP12 • Record all communication	• As per previous activation level	• As per previous activation level, AND • Support/supervise remedial works as required • Lower the storage if directed • Close any affected roads if not already closed by others • Maintain surveillance of area immediately downstream of dam (if safe to do so) and move on any members of the public	• As per previous activation level, AND • Vacate the immediate vicinity of the piping condition	• Forward information for event report to IC • Return to routine activities • Update Dam Log Book as per SOP12
Internal notifications	1. DSTDM 2. IC 3. SO	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level
External notifications	• As required	• As required	• As required	• As required	• As per previous activation level

Table 10: 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	• Liaise with DDO and IC re: situation • Record all communication	• 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 information for EER to IC email • Return to routine activities
Internal notifications	1. IC 2. DDO	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level
External notifications	3. LDMG	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level

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

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Increasing leakage through 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	• Liaise with DSTDM, DDO & LEC re: situation • Create Incident Report Record • **Update Sunwater Intranet with dam status** • Record all communication **NOTE**: IC to carry out LEC actions unless LDMG is *Stood Up*	• As per previous activation level, AND • Investigate availability of machinery and materials (if insufficient stockpiles available) • Place machinery operators on standby if directed by DSTDM • Consider the need to appoint a recovery coordinator. The recovery coordinator is then responsible for the follow through on actions to close out all matters and works outstanding after the initial emergency is over.	• As per previous activation level, AND • Mobilise resources to undertake remedial works if directed by DSTDM	• As per previous activation level	• Deactivate EAP Event • Compile EER and deliver to DSR if required • Close Incident Report Record • **Update Sunwater Intranet with dam status** • Return to routine activities
Internal notifications	1. DSTDM 2. DDO 3. LEC/ORR 4. SMT 5. SRT	• As per previous activation level	• As per previous activation level	• As per previous activation level	• Inform previous notifications of deactivation as required
External notifications	6. DDMG	1. QPS1 2. QPS2 3. DDMG	• As per previous activation level, AND 1. D/S residents 2. SDCC Watch Desk	• As per previous activation level	• As per previous activation level

Table 12: Piping: embankment, foundation, or abutments—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	• Increasing leakage through an embankment, the foundations, or abutments	• **LDMG**	• Phone	Describe current situation with dam—What is the event? *(Unconfirmed piping risk)* What is the status? (Unconfirmed leakage—Investigation continues) Advise of current storage level Advise any issues you are aware of Standby for further advices
Lean Forward	• Increasing leakage through the embankment, the foundations or abutments with cloudy water	• **LDMG** • QPS1 • QPS2 • DDMG	• 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 advices
Stand Up—1	• Piping condition has been established	• **LDMG** • QPS1 • QPS2 • DDMG	• Phone	Describe current situation with dam—What is the event? *(Confirmed piping risk)* What is the status? (Confirmed piping/leakage) Advise of current storage level Advise any issues you are aware of. Discuss any potential road/bridge closures Prepare for possible evacuations
		• SDCC Watch Desk	• Phone & Email	**Complete Emergency Alert Request Form as per instructions (blank copy in Appendix D) and email to SDCC Watch Desk to send.** ***Develop messages in consultation with DSTDM***
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Customer Support to send SMS:** Sunwater Emergency notification DAM: Moura OS EVENT: Dam safety risk—piping STATUS: Confirmed—piping/leakage ACTION: Possible issue at dam listen for further advice

Table 12 (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** • QPS1 • QPS2 • DDMG	• Phone	Describe current situation with dam—What is the event? *(Confirmed piping risk)* What is the status? (Possible Dam Failure) Advise of current storage level Prepare coordinated evacuations
		• SDCC Watch Desk	• Phone & Email	**Complete Emergency Alert Request Form as per instructions (blank copy in Appendix D) and email to SDCC Watch Desk to send.** ***Develop messages in consultation with DSTDM***
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Customer Support to send SMS:** Sunwater Emergency notification—urgent DAM: Moura OS EVENT: Dam safety risk—piping STATUS: Dam failure likely ACTION: Possible evacuation follow instructions of emergency services
	• Dam failure in progress	• **LDMG** • QPS1 • QPS2 • DDMG	• Phone	Describe current situation with dam—What is the event? *(Confirmed piping risk)* What is the status? (Dam Failure In Progress) Advise of current storage level Coordinate evacuations of affected Downstream Residents and move people to higher ground
		• SDCC Watch Desk	• Phone & Email	**Complete Emergency Alert Request Form as per instructions (copies in Appendix A7 and Appendix D) and email to SDCC Watch Desk to send.** **SMS text as follows:** IMMINENT FAILURE OF MOURA OFFSTREAM STORAGE TAKE ACTION TO PROTECT LIFE AND LEAVE NOW. AREAS AROUND MOURA ARE AT RISK. INFO ON ABC RADIO. MOURA IS SAFE.
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Customer Support to send SMS:** IMMINENT FAILURE OF MOURA OFFSTREAM STORAGE TAKE ACTION TO PROTECT LIFE AND LEAVE NOW. AREAS AROUND MOURA ARE AT RISK. INFO ON ABC RADIO. MOURA IS SAFE.
Stand Down	• Risk assessment has determined that piping risk has reduced	• **LDMG** • QPS1 • QPS2 • DDMG)	• 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	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Customer Support to send SMS:** Sunwater Emergency notification DAM: Moura OS EVENT: Dam safety risk—piping STATUS: Dam hazard stood down ACTION: None

Table 13: 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 • Notify DSR	• As per previous activation level	• As per previous activation level, AND • Assess risk and determine if failure likely or in progress • Liaise with the DDO & IC • Determine if remedial repairs are practical • Determine if risks can be reduced by lowering storage. • Supervise* remedial repairs (if applicable)	• As per previous activation level, AND • Liaise with the IC and advise on need to recommend evacuations	• Forward information for EER to IC email • Return to routine activities
Internal notifications	1. DDO 2. IC	• As per previous activation level	• As per previous activation level	• As per previous activation level, AND • CEO—if time permits	• As per previous activation level
External notification	3. DSR	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level

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

7. Dam hazard—earthquake

7.1 Overview

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

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

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

- Use the Sunny Day Failure (SDF) outline when a dam failure is in progress or likely due to earthquake damage and no concurrent flooding or downstream releases are occurring or expected to occur, or
- Use the Probable Maximum Flood (PMF) outline when a dam failure is in progress or likely due to earthquake damage and concurrent flooding or downstream releases are occurring or expected to occur.

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

7.2 Emergency action roles

Table 14 to Table 18 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 3: Earthquake flowchart

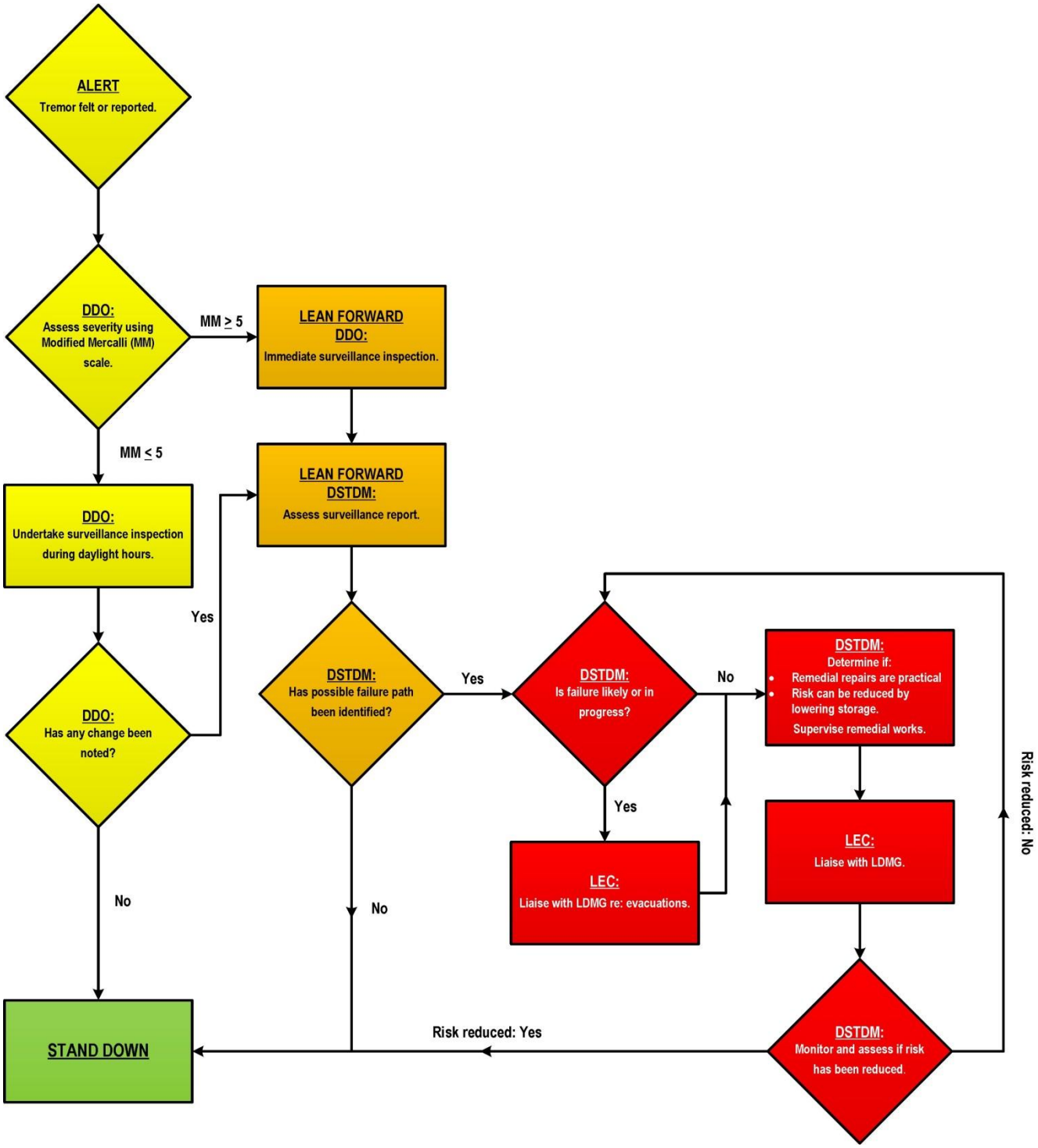


Table 14: Earthquake—DDO emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Earthquake reported or felt in the area, AND • Intensity less than 5MM*	• 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	• Failure in progress or likely due to earthquake, AND • Sufficient water in storage to create a dam hazard	• Risk assessment has been determined that failure risk has reduced
Actions	• Inspect the dam wall, spillway structure, and abutments in daylight hours (if safe to do so); photograph/video and record using the approved forms in Appendix D and send to IC and DSTDM • Check for leaks, deformation, erosion, and concrete damage • Notify SO • Update Dam Log Book as per SOP12 • Record all communication	• As per previous activation level, AND • **Unless completed in Alert Stage**, immediately inspect the dam wall, spillway structure, and abutments (if safe to do so); photograph/video and record using the approved forms in Appendix D and send to IC and DSTDM • Repeat the inspection as directed	• As per previous activation level, AND • Support/supervise remedial work as required • Lower the storage if directed • Close any affected roads, if not already closed by others • Maintain surveillance of area immediately downstream of dam or Saddle Dams (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 information for EER to IC email • Update Dam Log Book as per SOP12 • Return to routine activities
Internal notifications	1. DSTDM 2. IC 3. LEC 4. SO	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level
External notifications	• As required	• As required	• As required	• As required	• As per previous activation level

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

Table 15: Earthquake—LEC emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Earthquake reported or felt in the area, AND • Intensity less than 5MM	• 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	• Failure in progress or likely due to earthquake, AND • Sufficient water in storage to create a dam hazard	• Risk assessment has been determined that failure risk has reduced
Actions	• Liaise with DDO and IC re: situation • Record all communication	• As per previous activation level, AND • Liaise with LDMG re: situation	• As per previous activation level, AND • Liaise with DDO and relevant Council(s) regarding potential road/bridge closures	• As per previous activation level	• Forward information for EER to IC email • Return to routine activities
Internal notifications	1. IC 2. DDO	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level
External notifications	3. LDMG	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As per previous activation level

Table 16: Earthquake—IC emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Earthquake reported or felt in the area, AND • Intensity less than 5MM	• 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	• Failure in progress or likely due to earthquake, AND • Sufficient water in storage to create a dam hazard	• Risk assessment has been determined that failure risk has reduced
Actions	• Liaise with DDO, DSTDM & LEC re: situation • Record all communication • Create Incident Report Record • **Update Sunwater Intranet with dam status** **NOTE**: IC to carry out LEC actions unless LDMG is *Stood Up*	• As per previous activation level, AND • Investigate availability of machinery and materials (if insufficient stockpiles available) • Place machinery operators on standby if directed by DSTDM	• As per previous activation level, AND • Mobilise resources to undertake remedial works if directed by DSTDM	• As per previous activation level	• Deactivate EAP • Compile EER and deliver to the DSR if required • Close Incident Report Record • **Update Sunwater Intranet with dam status** • Return to routine activities
Internal notifications	1. DDO 2. DSTDM 3. LEC/ORR 4. SMT 5. SRT	• As per previous activation level	• As per previous activation level	• As per previous activation level	• Inform previous notifications of deactivation as required
External notifications	• As required	• As required	1. D/S Residents 2. SDCC Watch Desk 3. QPS1 4. QPS2 5. DDMG	• As per previous activation level	• As per previous activation level

