EMERGENCY ACTION PLAN — TEEMBURRA DAM (ID 874)

ISSUE: i10.0 — October 2024 **Expiry:** 1 July 2029

Prepared by **Sunwater Limited**

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Approved by the delegate of the Chief Executive, Department of Local Government, Water and Volunteers until 1 July 2029.

Emergency activation quick reference – Dam Hazards

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

Table 1: Emergency activation quick reference

Dam hazards and section numbers	Activation Levels for dam hazards			
	Alert	Lean Forward	Stand Up	Stand Down
Flood operations **See section 5**	• Storage above EL 290.00 (FSL)	• Storage above EL 291.32 m (flood of record)	• Storage above EL 292.70 m (top of clay core – Saddle Dam 1)	• Storage level below EL 290.20 m with no forecast increase
Piping: embankment, foundation, or abutments **See section 6**	• Increasing leakage through an embankment, the foundations, or abutments	• Increasing leakage through the embankment, the foundations, or abutments with cloudy water, OR • Storage level at toe of Saddle Dam 3 embankment (EL 292.42 m)	• Piping condition has been established	• Risk assessment has determined that failure risk has reduced
Earthquake **See section 7**	• Earthquake confirmed (by DSTDM) or felt in the area, AND • Intensity less than 5 Modified Mercalli (MM)	• Earthquake confirmed (by DSTDM) or felt in the area, AND • Intensity greater than or equal to 5 MM, OR • Intensity less than 5 MM and change detected during surveillance inspection	• Earthquake confirmed or felt in the area, AND • A possible failure path has been identified	• Risk assessment has determined that failure risk has reduced
Terrorist threat/ activity or high energy impact **See section 8**	• Not applicable	• Not applicable	• Possible terrorist activity noticed at dam, OR • Threat received • Large explosion heard/observed at dam (e.g. bomb explosion, aircraft hit) • Failure in progress or likely due to impact or explosion, AND • Sufficient water in storage to create a dam hazard	• Risk assessment has determined that failure risk has reduced

Next page: Emergency activation quick reference – Other Emergency Situations

Emergency activation quick reference – Other Emergency Situations

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

Table 1: Emergency activation quick reference (continued)

Other Emergency Situations and section numbers	Activation level		
	Communications Failure – Dam Site (DDO)	Communications Failure – Local Area (LEC/ORR)	Communications Failure – Brisbane (IC/DSTDM)
	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
[redacted]	EAP Program Lead — Prepared for submission	[redacted]	16/05/2025
[redacted]	Principal Engineer – Dam Safety — Approved for submission	[redacted]	16/05/2025
[redacted]	GM Asset Integrity — Approved for submission	[redacted]	19/05/2025
[redacted]	EGM Engineering and Water Resources (or delegate) — Dam Owner Authorising Officer	[redacted]	19/05/2025

Document revision history

Issue	Date	Prepared by	Reason for change	Ref No.
2	May 2008		Significant changes of Teemburra Dam Emergency Action Plan to reflect Sunwater Management structure and other minor changes.	HB# 599431
3	October 2011		Significant changes to all sections of Teemburra Dam Emergency Action Plan to reflect current Sunwater Management structure and other changes.	HB# 1060534
4	October 2015		New Emergency Action Plan developed at expiry of 3E approval. Issued for consultation with Relevant Disaster Management Groups.	HB# 1823117
5	September 2016		Updates to notification & communication lists and Emergency Alert sections.	HB# 2023443
6	August 2017		Revised and reviewed Emergency Action Plan developed at expiry of approval. Also includes updates that reflect the Water Legislation (Dam Safety) Amendment Act 2017, implementation of changes to Sunwater management structure, new event management roles and addition of new Emergency Activation section (Other Emergency Situations).	HB# 2091718
7	December 2018		Amended contacts and associated sections, e.g. Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes.	HB# 2367039
7.1	September 2019		Amended contacts and associated sections, e.g. Organisation chart & Controlled Copy Holders list. Added instructions for Emergency Siren activation. Added Downstream Notification map. Minor error corrections and other non-substantive changes.	HB# 2452380
8.0	March 2020		Revised and reviewed at expiry of approval. Minor error corrections and other non-substantive changes to improve readability and useability.	HB# 2505614
8.1	September 2020		Amended contacts and associated sections, e.g. Organisation chart & Controlled Copy Holders list. Minor error corrections and other non-substantive changes.	HB# 25070507
8.2	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 # 2653255