Table 17: Earthquake—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	• Earthquake reported or felt in the area, AND • Intensity less than 5MM	• **LDMG**	• Phone	Describe current situation with dam—What is the event? (Dam Safety Risk—Earthquake damage) What is the status? (Under investigation) Advise current storage level Stand by for further information
Lean Forward	• 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	• **LDMG**	• Phone	Describe current situation with dam—What is the event? (Dam Safety Risk—Earthquake damage) What is the status? (Under investigation) Advise current storage level Stand by for further information
		Send Sunwater Incident and Near Miss Report		EAP Alert Notification—Moura OS—Earthquake reported in area
Stand Up—1	• Earthquake reported or felt in the area, AND • A possible failure path has been identified	• **LDMG** • QPS1 • QPS2 • DDMG	• Phone	Describe current situation with dam—What is the event? (Dam Safety Risk—Earthquake felt or reported in area) What is the status? (Possible earthquake damage to dam) Advise of current storage level. Discuss any potential road/ bridge closures Activate emergency response
		• SDCC Watch Desk	• Phone & Email	**Complete Emergency Alert Request Form as per instructions (blank copy in Appendix D) and email to SDCC Watch Desk to send.** ***Develop messages in consultation with DSTDM***
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Customer Support to send SMS:** Sunwater Emergency notification DAM: Moura OS EVENT: Dam safety risk—earthquake damage STATUS: Confirmed—earthquake damage ACTION: Possible issue at dam listen for further advice

Table 17 (Continued): Earthquake—LEC and IC communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Stand Up—2	• Failure likely due to earthquake, AND • Sufficient water in storage to create a dam hazard	• **LDMG** • QPS1 • QPS2 • DDMG	• Phone	Describe current situation with dam—What is the event? *(Dam Safety Risk—Earthquake damage)* What is the status? (Dam Failure Likely) Advise of current storage level. Discuss any potential road/bridge closures (if not discussed at Stand Up—1) Prepare coordinated evacuation
		• SDCC Watch Desk	• Phone & Email	**Complete Emergency Alert Request Form as per instructions (blank copy in Appendix D) and email to SDCC Watch Desk to send.** ***Develop messages in consultation with DSTDM***
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Customer Support to send SMS:** Sunwater Emergency notification—urgent DAM: Moura OS EVENT: Dam safety risk—earthquake damage STATUS: Dam failure likely ACTION: Possible evacuation follow instructions of emergency services
	• Dam failure in progress	• **LDMG** • QPS1 • QPS2 • DDMG	• Phone	Describe current situation with dam—What is the event? *(Dam Safety Risk—Earthquake damage)* What is the status? (Dam Failure In Progress) Advise of current storage level Coordinate evacuation of Downstream Residents and move people to higher ground
		• SDCC Watch Desk	• Phone & Email	**Complete Emergency Alert Request Form as per instructions (copies in Appendix A7 and Appendix D) and email to SDCC Watch Desk to send.** **SMS text as follows:** IMMINENT FAILURE OF MOURA OFFSTREAM STORAGE TAKE ACTION TO PROTECT LIFE AND LEAVE NOW. AREAS AROUND MOURA ARE AT RISK. INFO ON ABC RADIO. MOURA IS SAFE.
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Customer Support to send SMS:** IMMINENT FAILURE OF MOURA OFFSTREAM STORAGE TAKE ACTION TO PROTECT LIFE AND LEAVE NOW. AREAS AROUND MOURA ARE AT RISK. INFO ON ABC RADIO. MOURA IS SAFE.
Stand Down	• Risk assessment has been determined that failure risk has reduced	• **LDMG** • QPS1 • QPS2 • DDMG	• Phone	Describe current situation with dam—What is the event? *(Dam Safety Risk—Earthquake damage)* What is the status? (Dam hazard Stood Down) Advise risk assessment has been determined that failure risk has reduced and that EAP has been deactivated
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Customer Support to send SMS:** Sunwater Emergency notification DAM: Moura OS EVENT: Dam safety risk—earthquake damage STATUS: Dam hazard stood down ACTION: None

Table 18: Earthquake—DSTDM emergency action

Activation level	Alert	Lean Forward	Stand Up—1	Stand Up—2	Stand Down
Activation trigger	• Earthquake reported or felt in the area, AND • Intensity less than 5MM	• 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	• Failure in progress or likely due to earthquake, AND • Sufficient water in storage to create a dam hazard	• Risk assessment has been determined that failure risk has reduced
Action	• Monitor situation and assess risks • Liaise with DDO & IC • Record all communication • Notify DSR **NOTE:** 'Reported' is defined as an alert received from Geoscience Australia or other source that advises an Earthquake >4.8ML (Richter Scale) has occurred within a 200km radius of the Dam.	• As per previous activation level, AND • Review surveillance inspection of the dam and assess its condition as soon as possible • Determine if there are any possible failure paths from reported damage	• As per previous activation level, AND • Arrange an inspection of the dam and assess its condition as soon as possible, when safe to do so • Assess risk and determine if failure likely or in progress • Determine if remedial repairs are practical • Determine if risks can be reduced by lowering storage • Supervise* remedial repairs (if applicable)	• As per previous activation level	• Forward information for EER to IC email • Return to routine activities
Internal notifications	1. DDO 2. IC	• As per previous activation level	• As per previous activation level, AND • CEO—if time permits	• As per previous activation level	• As required
External notification	3. DSR	• As per previous activation level	• As per previous activation level	• As per previous activation level	• As required

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

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

8.1 Overview

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

The vulnerability of Moura Offstream Storage to a terrorist attack or high energy impact 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 a terrorist attack or a 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 a terrorist attack or a 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 a terrorist attack or a high energy impact and concurrent flooding or downstream releases are occurring or expected to occur.

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

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

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

8.2 Emergency action roles

Table 19 to Table 23 specify emergency actions for the following roles:

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

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

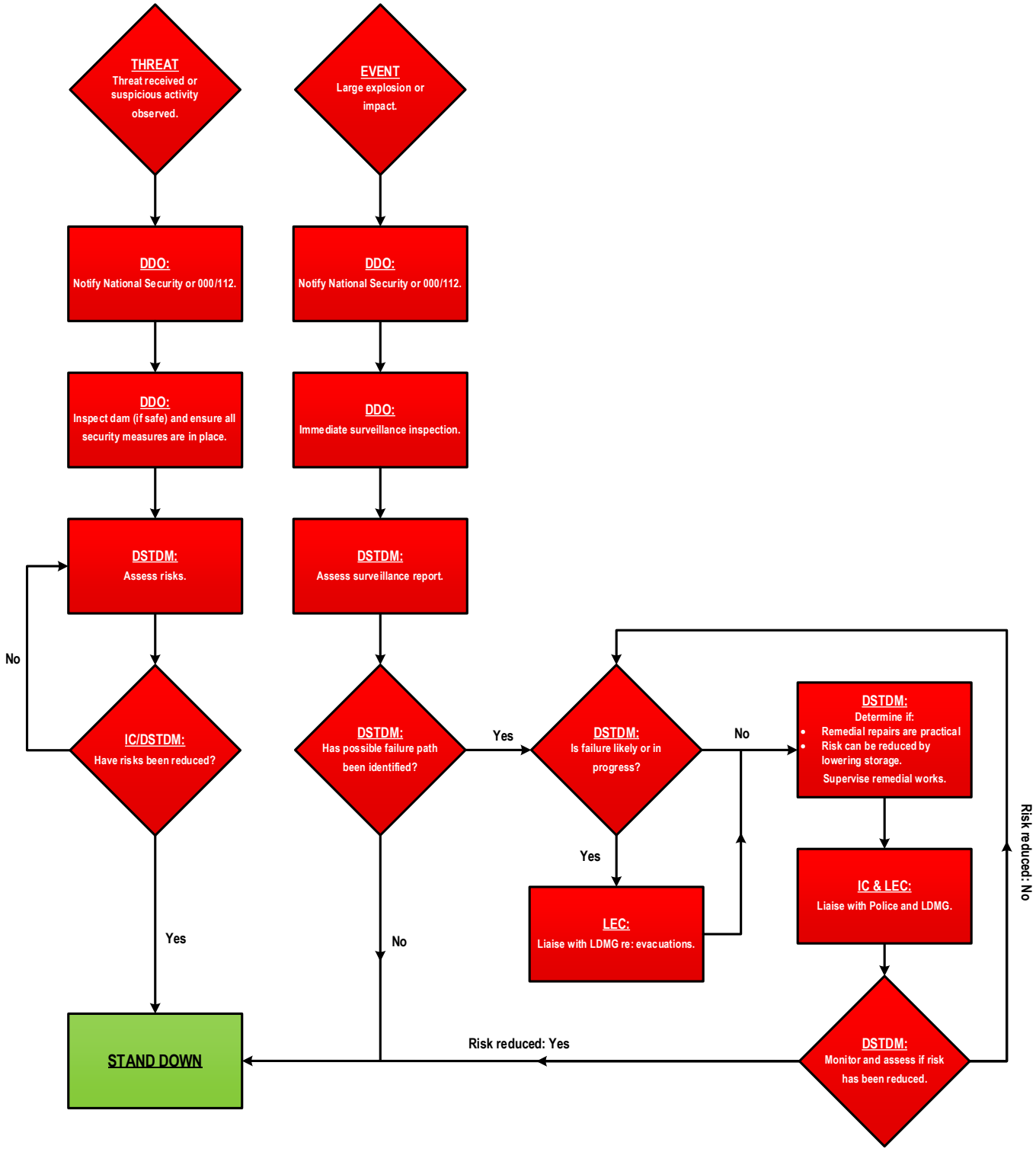


Table 19: Terrorist threat/activity or high energy impact—DDO emergency action

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 • 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 the approved forms in Appendix D and send to IC & DSTDM • If Police appoint incident manager support and follow instructions • Close any affected roads as directed • Notify SO • Update Dam Logbook as per SOP 12	• As per previous activation level, AND • Vacate the immediate vicinity of the affected area	• As per previous activation level, AND • Lower reservoir level, if directed by DSTDM • Sound siren	• Forward information for EER to IC email • Update Dam Logbook as per SOP12 • Return to routine activities
Internal notifications	• Not applicable	2. DSTDM 3. IC 4. SO	• As per previous activation level	• As per previous activation level	• As per previous activation level
External notifications	• Not applicable	1. **#000 Emergency**	• As required	• As required	• As per previous activation level

Table 20: 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 • Threat received	**EVENT** • Large explosion heard/observed at dam (e.g., bomb explosion, aircraft hit)	**RESPONSE** • Failure in progress or likely due to impact or explosion, AND • Sufficient water in storage to create a dam hazard	• Risk assessment has determined that failure risk has reduced
Actions	• Not applicable	• Liaise with DDO, IC and LDMG re: situation • If Police appoint incident manager support and follow instructions • Monitor situation and assess risks • Liaise with relevant Council(s) regarding possible road/bridge closures • Record all communication	• As per previous activation level	• As per previous activation level, AND • Liaise with DDO and LDMG re: potential for evacuations	• Forward information for EER to IC email • Return to routine activities
Internal notifications	• Not applicable	1. DDO 2. IC	• As per previous activation level	• As per previous activation level	• As per previous activation level
External notifications	• Not applicable	3. LDMG	• As per previous activation level	• As per previous activation level	• As per previous activation level

Table 21: 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 • Threat received	**EVENT** • Large explosion heard/observed at dam (e.g., bomb explosion, aircraft hit)	**RESPONSE** • Failure in progress or likely due to impact or explosion, AND • Sufficient water in storage to create a dam hazard	• Risk assessment has determined that failure risk has reduced
Actions	• Not applicable	• Record all communication • Liaise with DDO, DSTDM and LEC • Contact National Security • If Police appoint incident manager support and follow instructions • Create Incident Report Record • **Update Sunwater Intranet with dam status** **NOTE**: IC to carry out LEC actions unless LDMG1 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 Event • Compile EER and organise delivery to the DSR if required • Close Incident Report Record • **Update Sunwater Intranet with dam status** • Return to routine activities
Internal notifications	• Not applicable	3 DDO 4. DSTDM 5. LEC/ ORR 6. SMT 7. SRT	• As per previous activation level	• As per previous activation level	• Inform previous notifications of deactivation as required
External notifications	• Not applicable	**1. CTG** 2. DDMG	• As per previous activation level, AND 1. D/S Residents 2. SDCC Watch Desk	• As per previous activation level	• As per previous activation level

Table 22: Terrorist threat/activity or high energy impact—LEC and IC communication plan

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 • Threat received	• **LDMG** • QPS1 • QPS2 • DDMG • 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)	• **LDMG** • QPS1 • QPS2 • DDMG • CTG (if not at Stand Up—1)	• Phone	Describe current situation with dam—What is the event? (Dam Safety Risk—Security threat/ impact/explosion, etc.) What is the status? (Under Investigation) Discuss any potential road/bridge closures (if not discussed at Stand Up—1) Prepare coordinated evacuation
		• SDCC Watch Desk	• Phone & Email	**Complete Emergency Alert Request Form as per instructions (blank copy in Appendix D) and email to SDCC Watch Desk to send.** ***Develop messages in consultation with DSTDM***
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Customer Support to send SMS:** Sunwater Emergency notification—urgent DAM: Moura OS EVENT: Dam safety risk—security threat/impact/explosion STATUS: Under investigation ACTION: Possible evacuation follow instructions of emergency services
Stand Up—3	**RESPONSE** • Failure in progress or likely due to impact or explosion, AND • Sufficient water in storage to create a dam hazard	• **LDMG** • QPS1 • QPS2 • DDMG	• 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
		• SDCC Watch Desk	• Phone & Email	**Complete Emergency Alert Request Form as per instructions (copies in Appendix A7 and Appendix D) and email to SDCC Watch Desk to send. SMS text as follows:** IMMINENT FAILURE OF MOURA OFFSTREAM STORAGE TAKE ACTION TO PROTECT LIFE AND LEAVE NOW. AREAS AROUND MOURA ARE AT RISK. INFO ON ABC RADIO. MOURA IS SAFE.
		• D/S Residents	• SMS (Phone for those without mobiles)	***Liaise with Sunwater Customer Support to send SMS:*** IMMINENT FAILURE OF MOURA OFFSTREAM STORAGE TAKE ACTION TO PROTECT LIFE AND LEAVE NOW. AREAS AROUND MOURA ARE AT RISK. INFO ON ABC RADIO. MOURA IS SAFE.

Table 22 (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 Down	• Risk assessment has determined that failure risk has reduced	• **LDMG** • QPS1 • QPS2 • DDMG	• Phone	Describe current situation with dam—What is the event? (Dam Safety Risk—Security threat/ impact/explosion, etc.) What is the status? (Dam hazard Stood Down) Advise that failure risk has been reduced and EAP has been deactivated
		• D/S Residents	• SMS (Phone for those without mobiles)	**Liaise with Sunwater Customer Support to send SMS:** Sunwater Emergency notification DAM: Moura OS EVENT: Dam safety risk—security threat/impact/explosion STATUS: Dam hazard stood down ACTION: None

Table 23: Terrorist threat/activity or high energy impact—DSTDM emergency action

Activation level	Alert/Lean Forward	Stand Up—1	Stand Up—2	Stand Up—3	Stand Down
Activation trigger	• Not applicable	**THREAT** • Possible terrorist activity/suspicious behaviour noticed at the dam • Threat received	**EVENT** • Large explosion heard/observed at dam (e.g., bomb explosion, aircraft hit)	**RESPONSE** • Failure in progress or likely due to impact or explosion, AND • Sufficient water in storage to create a dam hazard	• Risk assessment has determined that failure risk has reduced
Action	• Not applicable	• Record all communication • Liaise with IC and DDO • Assess risks • Liaise with SRT • Notify DSR	• As per previous activation level, AND • Arrange an inspection of the dam and assess its condition as soon as possible, when safe to do so • Assess risk and determine if failure likely or in progress • Determine if remedial repairs are practical • Determine if risks can be reduced by lowering storage • Supervise* remedial repairs (if applicable) • Monitor situation and assess risks	• As per previous activation level, AND • Liaise with the IC and advise on need to recommend evacuations	• Forward information for EER to IC email • Return to routine activities
Internal notifications	• Not applicable	1. IC 2. DDO 3. SRT	• As per previous activation level	• As per previous activation level	• As per previous activation level
External notification	• Not applicable	4. DSR	• As per previous activation level	• As per previous activation level	• As per previous activation level

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

9. Other emergency situation—communications failure

9.1 Overview

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

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

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

9.2 Emergency actions

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

9.2.1 Activation triggers

Table 24: Communications failure emergency activation trigger summary

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

9.2.2 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 on a daily basis in accordance with the Operations Centre (OC) SOP. 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.

9.2.3 Emergency action roles

Table 24 to Table 28 specify emergency actions for the following roles:

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

Table 25: 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 – Fax-generally uses fixed landline and is therefore less likely to have failed – Social Media-e.g. Facebook (Internet may be available via landline) • Record all communication and attempts via Dam Log Book entries as per SOP 12 and communications log if EAP event is current	• Determine if LEC is in communication and if not, assume the LEC role as much as is practicable • Continue tasks in accordance with any other current Emergency Action • Every hour attempt communications by all means noting the following: – Mobile phone-try texting instead of voice, much higher probability of success – Satellite Phone-needs to access open sky unless external antenna fitted – Fax-generally uses fixed landline and is therefore less likely to have failed – Social Media-e.g. Facebook (Internet may be available via landline) • Record all communication and attempts via Dam Log Book entries as per SOP 12 and communications log if EAP event is current
Internal notifications	1. IC 2. SO (if available)	1. LEC 2. SO (if available)
External notifications	• As required	• As required

Table 26: Communications failure—LEC emergency action

Activation level	Comms Failure – Dam Site	Comms Failure – Brisbane
Activation trigger	• Unable to communicate to Dam site	• Unable to communicate to Sunwater Brisbane including IC or DSTDM or FODM
Actions	• Every hour attempt communications by all means noting the following: – Mobile phone-try texting instead of voice, much higher probability of success – Satellite Phone-needs to access open sky unless external antenna fitted – Fax-generally uses fixed landline and is therefore less likely to have failed – Social Media-e.g. Facebook (Internet may be available via landline) • Record all communication and attempts • Assume that the DDO is carrying out LEC role at site as much as practicable • Liaise with IC • Liaise with DSTDM • As much as is practicable continue other tasks associated with the role in accordance with any other current Emergency Action	• 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 – Fax-generally uses fixed landline and is therefore less likely to have failed – Social Media-e.g. Facebook (Internet may be available via landline) • Record all communication and attempts • Liaise with the DDO and assume IC role • As much as is practicable continue other tasks associated with the role in accordance with any other current Emergency Action
Internal notifications	1. IC 2. DSTDM 3. SO (if available)	1. DDO 2. DSTDM (if available) 3. SO
External notifications	4. LDMG	4. LDMG 5. QPS 6. DDMG

Table 27: Communications failure—LEC and IC communication plan

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

Table 28: Communications failure—DSTDM 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	• 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
Internal notifications	1. IC 2. LEC And CEO (if time permits)	1. IC 2. DDO (if available) And CEO (if time permits)
External notifications	3. DSR (if applicable)	3. DSR (if applicable)

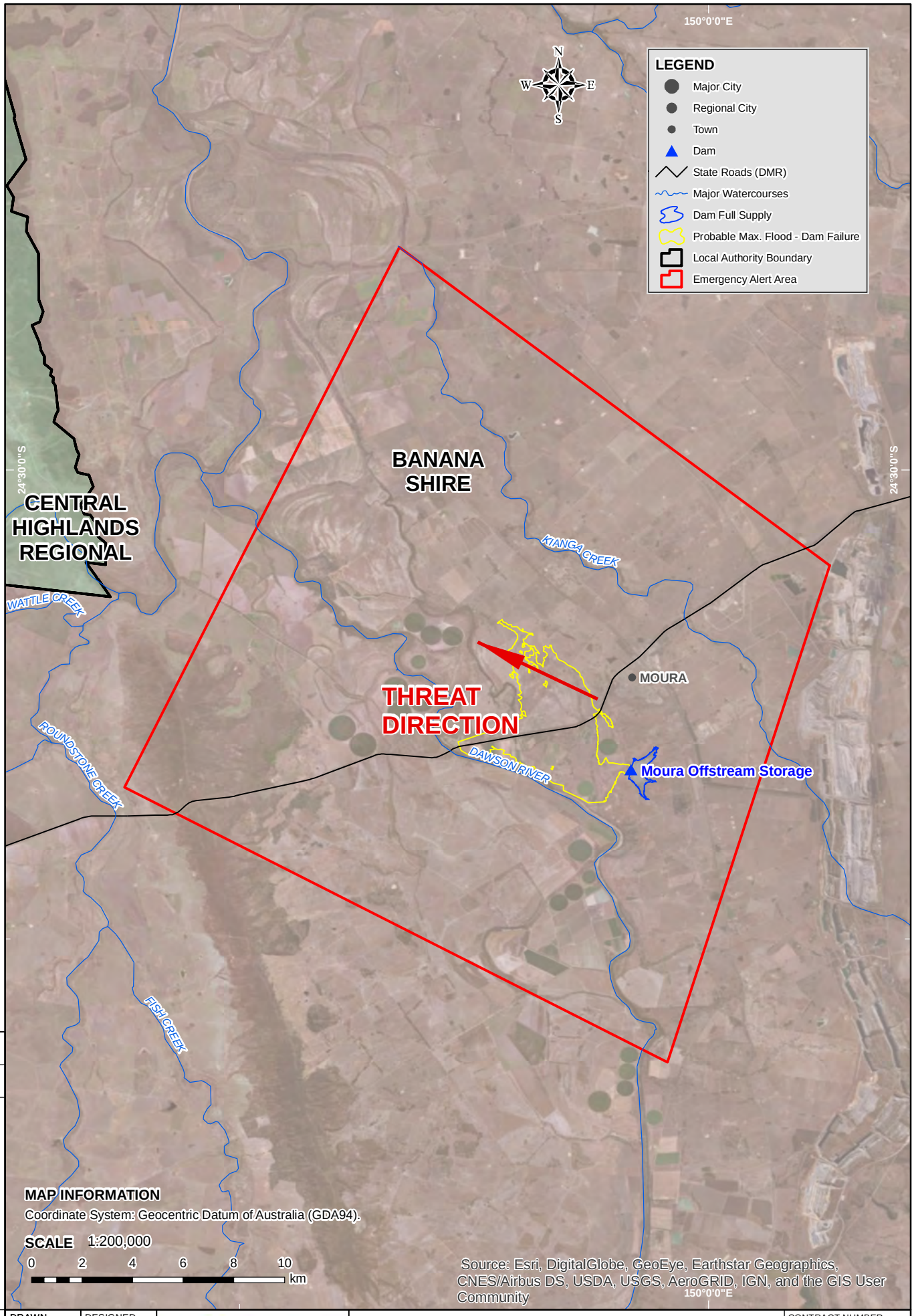
APPENDIX A Notification and communication lists

A1 Sunwater regional notification list
A2 Sunwater Brisbane notification list
A3 External notification list
A4 D/S residents notification list
A5 Other reference contacts
A6 Emergency alert polygon
A7 Dam failure emergency alert request

Appendix A1 to A5 have been redacted

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-WSRW-38-01-05-01 EAP Mapping\Drawings\ArcMap\Emergency Alerts\249583-A.mxd
Printed: Tuesday, 23/01/2018 11:27:08 AM

MAP PRODUCED BY:
ASSET DELIVERY
TEL. (07)3120 0000



REVISION	DATE	REMARKS	CKD	PSD
A	23/01/18	ISSUED FOR USE	MB	MH

DRAWN IDH | DESIGNED
CHECKED MB | CHECKED
APPROVED M. HUGHES 23/1/2018

SunWater

MOURA OFFSTREAM STORAGE
EMERGENCY ACTION PLAN
EMERGENCY ALERT AREA

CONTRACT NUMBER
DRAWING NUMBER 249583
REV. A
SHEET 1 OF 1
DATE JANUARY 2018

Appendix A7: 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 Watch Desk to activate the Moura Offstream Storage Emergency Polygon.

Instructions

- This form is not to be used for Flood UNLESS a flood has triggered an emergency event.
- Print off the following Queensland Emergency Alert Request form.
- Telephone the SDCC Watch Desk on [redacted] and tell them your intention to use the Emergency Alert for an emergency event for Moura Offstream Storage.
- 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 [redacted]
- Give them your phone number, confirm their name, and end the call after advising the form will be sent shortly.
- IC and DSTDM will work together to craft a message relevant to the hazard and discuss with the LDMG, if there is time.
- Fill in the form and send to SDCC watch desk email: [redacted] 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 DRDMW (Regulator), if required.
- Use the following text to complete the emergency alert request:

Filename:	Message:	SMS
[redacted]	EMERGENCY. MOURA OFFSTREAM STORAGE IS FAILING/EXPECTED TO FAIL. 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: AREAS AROUND MOURA. DO NOT DELAY. LEAVE NOW. MOURA IS A SAFE LOCATION.	IMMINENT FAILURE OF MOURA OFFSTREAM STORAGE TAKE ACTION TO PROTECT LIFE AND LEAVE NOW. AREAS AROUND MOURA ARE AT RISK. INFO ON ABC RADIO. MOURA IS SAFE.

The following two pages contain a pre-filled copy of the Moura Offstream Storage Emergency Alert request form.