Issue	Date	Prepared by	Reason for change	Ref No.
8.3	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 # 2726205
8.4	September 2023		Added Fatigue Management as section 2.5. Removed Hazard Management Toolkit from Appendix D. Removed references to chemical spill. Added Annexe and amended messaging in communication tables to comply with AWS requirements. Non-substantive updates as part of Annual Safety Statement. Minor error corrections and readability.	2810992
9.0	October 2023		Revised and reviewed at expiry of approval. AWS added to Abbreviations and Business Terms and Definitions sections. 2022 CRA added and referenced. Crest levels clarified for Saddle Dams. 2023 historical flood level added. AWS warning levels added to Flood Action tables. Flood triggers amended and Stand Up 3 trigger removed. Piping action tables amended. Earthquake triggers clarified. References updated. Removed references to spillway adequacy and updated to match new discharge rating curve. Minor error corrections and readability improvements.	2817679
10.0	October 2024	EAP Team	Full review pending expiry date	2870389

Controlled document distribution list

Copy#	Position	Location
1	Senior Storage Operator	Sunwater, Kinchant Dam
2	General Manager, Central	Sunwater, Moranbah
3	Operations Centre	Sunwater, Brisbane
Note: Communication information for each 'Controlled Copy Holder' is attached in Appendix A		

Electronic document distribution list

Printed electronic copies are considered uncontrolled copies.

Position	Location
Local Disaster Coordinator, Local Disaster Management Group (LDMG)	Mackay Regional Council, Mackay
Executive Officer, Mackay District Disaster Management Group (DDMG)	Police, Mackay
Officer in Charge, Mackay Police Communications Centre	Police, Mackay
Senior Flood Forecaster	Bureau of Meteorology, Brisbane
Note: Communication information for each 'Electronic Copy Holder' is in Appendix A.	

1. References, abbreviations, and definitions

1.1 References/associated documents

Ref	Document title	Reference/location
A	Water Supply (Safety and Reliability) Act 2008 (March 2022)	https://www.legislation.qld.gov.au/view/whole/pdf/inforce/current/act-2008-034
B	Queensland Disaster Management Act 2003 (April 2022)	https://www.legislation.qld.gov.au/view/pdf/inforce/current/act-2003-091
C	Interim Queensland Prevention, Preparedness, Response and Recovery Disaster Management Guideline 2024-25	QLD-Disaster-Management-Guideline.pdf
D	Guidelines on Safety Assessments for Referable Dams (November 2023 (Version 8)	Guidelines on Safety Assessments for Referable Dams
E	Queensland Dam Safety Management Guidelines Version 03.1 August 2024	https://www.dnrme.qld.gov.au/__data/assets/pdf_file/0007/78838/dam-safety-management.pdf
F	Australian Rainfall and Runoff (ARR) 2019	ISBN 978-1-925848-36-6 http://book.arr.org.au.s3-website-ap-southeast-2.amazonaws.com/
G	Emergency action plan for referable dam guideline Version 4 1 October 2023	https://www.resources.qld.gov.au/__data/assets/pdf_file/0018/84015/eap-guideline.pdf
H	Queensland Interim State Disaster Management Plan 2024-25 (Queensland's Disaster Management Committee)	Interim-Queensland-State-Disaster-Management-Plan-2024-25.pdf
I	Queensland Government Communications and systems for public information and warnings	Emergency alerts & public information | Disaster Management | Queensland Government
J	Professional Engineers Act 2002 (RPEQ) (September 2013)	https://www.legislation.qld.gov.au/view/pdf/inforce/2013-09-23/act-2002-054
K	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
L	Queensland Warnings Manual V1 (November 2024)	M.1.174 Queensland Emergency Alert Manual
M	Sunwater website — Emergency Action Plans, Flood Maps and Dam Emergency Sirens	https://www.sunwater.com.au/community/preparing-for-weather-events/emergency-management/
N	Sunwater (Internal) Strategic Event Procedure	Strategic Event Procedure
O	Sunwater (Internal) Teemburra Dam Safety Condition Schedule—August 2023	Sunwater Internal Document