EMERGENCY ALERT REQUEST

Location: Moura Offstream Storage

Date: / /

Time: : hrs

Requesting Officer:	Telephone:
Agency/Position:	Email:

Event Type	☐ Cyclone	☐ Storm Surge	☐ Flash Flood	☐ Flood
	☐ Bushfire	☐ Fire Incident	☐ Smoke or Toxic Plume	☐ Chemical Spill
	☐ Tsunami (NOTE Tsunami EA campaigns will be sent as Location Based Text Message ONLY)			
	☒ Other (please specify): Catastrophic Dam Failure			
Message Severity	☒ Emergency Warning (NOTE activates the SEWS)	☐ Watch & Act	☐ Advice	
Campaign Mode	☒ Voice	☒ SMS – Location Based	☐ SMS – Service Address Based	
LDMG Advised	☐ YES ☐ NO	DDMG Advised	☐ YES ☐ NO	

Threat Direction Required?	☐ YES ☐ NO	Note: Can only be used for Emergency Warnings. Indicate direction on map

STEP 1. EA Polygon Area: ☒ Map attached	**STEP 2. Filename:**
STEP 3. Spatial format: (Indicate the format used) ☒ **KML** *.kml (preferred format as per Spatial guidelines) ☐ **ESRI** *.dbf, *.prj, *.shp, *.shx ☐ **GML** *.gml, *.xsd ☐ **MapInfo TAB** *.dat, *.id, *.map, *.tab ☐ **MapInfo Mid/Mif** *. MIDI Sequence, *.mif ☐ **OTHER**(insert)	**STEP 4. Messaging/spatial data, is it supplied via** ☒ **DMportal** - specify filenames below ☐ **FTP** - specify filenames below ☐ **Email** ☐ **Other** (please specify)

Type (please use capitals for clarity) or handwrite Voice message (Ideally message should be less than 450 characters).

EMERGENCY. EMERGENCY. MOURA OFFSTREAM STORAGE IS FAILING OR EXPECTED TO FAIL. 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: AREAS AROUND MOURA. DO NOT DELAY. LEAVE NOW. MOURA IS A SAFE LOCATION.

Type or handwrite SMS below (maximum of 160 characters including spaces)

IMMINENT FAILURE OF MOURA OFFSTREAM STORAGE TAKE ACTION TO PROTECT LIFE AND LEAVE NOW. AREAS AROUND MOURA ARE AT RISK. INFO ON ABC RADIO. MOURA IS SAFE.

SEND TO [redacted] TO CONFIRM

FOR USE BY SDCC

Requesting Officer:	Signature	/ /20	☐ Manual Transmission
EA User Name:	Signature	/ /20	☐ EMS Transmission
Authorising Officer Name:	Signature	/ /20	EA Campaign No. _____
			EMS Report ID: _____

EA Manual and the Emergency Alert Request Form Template are available at: www.disaster.qld.gov.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 Drawings, inundation maps and emergency control measures

B1 Drawings

B2 Flood impact—downstream

B3 Inundation maps

B4 Emergency access routes

B5 Locality plan

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

FILE REFERENCE
E-00756

2

TO SALEYARDS ROAD

25
FN202

2
RP615891

21
FN553

BOUNDARY FENCE - TIMBER POSTS
8m APART/5 BARBED WIRES.

SPILLWAY
A3-209939

RISING MAIN
A3-209696

CONTRACT 573/0001

ISOLATING VALVE
PIT DIST 2084

INUNDATION BOUNDARY
FSL 125.20

RC PIPE STOCKPILE

PUMP STATION
A3-209628

450 x 300 BOX CULVERTS.
LOCATION BY SURVEYOR B. DEEN.

EMBANKMENT
A3-209982

CONDUIT
A3-209903

AREA RESERVED
FOR USE BY
THE PRINCIPAL

RIVER ROAD

INLET CHANNEL
EXCAVATION A3-209981

FLOATING INTAKE
A3-209904

RIVER

4m WIDE ACCESS ROAD,
100 GRAVEL PAVEMENT.
SEE A3-216264 FOR AS
BUILT SURVEY

21
FN553

DAWSON

TO THEODORE
BARALABA ROAD

35
FN552

E8500 N98000 N98500 N99000 E9000 N99500 E9500 N10000 N100500 E10000 E10500 E11000 N97500 N99000 N98500

LEGEND:

CONTRACT 573/0001
SITE BOUNDARY AND
CONSTRUCTION WORKPLACE BOUNDARY
FOR PURPOSE OF WORKPLACE HEALTH
& SAFETY ACT 1995

DEPARTMENT OF NATURAL RESOURCES
SITE BOUNDARY AND
CONSTRUCTION WORKPLACE BOUNDARY
FOR PURPOSE OF WORKPLACE HEALTH
& SAFETY ACT 1995

NOTES:

1. LEVEL DATUM : AHD.
2. AZIMUTH DATUM : MAGNETIC.
   COORDINATES : ARBITRARY.
3. CADASTRAL BOUNDARIES ARE APPROXIMATE ONLY.

LEVELS SHOWN ON THIS DRAWING ARE TO PLAN AHD.
PLAN AHD + 1.093 = AHD 2000.
AHD 2000 DERIVED FROM PM125858 AT EL 146.915m AHD

AS-BUILT
ITALIC TEXT INDICATES
AS-BUILT INFORMATION

REVISION					REFERENCE DRAWINGS		
30.01.01	D	DATUM CHANGE	AN	JFM			
6.7.99	C	AS BUILT	AN	JFM			
25.8.98	B	DNR SITE BOUNDARY ADDED	KP	RAG			
8.7.98	A	STOCKPILE MOVED & RESERVED AREA ADDED	KP	RAG			
DATE		REMARKS	CKD	PSD	A3-209815	LOCALITY PLAN	

SCALES
0 100 200 300 400 500 METRES
1:10000

DRAFTING	IMP
DRAFTING CHK	kp
DESIGN	
DESIGN CHK	

RECOMMENDED
B J SHANNON
GENERAL MANAGER
ENGINEERING SERVICES

APPROVED
P NOONAN
EXECUTIVE DIRECTOR
STATE WATER PROJECTS

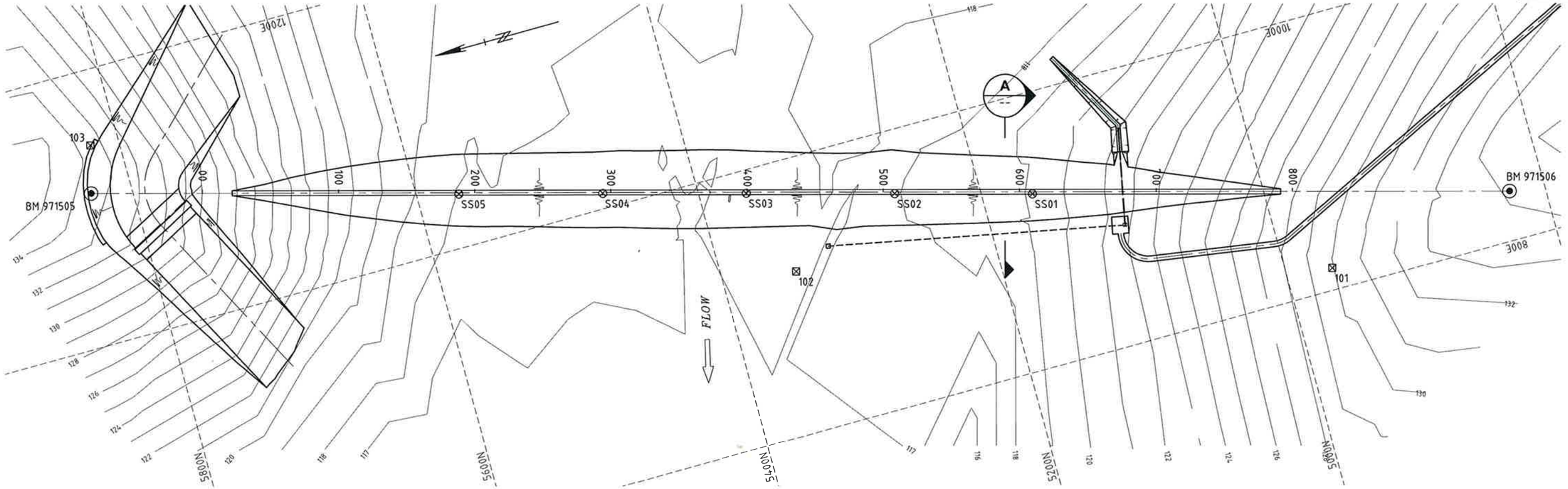
Services Engineering
NATURAL RESOURCES
State Water Projects

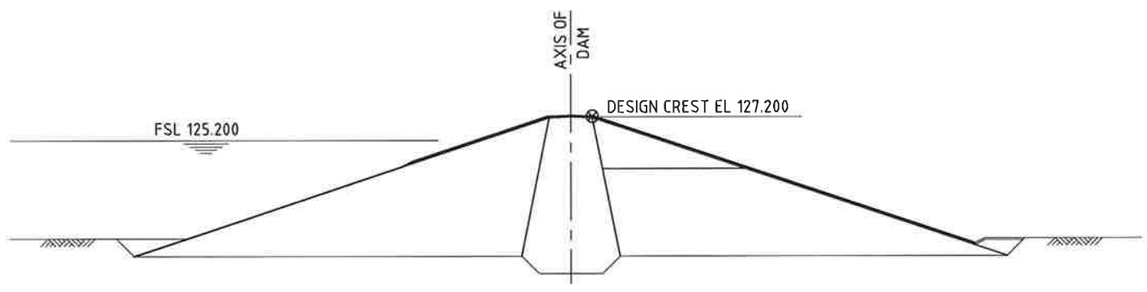
MOURA OFFSTREAM STORAGE
GENERAL ARRANGEMENT

CONTRACT NUMBER 573/0001
DRAWING NUMBER A3-209968
DATE JUNE 1998
A B C D

Q:\Moura0S2-00756\w209968.dwg
31 Jan 2001 9:27 AM

209968D (tif)





SECTION A--

SCALE B

SURFACE SETTLEMENT INSTALLATIONS

No	EASTING	NORTHING	ELEVATION	REMARKS
01	926.984	5163.639	128.063	
02	953.996	5261.039	127.913	
03	983.257	5366.083	127.826	
04	1011.156	5467.466	127.945	
05	1038.875	5569.593	127.952	

SURVEY CONTROL STATIONS

No	EASTING	NORTHING	ELEVATION	REMARKS
BM 971505	1111.2	5829.5	133.922	
BM 971606	835.9	4825.8	134.701	
101	816.076	4966.273	131.709	PILLAR
102	918.119	5345.967	119.166	PILLAR
103	1145.442	5820.629	135.956	PILLAR

NOTES:

1. LEVELS DATUM: AHD.
   (LEVELS ON THE DESIGN DRAWINGS ARE AHD MINUS 0.093m.)
2. AZIMUTH DATUM : MGA94 ZONE 55.
3. COORDINATES : PLANE TRUNCATED.
   EASTING: ADD 800,000 TO EQUATE TO PLANE MGA94 ZONE 55
   NORTHING: ADD 7,270,000 TO EQUATE TO PLANE MGA94 ZONE 55
4. TOP OF PILLAR AND SETTLEMENT MARKS ARE 0.055m LOWER THAN LEVELS SHOWN IN TABLES.

LEGEND:

⊗ SURFACE SETTLEMENT POINT
⊠ CONTROL STATION

DRAWING PRODUCED BY:
ASSET SOLUTIONS
LEVEL 9, 179 TURBOT ST
BRISBANE QLD 4000
TEL: (07) 3120 0000

T:\Asset Solutions\SW-Dawson Valley WSSVN-WLBD-04-01-01-AR_MOS Survey Points\Drawings\AutoCAD\232479.dwg
24 Jun 2009 1:26 PM

REVISION					REFERENCE DRAWINGS
DATE		REMARKS	CKD	PSD	

SCALES (A3 SIZE)

A 0 50 100 150 METRES 1:3000

B 0 5 10 15 20 25 METRES 1:500

DRAWN	DESIGNED
RET	
CHECKED	CHECKED
AJ	
APPROVED	
MANAGER RISK ASSESSMENT	

SunWater

DAM SAFETY INVESTIGATION
MOURA OFFSTREAM STORAGE
INSTRUMENTATION LAYOUT

CONTRACT NUMBER

DRAWING NUMBER 232479

DATE JUN 2009

MAP INFORMATION

Coordinate System: Geocentric Datum of Australia (GDA94).

SCALE (A4 SIZE)

0 600 1,200 1,800 2,400 3,000 m 1:60,000

LEGEND

- AMTD (Markers)
- Dam Full Supply Level
- Limit of Downstream Notification Area

MOURA OFFSTREAM STORAGE DOWNSTREAM NOTIFICATION AREA

NOTES

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

DRAWING No. 250718 B

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-WSRW-38-01-05-01 EAP Mapping\Drawings\ArcMap\DS Notification Area\250718-B.mxd
Printed: Monday, 22/10/2018 0:22:4:37 PM

Appendix B3: Inundation maps

A Failure Impact Assessment (FIA) was completed by a contractor and issued to Sunwater in July 2017 (ref X).

- The following inundation drawings are presented on the following pages:
  - Keymap – 250016-A
  - Sunny Day Failure – 250017-A
  - Design Crest Flood – 250018-A
  - Probable Maximum Flood – 250019-A

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.