Ref	Document title	Reference/location
P	Sunwater (Internal) Teemburra Dam Operation and Maintenance Manual	Teemburra Dam O&M Manual
Q	Sunwater (Internal) Teemburra Dam Comprehensive Risk Assessment 2022	Sunwater Internal Document
R	Guidelines on Dam Safety Management (ANCOLD, 2003)	ANCOLD ISBN: 0-731027620
S	Guidelines on Consequence Categories for Dams (ANCOLD, 2012)	ANCOLD ISBN: 978-0-9808192-5-0
T	Guideline for Failure Impact Assessment of Water Dams (DNRME 2018)	Guidelines-failure-assessment
U	Sunwater (Internal) Emergency Alert Protocol	Sunwater Internal Document
V	Water Act 2000	https://www.legislation.qld.gov.au/view/pdf/inforce/current/act-2000-034
W	Fatigue Management Procedure WHS42 (Sunwater internal)	Sunwater Internal Document
X	Sunwater (internal) Referable Structures Standing Operating Procedure (SOP) 12 – Dam Log Books	SOP 12

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
AWS	Australian Warning System
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
DLGWV	Department of Local Government, Water and Volunteers
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
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
PMPF	Probable Maximum Precipitation Flood
PWRE	Principal Water Resources Engineer
QDMC	Queensland Disaster Management Committee
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
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
SOM	Senior Operator Maintainer
SOP	Standing Operating Procedure
SRT	Strategic Response Team
SSO	Senior Storage Operator
SWL	Storage Water Level
SWRE	Senior Water Resources Engineer
U/S	Upstream
WHS	Workplace Health & Safety
WSSR	Water Supply (Safety and Reliability) Act
WQ	Water Quality

1.3 Business terms and definitions

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

Term	Definition
Terms defined in accordance with the Water Supply (Safety and Reliability) Act (the WSSR Act)	
Australian Warning System	A national approach to information and warnings during emergencies like bushfire, flood, storm, extreme heat and severe weather.
Dam hazard	Means a reasonably foreseeable situation or condition that may: • cause or contribute to the failure of the dam, if the failure may cause harm to persons or property, OR • require an automatic or controlled release of water from the dam, if the release of the water may cause harm to persons or property
Dam hazard event	Means an event arising from a *dam hazard* if: • persons or property may be harmed because of the event, AND • a coordinated response, involving two 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 (DMP)	Of a *district group* or local government, means the group's District DMP (DDMP) or local government's Local DMP (LDMP) under the Queensland Disaster Management Act 2003.
District group (District Disaster Management Group)	For an EAP, means a district group established under the Queensland Disaster Management Act 2003,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 Queensland Disaster Management Act 2003, 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 Queensland Disaster Management Act 2003, section 29 whose local government area could, under the plan, be affected by a *dam hazard*.

Term	Definition
Notice response	A dam owner's written response to a notice following an assessment of an EAP by a local government or *district group*.
Referable dam	A dam, or a proposed dam after its construction, will be a referable dam if: • a failure impact assessment of the dam, or the proposed dam, is carried out under the WSSR Act, AND • the assessment states the dam has, or the proposed dam after its construction will have, a category 1 or category 2 failure impact rating, AND • the Chief Executive has, under section 349 of the WSSR Act, accepted the assessment Also, a dam is a referable dam if: • under section 342B of the WSSR Act, the owner of a dam is given a referable dam notice and, before the effective day for the notice, does not give the Chief Executive a failure impact assessment for the dam, AND • the Chief Executive has not, under section 349 of the WSSR Act, accepted a failure impact assessment of the dam
Relevant entity	Means each of the following under the EAP for the dam: • the persons who may be affected, or whose property may be affected, if a *dam hazard event* or *emergency event* were to happen for the dam, e.g. the owners of parcels of farmland adjacent to the dam or residents of a township • each local group and district group for the EAP • each local government whose local government area may be affected if a *dam hazard event* or *emergency event* were to happen • the Chief Executive • another entity the owner of the dam considers appropriate e.g. the Queensland Police Service (QPS)
Terms consistent with *Queensland Disaster Management Guidelines*	