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Moura\250016-A.mxd
Printed: Wednesday, 17/10/2018 01:52:00 PM

MAP PRODUCED BY:
WATER RESOURCES AND DAM SAFETY
TEL: (07) 3120 0000

770,000 780,000 790,000 800,000 810,000 820,000

7,290,000 7,280,000 7,270,000

BANANA MUNGI RD
DENBY RD
DENBY CREEK
BACK CREEK
DAWSON RIVER
MOURA BARALABA RD
MOURA BINDAREE RD
FOUR MILE CREEK
BARALABA BANANA RD
LEICHHARDT HWY
STATION CREEK
DAWSON HWY
BANANA
EDWARD ST
ZOWEN ST
BANANA CREEK
SANDY CREEK
BARFIELD RD
WARDLES RD
ZAMA CREEK
BEARS LAGOON RD
MIMOSA CREEK
ROUNDSTONE CREEK
KIANGA CREEK
THREE CHAIN RD
ROAD
PEGUNNY RD
WATTLE CREEK
WALONEYS CREEK
YOUNG ST
GUISE ST
PRIEST ST
MOURA
NOBBS ST
NORTHS RD
MOURA WEIR
SAXELBYS RD
DAWSON RIVER
MOURA OFFSTREAM STORAGE
RIVER RD
GIBIHI RD
KAVANAGHS RD
BOTTLE TREE CREEK
LITTLE ROUNDSTONE CREEK
DAWSON HWY
ROAD
MALONEYS RD
THEODORE MOURA RD
LEICHHARDT HWY
FISH CREEK
GLENMORAL ROUNDSTONE RD
ANGLE CREEK
MOOGINE RD
BEHENDORFFS RD
KUON CREEK
KIANGA RIVER RD
KIANGA RD
UNCLE TOMS RD
GENEVA RD
KIANGA CREEK

SHEET 4 OF 4
SHEET 2 OF 4
SHEET 3 OF 4
SHEET 1 OF 4

N W E S

LEGEND
- Settlements
- Major Roads
- Local Roads
- Qld Rail Network
- Built Up Areas

SunWater Storages
- Offstream Storage
- Weir
- Lake Moura

REVISION					
17/10/18	A	ISSUED FOR USE	IDH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA94) Zone 55.

REFERENCE DRAWINGS
250017 - Sunny Day Failure Inundation Plan
250018 - Design Crest Flood Inundation Plan
250019 - Probable Maximum Flood Inundation Plan

SCALES (A3 SIZE)
0 1.5 3 4.5 6 7.5 km 1:150,000

DRAWN	DESIGNED
IDH	
CHECKED	CHECKED
	MGH
APPROVED	
M.G. HUGHES	
17/10/2018	
RPEQ: 18351	

SunWater

MOURA OFFSTREAM STORAGE
DAM BREAK ANALYSIS 2018
INUNDATION PLANS
KEYMAP

CONTRACT NUMBER	
DRAWING NUMBER	REV.
250016	A
SHEET 1 OF 1	
DATE OCTOBER 2018	

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Moura\250017-B.mxd
Printed: Tuesday, 06/11/2018 09:57:47 AM

Map Produced By:
Water Resources and Dam Safety
Tel: (07) 3120 0000

796,000 798,000 800,000 802,000 804,000

7,276,000 7,274,000 7,272,000

DAWSON HWY
DAWSON RIVER
153 154 155 156 157 158 159 160
Gibihi
Moura Offstream Storage
THEODORE MOURA RD

LEGEND
- AMTD (Markers)
- Local Roads
- Major Roads
- Qld Rail Network
- Cadastral Lot Boundaries

Flood Modelling
- PAR - Dam Failure
- Modelling Limits
- Sunny Day Failure

SunWater Storages
- Offstream Storage
- Weir
- Moura OS FSL 125.29m

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

REVISION				
06/11/18	B	VARIOUS AMENDMENTS	IDH	MGH
17/10/18	A	ISSUED FOR USE	IDH	MGH
DATE		REMARKS	CKD	PSD

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA94) Zone 55.

REFERENCE DRAWINGS
250016 - Keymap

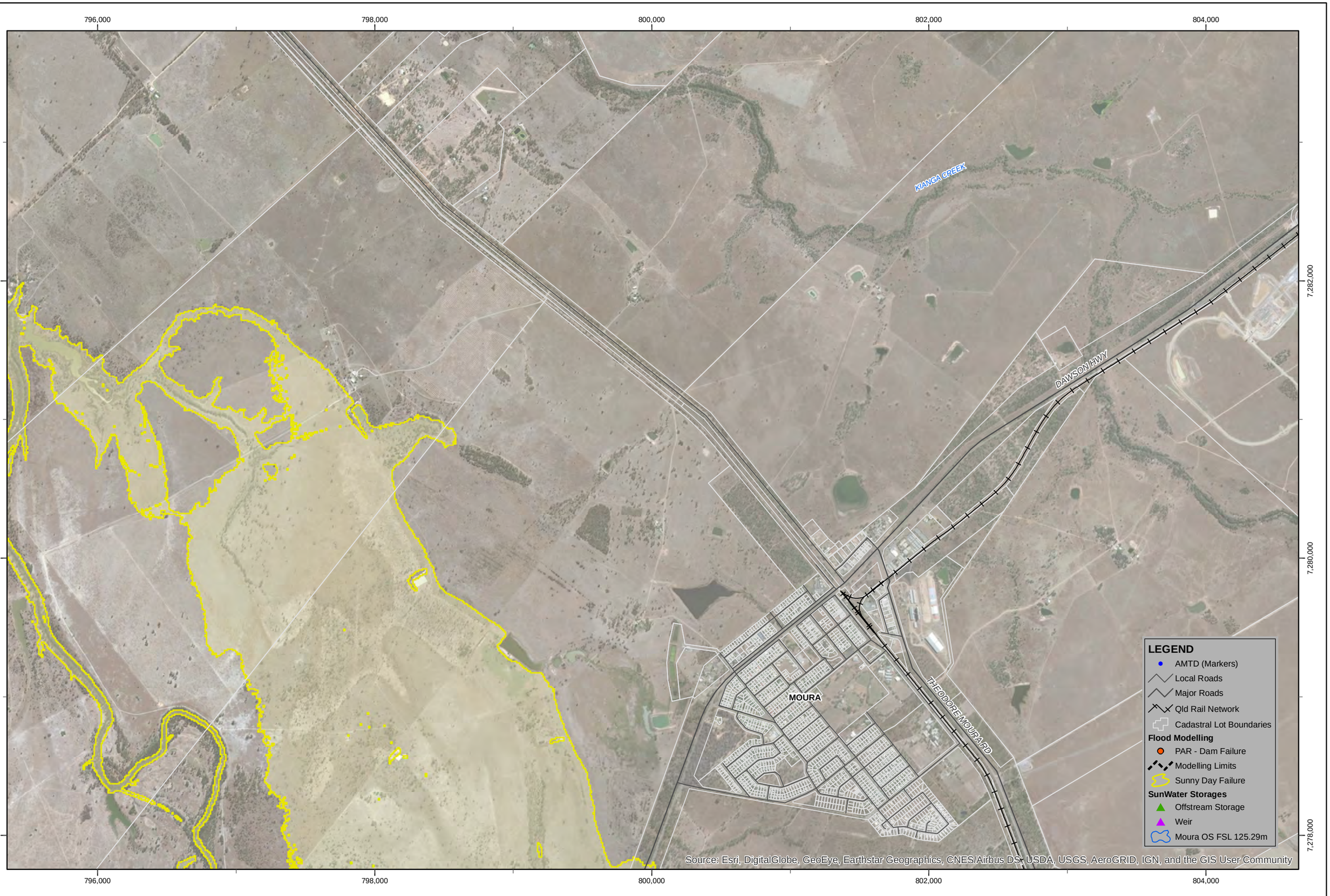
SCALES (A3 SIZE)
0 250 500 750 1,000 1,250 m
1:25,000

DRAWN: IDH	DESIGNED:
CHECKED:	CHECKED: MGH
APPROVED: M.G. HUGHES 17/10/2018	RPEQ: 18351

MOURA OFFSTREAM STORAGE
DAM BREAK ANALYSIS 2018
SUNNY DAY FAILURE
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER
DRAWING NUMBER: 250017
REV.: B
SHEET 1 OF 4
DATE OCTOBER 2018

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Moura\250017-B.mxd
Printed: Tuesday, 06/11/2018 09:57:47 AM



Map Produced By:
Water Resources and Dam Safety
Tel: (07) 3120 0000

REVISION					
06/11/18	B	VARIOUS AMENDMENTS	IDH	MGH	
17/10/18	A	ISSUED FOR USE	IDH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA94) Zone 55.

REFERENCE DRAWINGS
250016 - Keymap

SCALES (A3 SIZE)
0 250 500 750 1,000 1,250 m
1:25,000

DRAWN	DESIGNED
IDH	
CHECKED	CHECKED
	MGH
APPROVED	
M.G. HUGHES	
17/10/2018	
RPEQ: 18351	

MOURA OFFSTREAM STORAGE
DAM BREAK ANALYSIS 2018
SUNNY DAY FAILURE
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
250017	B

SHEET 2 OF 4

DATE OCTOBER 2018

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Printed: Tuesday, 06/11/2018 09:57:47 AM

Map Produced By:
Water Resources and Dam Safety
Tel: (07) 3120 0000

788,000 790,000 792,000 794,000

7,276,000 7,274,000 7,272,000

Moura Weir
150
151
152
DAWSON HWY
DAWSON RIVER
MALONEY'S CREEK
Moloneys
Moloneys

LEGEND
- AMTD (Markers)
- Local Roads
- Major Roads
- Qld Rail Network
- Cadastral Lot Boundaries

Flood Modelling
- PAR - Dam Failure
- Modelling Limits
- Sunny Day Failure

SunWater Storages
- Offstream Storage
- Weir
- Moura OS FSL 125.29m

REVISION					
06/11/18	B	VARIOUS AMENDMENTS	IDH	MGH	
17/10/18	A	ISSUED FOR USE	IDH	MGH	
DATE		REMARKS	CKD	PSD	

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REFERENCE DRAWINGS
250016 - Keymap

SCALES (A3 SIZE)
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1:25,000

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IDH	
CHECKED	CHECKED
	MGH
APPROVED	
M.G. HUGHES	
17/10/2018	
RPEQ: 18351	

MOURA OFFSTREAM STORAGE
DAM BREAK ANALYSIS 2018
SUNNY DAY FAILURE
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
250017	B

SHEET 3 OF 4

DATE OCTOBER 2018

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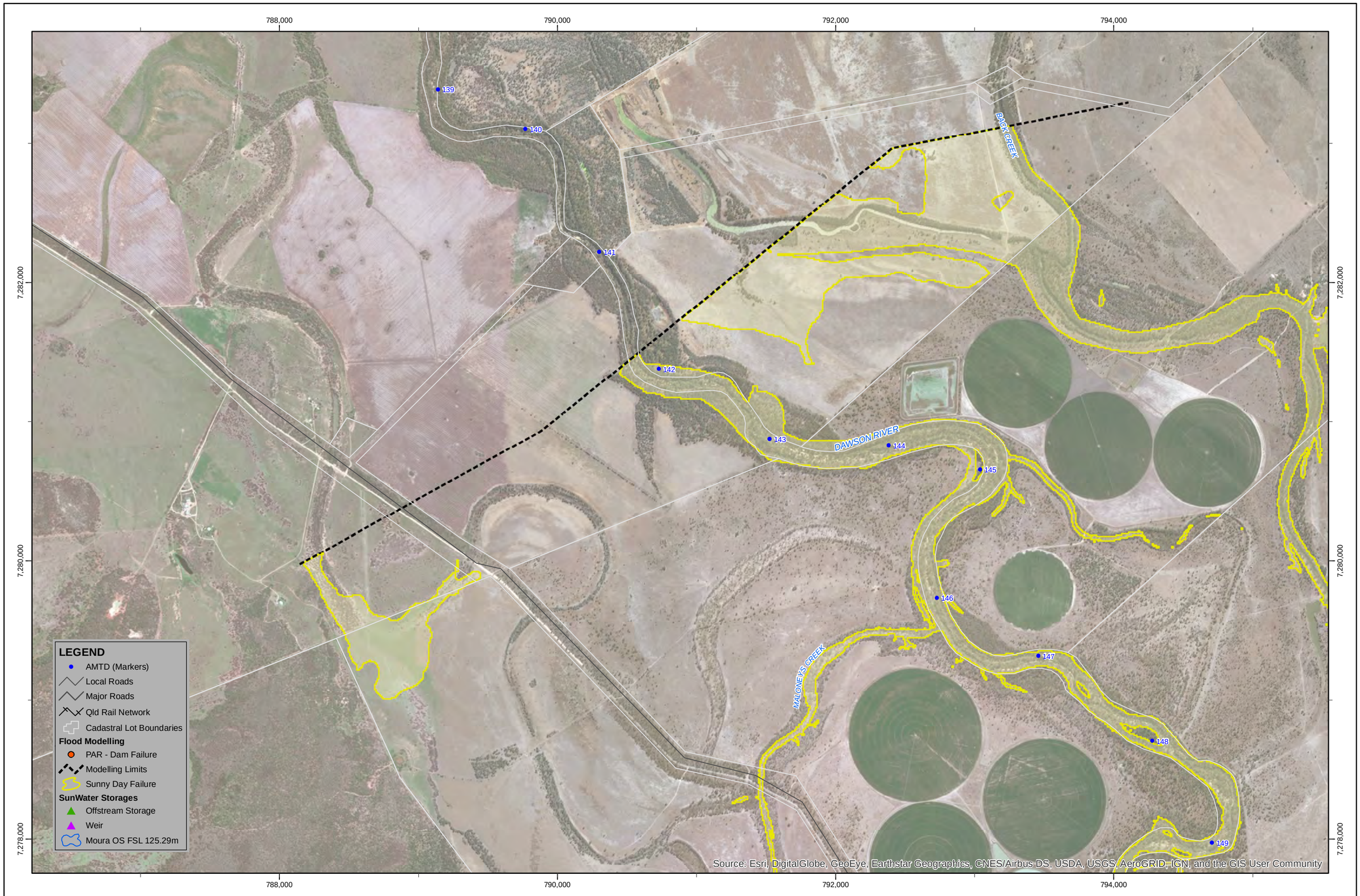

REVISION					
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17/10/18	A	ISSUED FOR USE	IDH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION
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REFERENCE DRAWINGS
250016 - Keymap

SCALES (A3 SIZE)
0 250 500 750 1,000 1,250 m
1:25,000

DRAWN	DESIGNED
IDH	
CHECKED	CHECKED
	MGH
APPROVED	
M.G. HUGHES	
17/10/2018	
RPEQ: 18351	

MOURA OFFSTREAM STORAGE
DAM BREAK ANALYSIS 2018
SUNNY DAY FAILURE
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER	
DRAWING NUMBER	REV.
250017	B
SHEET 4 OF 4	
DATE OCTOBER 2018	

MAP PRODUCED BY:
WATER RESOURCES AND DAM SAFETY
TEL: (07) 3120 0000

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Moura\250018-B.mxd
Printed: Tuesday, 06/11/2018 09:42:15 AM

Map Produced By:
Water Resources and Dam Safety
Tel.: (07) 3120 0000

796,000 798,000 800,000 802,000 804,000

7,276,000 7,274,000 7,272,000

DAWSON HWY
DAWSON RIVER
153 154 155 156 157 158 159 160
Gibihi
Moura Offstream Storage
THEODORE MOURA RD

LEGEND

- AMTD (Markers)
- Local Roads
- Major Roads
- Qld Rail Network
- Cadastral Lot Boundaries

Flood Modelling

- PAR - No Dam Failure
- Additional PAR - Dam Failure
- Modelling Limits
- DCF - No Dam Failure
- DCF - Dam Failure

SunWater Storages

- Offstream Storage
- Weir
- Moura OS FSL 125.29m

REVISION				
06/11/18	B	VARIOUS AMENDMENTS	IDH	MGH
17/10/18	A	ISSUED FOR USE	IDH	MGH
DATE		REMARKS	CKD	PSD

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA94) Zone 55.

REFERENCE DRAWINGS
250016 - Keymap

N W E S

SCALES (A3 SIZE)
0 250 500 750 1,000 1,250 m
1:25,000

DRAWN IDH | DESIGNED
CHECKED | CHECKED MGH
APPROVED M.G. HUGHES 17/10/2018 RPEQ: 18351

SunWater

MOURA OFFSTREAM STORAGE
DAM BREAK ANALYSIS 2018
DAM CREST FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER
DRAWING NUMBER 250018 | REV. B
SHEET 1 OF 4
DATE OCTOBER 2018

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Moura\250018-B.mxd
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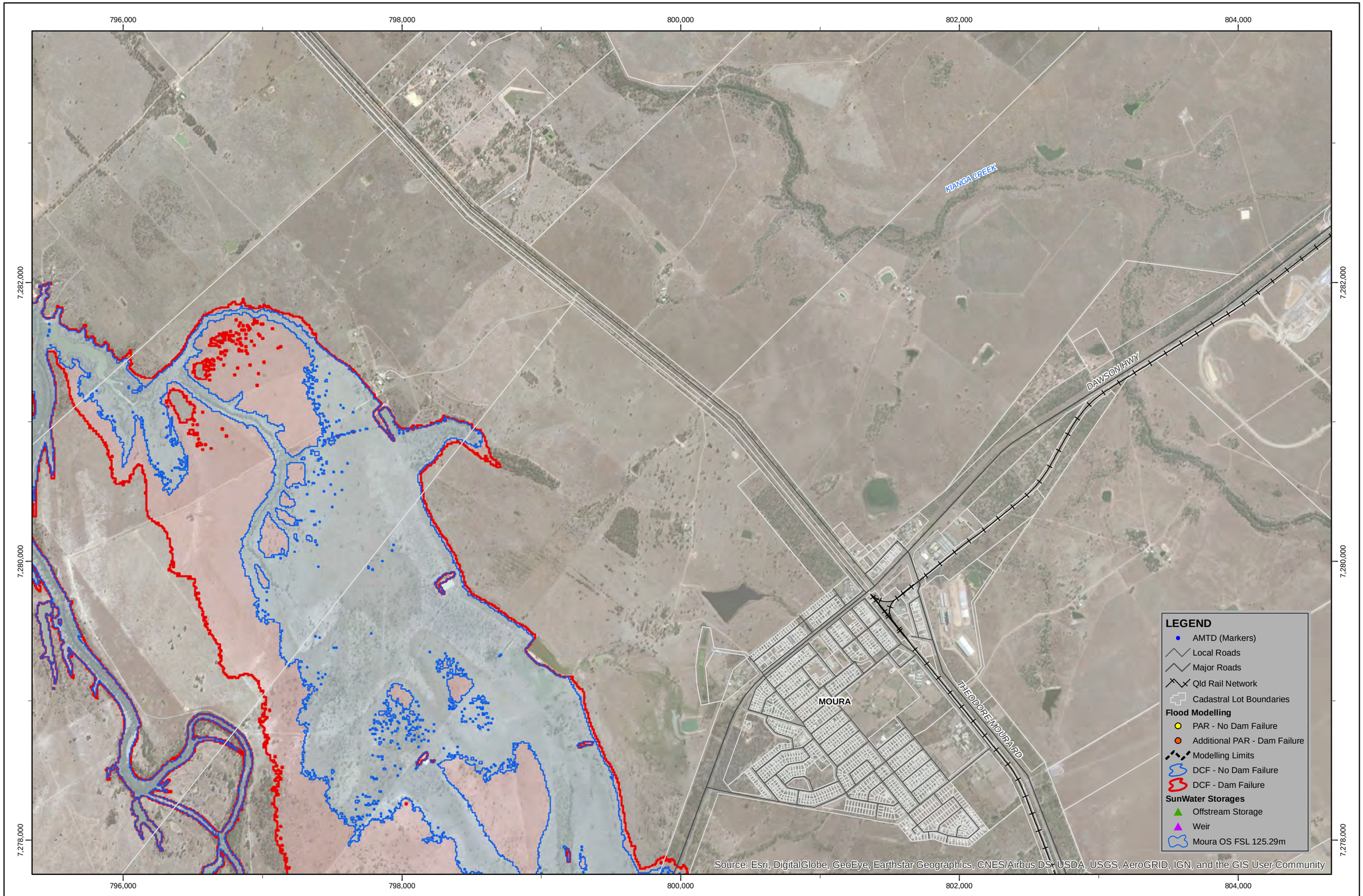
Map Produced By:
Water Resources and Dam Safety
Tel: (07) 3120 0000



REVISION				
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17/10/18	A	ISSUED FOR USE	IDH	MGH
DATE		REMARKS	CKD	PSD

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SCALES (A3 SIZE)
0 250 500 750 1,000 1,250 m
1:25,000

DRAWN	DESIGNED
IDH	
CHECKED	CHECKED
	MGH
APPROVED	
M.G. HUGHES 17/10/2018	
RPEQ: 18351	

SunWater

MOURA OFFSTREAM STORAGE
DAM BREAK ANALYSIS 2018
DAM CREST FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER	
DRAWING NUMBER	REV.
250018	B
SHEET 2 OF 4	
DATE OCTOBER 2018	

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Map Produced By:
Water Resources and Dam Safety
Tel: (07) 3120 0000

788,000 790,000 792,000 794,000

7,276,000 7,274,000 7,272,000

Moura Weir
150
151
152
DAWSON HWY
DAWSON RIVER
MALONEYS CREEK
Moloneys
Moloneys

LEGEND
- AMTD (Markers)
- Local Roads
- Major Roads
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- Cadastral Lot Boundaries

Flood Modelling
- PAR - No Dam Failure
- Additional PAR - Dam Failure
- Modelling Limits
- DCF - No Dam Failure
- DCF - Dam Failure

SunWater Storages
- Offstream Storage
- Weir
- Moura OS FSL 125.29m

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

REVISION				
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0 250 500 750 1,000 1,250 m
1:25,000

DRAWN	DESIGNED
IDH	
CHECKED	CHECKED
	MGH

APPROVED
M.G. HUGHES
17/10/2018
RPEQ: 18351

MOURA OFFSTREAM STORAGE
DAM BREAK ANALYSIS 2018
DAM CREST FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
250018	B

SHEET 3 OF 4

DATE OCTOBER 2018

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Map Produced By:
Water Resources and Dam Safety
Tel: (07) 3120 0000

788,000 790,000 792,000 794,000

7,282,000 7,280,000 7,278,000

139 140 141 142 143 144 145 146 147 148 149

BACK CREEK
DAWSON RIVER
MALONEYS CREEK

LEGEND
- AMTD (Markers)
- Local Roads
- Major Roads
- Qld Rail Network
- Cadastral Lot Boundaries

Flood Modelling
- PAR - No Dam Failure
- Additional PAR - Dam Failure
- Modelling Limits
- DCF - No Dam Failure
- DCF - Dam Failure

SunWater Storages
- Offstream Storage
- Weir
- Moura OS FSL 125.29m

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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1:25,000

DRAWN	DESIGNED
IDH	
CHECKED	CHECKED
	MGH

APPROVED
M.G. HUGHES
17/10/2018
RPEQ: 18351

MOURA OFFSTREAM STORAGE
DAM BREAK ANALYSIS 2018
DAM CREST FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
250018	B

SHEET 4 OF 4

DATE OCTOBER 2018

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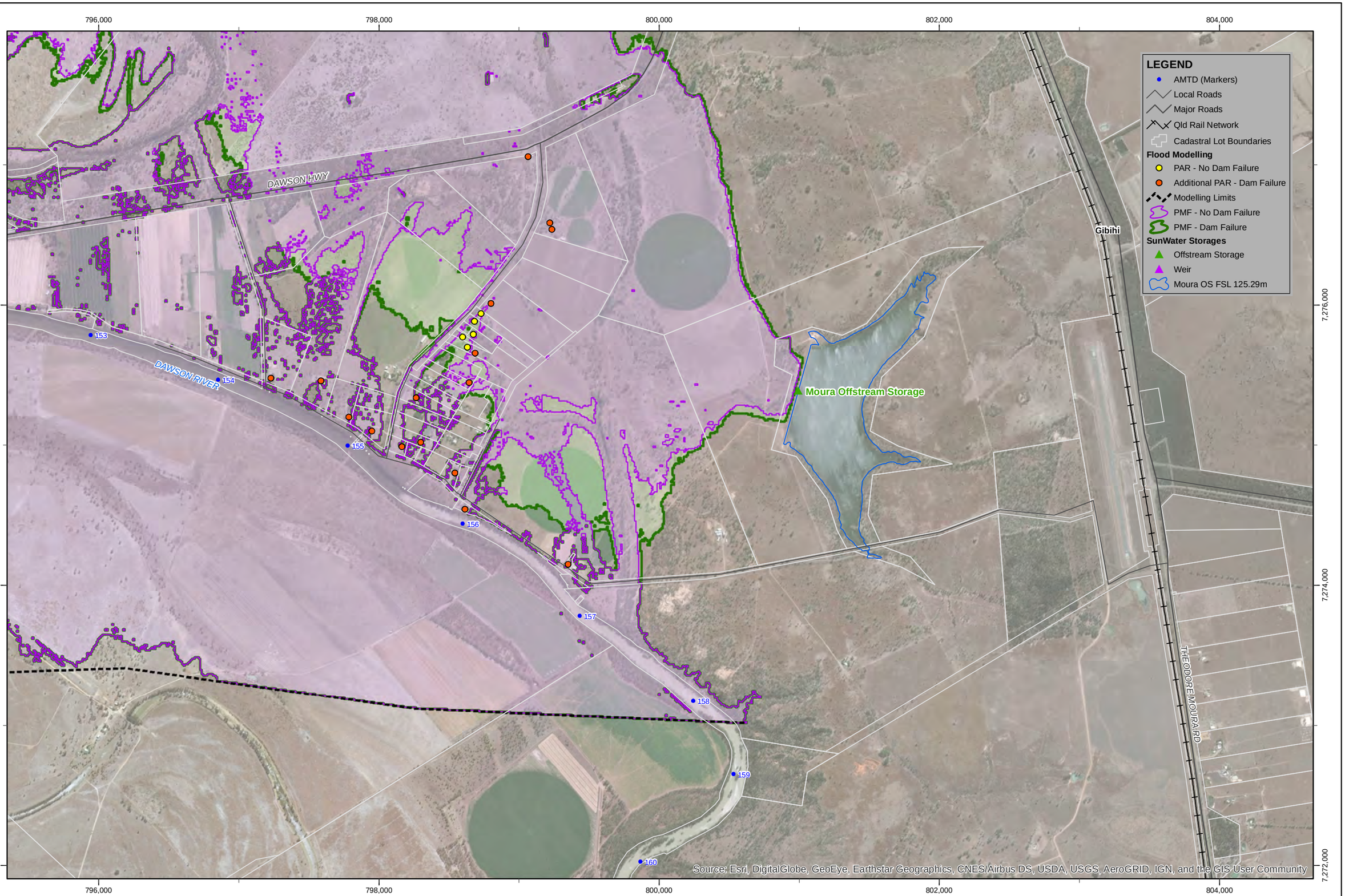

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17/10/18	A	ISSUED FOR USE	IDH	MGH
DATE		REMARKS	CKD	PSD

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA94) Zone 55.

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SCALES (A3 SIZE)
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1:25,000

DRAWN	DESIGNED
IDH	
CHECKED	CHECKED
	MGH
APPROVED	
M.G. HUGHES 17/10/2018	
RPEQ: 18351	

MOURA OFFSTREAM STORAGE
DAM BREAK ANALYSIS 2018
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER	
DRAWING NUMBER	REV.
250019	A
SHEET 1 OF 4	
DATE OCTOBER 2018	

MAP PRODUCED BY:
WATER RESOURCES AND DAM SAFETY
TEL: (07) 3120 0000

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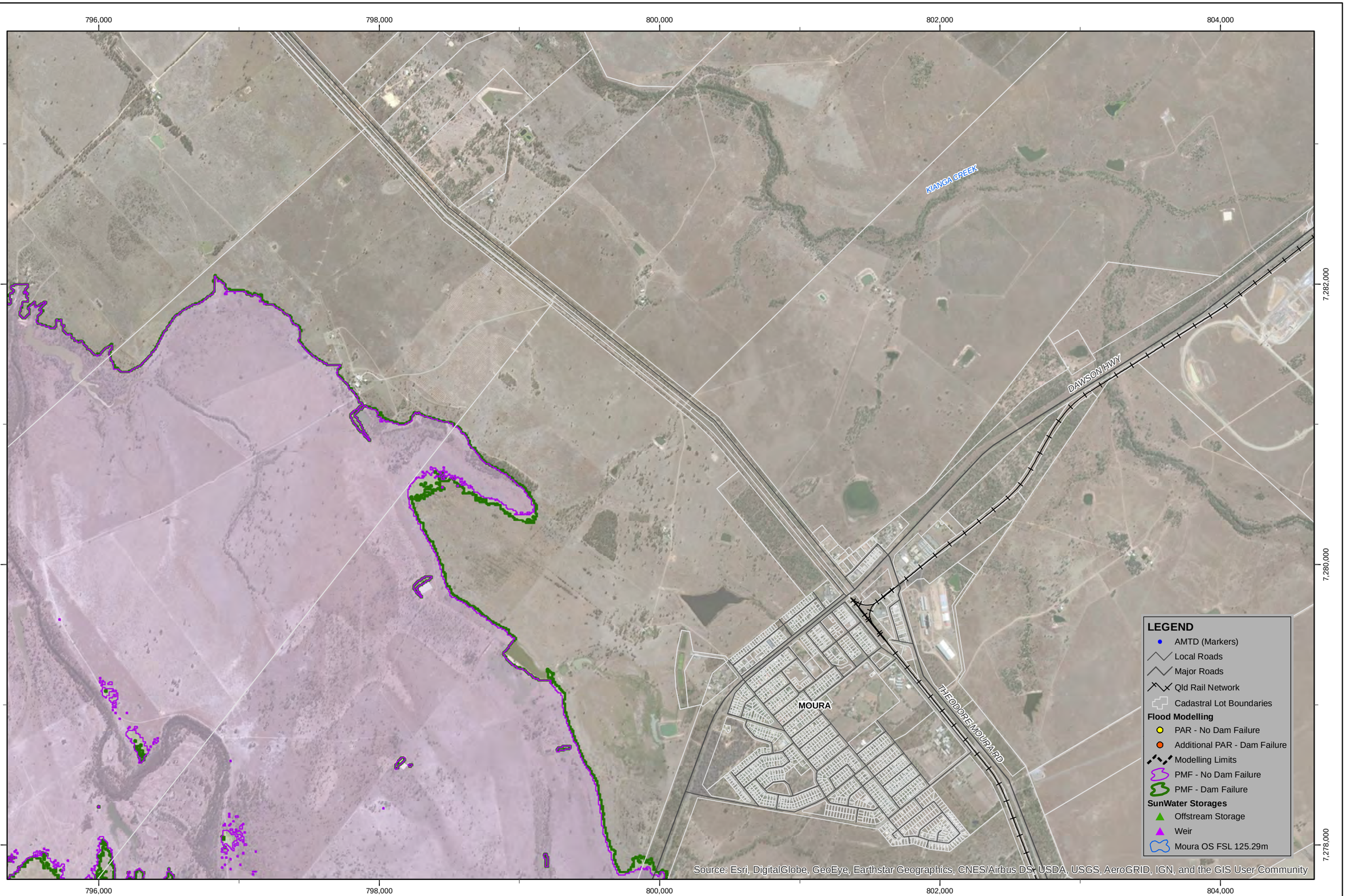

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17/10/18	A	ISSUED FOR USE	IDH	MGH
DATE		REMARKS	CKD	PSD

MAP INFORMATION
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REFERENCE DRAWINGS
250016 - Keymap

SCALES (A3 SIZE)
0 250 500 750 1,000 1,250 m
1:25,000

DRAWN	DESIGNED
IDH	
CHECKED	CHECKED
	MGH

APPROVED
M.G. HUGHES
17/10/2018
RPEQ: 18351

MOURA OFFSTREAM STORAGE
DAM BREAK ANALYSIS 2018
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
250019	A

SHEET 2 OF 4

DATE OCTOBER 2018

MAP PRODUCED BY:
WATER RESOURCES AND DAM SAFETY
TEL: (07) 3120 0000

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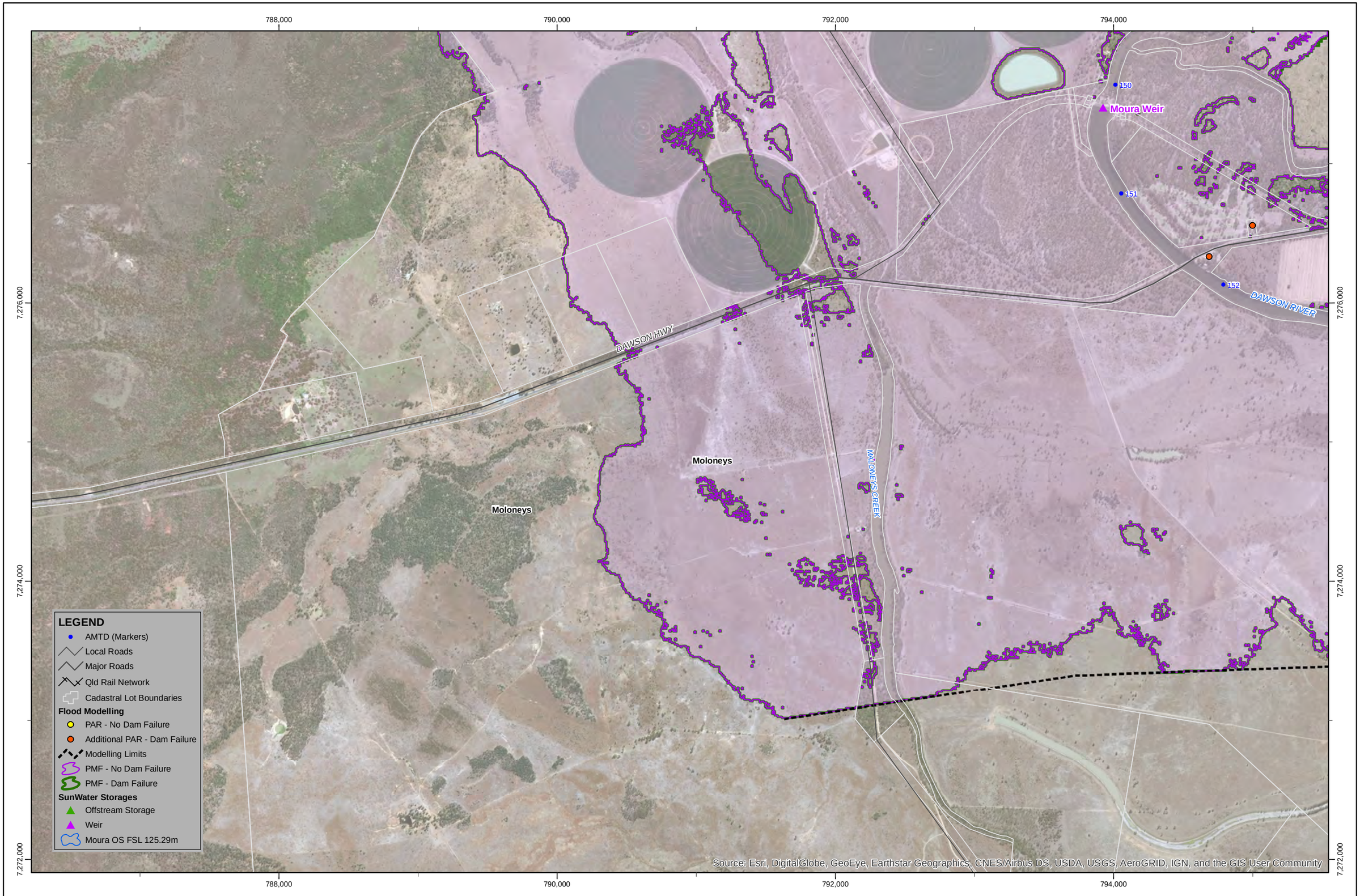

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1:25,000

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CHECKED	CHECKED
	MGH
APPROVED	
M.G. HUGHES	
17/10/2018	
RPEQ: 18351	

MOURA OFFSTREAM STORAGE
DAM BREAK ANALYSIS 2018
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
250019	A

SHEET 3 OF 4
DATE OCTOBER 2018

MAP PRODUCED BY:
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TEL: (07) 3120 0000

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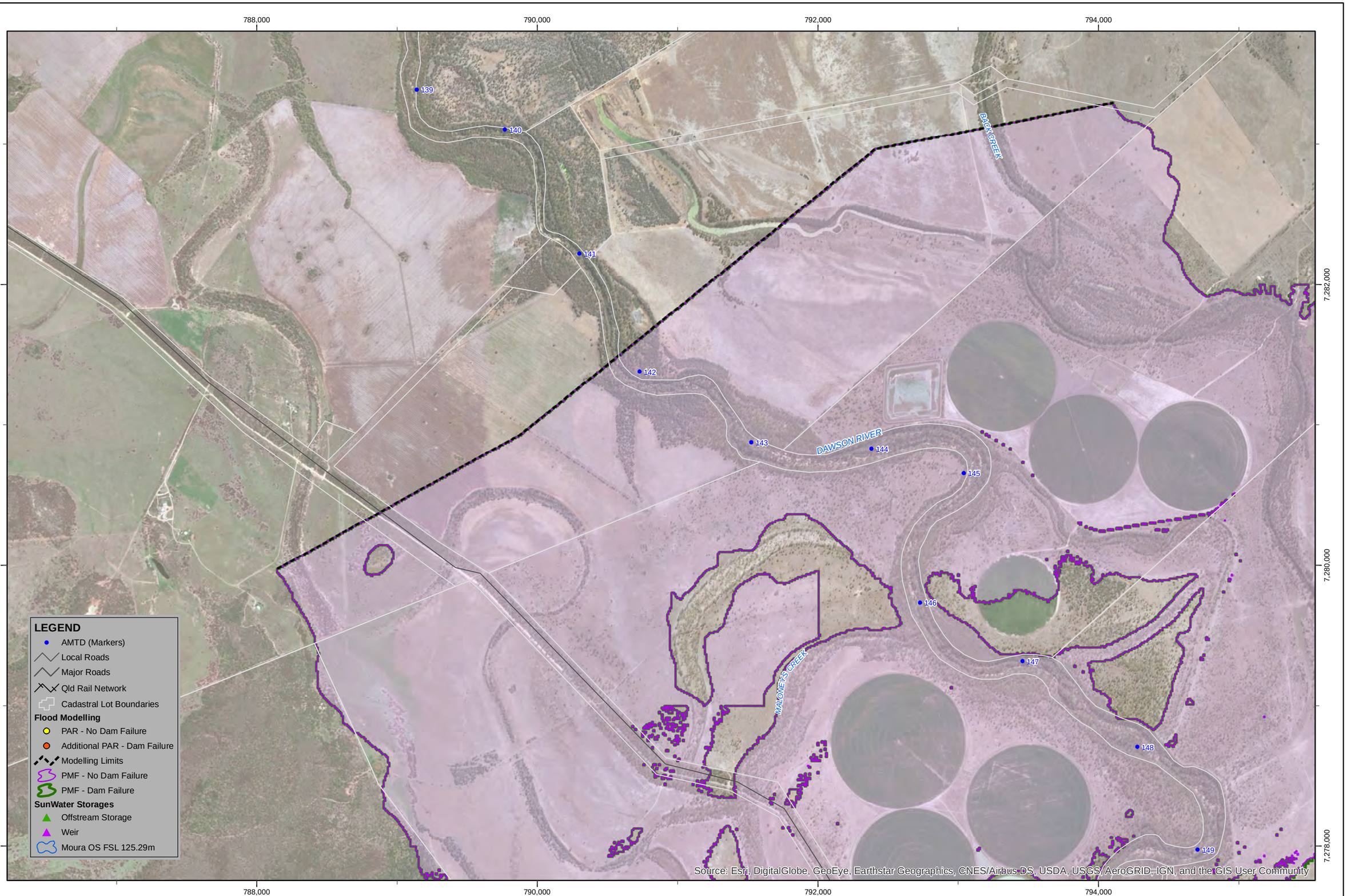

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APPROVED	
M.G. HUGHES	
17/10/2018	
RPEQ: 18351	

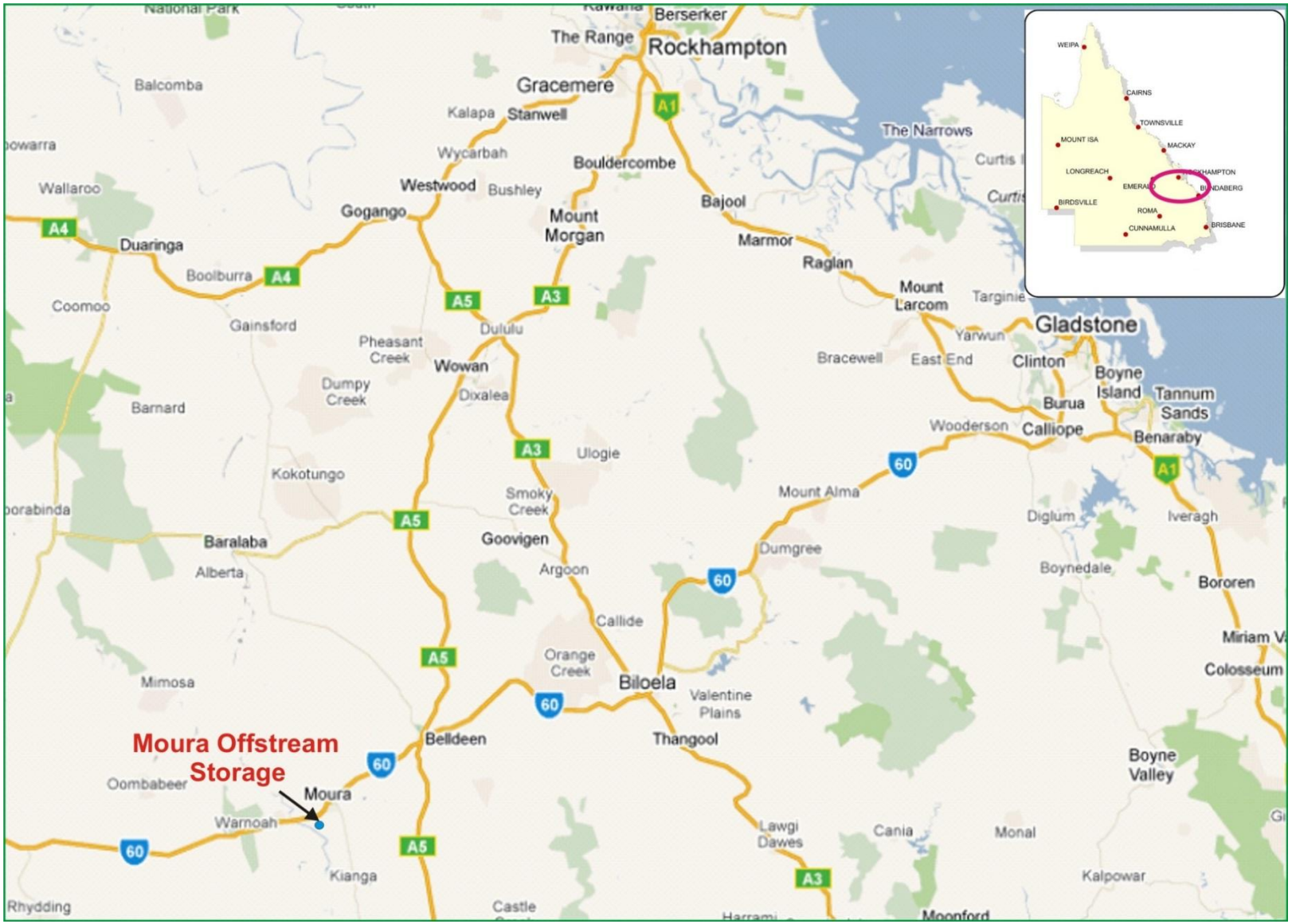
MOURA OFFSTREAM STORAGE
DAM BREAK ANALYSIS 2018
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER	
DRAWING NUMBER	REV.
250019	A
SHEET 4 OF 4	
DATE OCTOBER 2018	

MAP PRODUCED BY:
WATER RESOURCES AND DAM SAFETY
TEL: (07) 3120 0000

Appendix B4 : Locality plan

Figure B16: Moura Offstream Storage locality plan



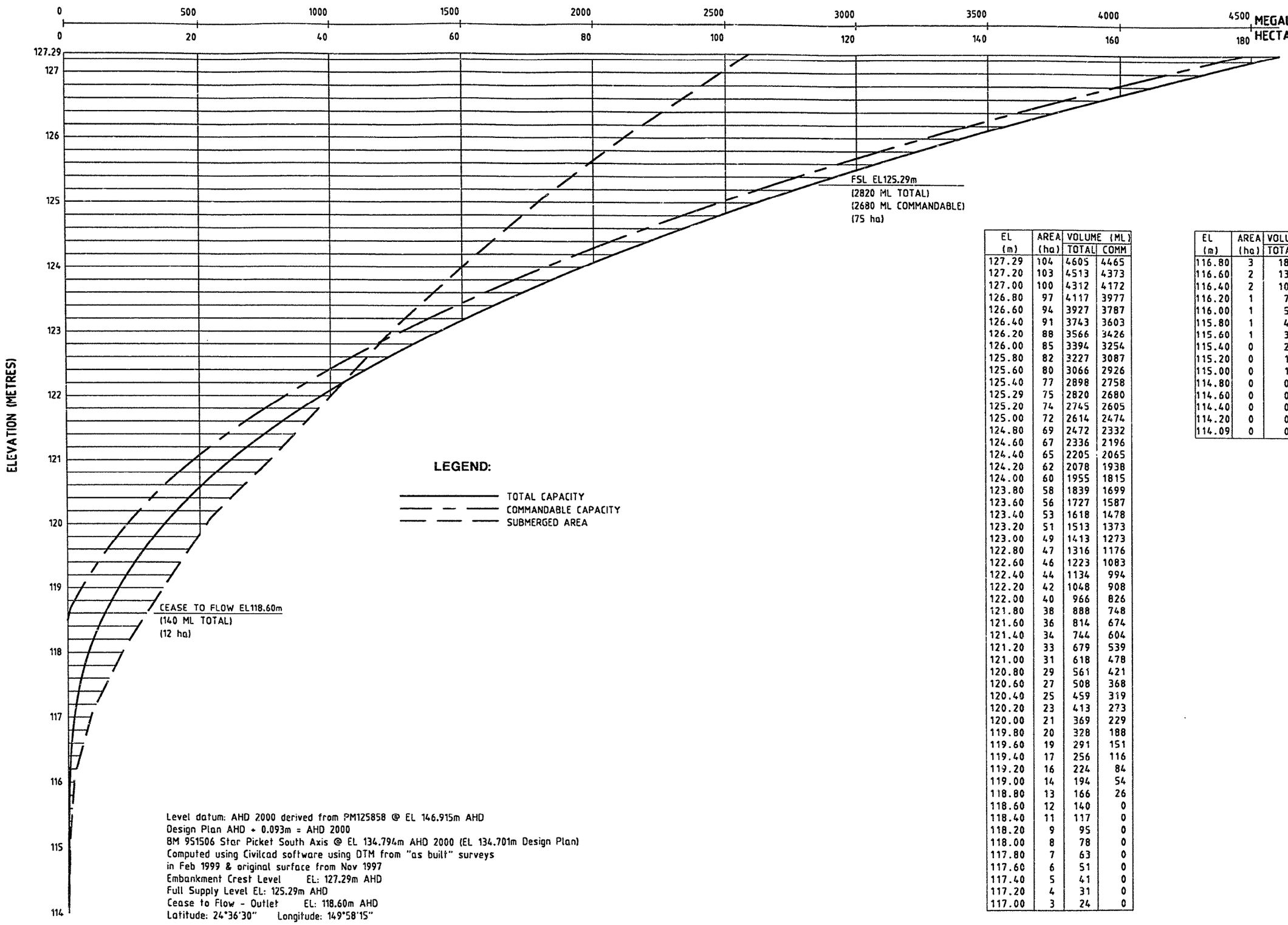
APPENDIX C Equipment and technical information

C1 List of equipment available during an emergency

C2 Moura OS storage curve

Appendix C1 has been redacted

FILE REFERENCE
2-01147(4)



EL (m)	AREA (ha)	VOLUME (ML) TOTAL	VOLUME (ML) COMM
127.29	104	4605	4465
127.20	103	4513	4373
127.00	100	4312	4172
126.80	97	4117	3977
126.60	94	3927	3787
126.40	91	3743	3603
126.20	88	3566	3426
126.00	85	3394	3254
125.80	82	3227	3087
125.60	80	3066	2926
125.40	77	2898	2758
125.29	75	2820	2680
125.20	74	2745	2605
125.00	72	2614	2474
124.80	69	2472	2332
124.60	67	2336	2196
124.40	65	2205	2065
124.20	62	2078	1938
124.00	60	1955	1815
123.80	58	1839	1699
123.60	56	1727	1587
123.40	53	1618	1478
123.20	51	1513	1373
123.00	49	1413	1273
122.80	47	1316	1176
122.60	46	1223	1083
122.40	44	1134	994
122.20	42	1048	908
122.00	40	966	826
121.80	38	888	748
121.60	36	814	674
121.40	34	744	604
121.20	33	679	539
121.00	31	618	478
120.80	29	561	421
120.60	27	508	368
120.40	25	459	319
120.20	23	413	273
120.00	21	369	229
119.80	20	328	188
119.60	19	291	151
119.40	17	256	116
119.20	16	224	84
119.00	14	194	54
118.80	13	166	26
118.60	12	140	0
118.40	11	117	0
118.20	9	95	0
118.00	8	78	0
117.80	7	63	0
117.60	6	51	0
117.40	5	41	0
117.20	4	31	0
117.00	3	24	0

EL (m)	AREA (ha)	VOLUME (ML) TOTAL	VOLUME (ML) COMM
116.80	3	18	0
116.60	2	13	0
116.40	2	10	0
116.20	1	7	0
116.00	1	5	0
115.80	1	4	0
115.60	1	3	0
115.40	0	2	0
115.20	0	1	0
115.00	0	1	0
114.80	0	0	0
114.60	0	0	0
114.40	0	0	0
114.20	0	0	0
114.09	0	0	0

Level datum: AHD 2000 derived from PM125858 @ EL 146.915m AHD
Design Plan AHD + 0.093m = AHD 2000
BM 951506 Star Picket South Axis @ EL 134.794m AHD 2000 (EL 134.701m Design Plan)
Computed using Civilcad software using DTM from "as built" surveys
in Feb 1999 & original surface from Nov 1997
Embankment Crest Level EL: 127.29m AHD
Full Supply Level EL: 125.29m AHD
Cease to Flow - Outlet EL: 118.60m AHD
Latitude: 24°36'30" Longitude: 149°58'15"

REVISION					REFERENCE DRAWINGS
DATE		REMARKS	CKD	PSD	
20/3/2000	A	AHD Adjustment	DHH	DHH	

SCALES

DRAFTING: IFE
DRAFTING CHK: RET
DESIGN:
DESIGN CHK:
RECOMMENDED:
APPROVED: Doug Houston
PRINCIPAL SURVEYOR

Services Engineering
NATURAL RESOURCES
State Water Projects

MOURA OFFSTREAM STORAGE
TOTAL VOLUME

STORAGE CURVE

CONTRACT NUMBER:
DRAWING NUMBER: A3-213163
DATE: AUG 1999
A

Q:\StorageCurves\W213163.dwg
30 Aug 1999 12:29 PM

213163A (tif)

Appendix D Moura Offstream Storage Hazard Management Toolkit

Not used, for Sunwater internal use only

Appendix E Interaction with local government and district groups

To be populated when EAP next completes a substantive review