Term	Definition
Activation levels	The four levels of EAP activation are: • **Alert:** A heightened level of vigilance due to the possibility of an event occurring. No further action may be required; however, the situation should be monitored by someone capable of assessing the potential of the threat. Moving to an Alert level indicates the dam owner is getting ready to activate the Lean Forward level of the EAP if the situation deteriorates. • **Lean Forward:** An operational state characterised by a heightened level of situational awareness of an impending disaster event and a state of operational readiness. Disaster coordination centres are on standby and prepared but not activated. • **Stand Up:** The operational state where resources are mobilised, personnel are activated, and operational activities commenced. Disaster coordination centres are activated. The dam owner needs to provide an Emergency Event Report (EER) in accordance with the provision of the WSSR Act . • **Stand Down:** Transition from responding to an event back to normal core business and/or continuance of recovery operations. There is no longer a requirement to respond to the event and the threat is no longer present. **Notes:** The movement through these levels of activation is not necessarily sequential. It should be applied with flexibility and adaptability and be tailored to the location and event. Triggering one of these levels of activation may not necessarily mean a similar activation of LDMGs or DDMGs.
AWS warning levels	The three AWS warning levels are: • **Advice:** The first warning level of the Australian Warning System meaning an incident has started but there is no immediate danger. Stay up to date in case the situation changes. • **Watch and Act:** The second warning level of the Australian Warning System meaning there is a heightened level of threat. Conditions are changing - you need to start taking action now to protect you and your family. • **Emergency:** The third and highest warning level of the Australian Warning System meaning lives may be in danger and action should be taken immediately. **Notes:** These AWS warning levels do not change the Activation Levels of the EAP and are intended for external public-facing information only. There is no Stand Down equivalent in AWS warning levels.

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.
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 level	The lowest elevation of the non-overflow crest section of the dam excluding handrails, parapets or wave walls that have not been designed to store water.
Dam crest flood (DCF)	The flood event that causes reservoir levels to reach the lowest point of non-overflow section of a dam.
Dam failure	Dam failure is the physical collapse of all or part of a dam or the uncontrolled release of any of its contents.
Downstream releases	Downstream releases are outflows from the dam made through appurtenant structures such as spillways or outlet works that are in accordance with the design of the dam.
Earthquake	A sudden release of energy in the earth's crust or upper mantle, usually caused by movement along a fault plane or by volcanic activity, resulting in the generation of seismic waves that can be destructive. The potential consequences of an earthquake include: • settlement, sliding, or overturning of monoliths in the dam wall • initiation of seepage lines in the foundations or abutments that could lead to piping damage and potential inoperability of appurtenant works
Flood release	A flood release from a dam occurs when catchment inflows raise the storage level above the Full Supply Level (FSL) resulting in a discharge from the spillway of the dam.
Piping	Internal scour caused by the water flow and seepage that occurs through earth dams, dam foundations, or dam abutments. The internal scour can lead to the formation of a pipe, which can lead to a failure of the dam.
Plane strike or other impact	The impact of a plane, meteorite, or other high energy item on or in close vicinity of a dam that could damage the dam structure or create a wave that could overtop the dam.
Probable maximum flood (PMF)	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.

Term	Definition
Probable maximum precipitation (PMP)	The theoretical greatest depth of precipitation for a given duration that is physically possible over a particular drainage basin.
Probable maximum precipitation flood (PMPF)	The flood resulting from the probable maximum precipitation coupled with typical catchment conditions.
Stability, main embankment	High foundation pore pressure peaks may reduce the Factor of Safety against slip circle failure to an unacceptable level.
'Sunny day' failure (SDF)	A failure that occurs at the FSL and there is no concurrent rain associated flooding.
Terrorist activity	A deliberate attempt to damage or fail or contaminate a dam.

2. Introduction

2.1 Context

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

This EAP has been prepared in accordance with Chapter 4 of the WSSR Act, the *Emergency action plan for referable dam guideline* and the *Queensland State Disaster Management Plan 2023* . The content requirements for EAPs are contained in section 352H of the WSSR Act.

Summary of legal requirements – Section 352H

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

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

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

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

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

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

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

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

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

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

2.2 Purpose

The purpose of this EAP is:

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

It is possible for more than one dam hazard to exist at Teemburra Dam at 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 Teemburra Dam by the owner of the dam (Sunwater) and the communication and notification of dam hazards to the LDMGs, DDMGs and broader community. However, the EAP sits within the broader emergency response framework. This EAP has been assessed and considered to be consistent with the Mackay Regional Councils' Local Disaster Management Plan (LDMP) and associated disaster management sub plans.

2.3 Scope

The Teemburra Dam EAP covers:

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

2.4 Sunwater training

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

During this period, Sunwater staff complete work instructions for site preparations and during July to September carry out checks on stores, supplies of fuel and the current EAP, such as contact details for individuals and dam information.

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

Note: All enquiries regarding EAP training should be directed to

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

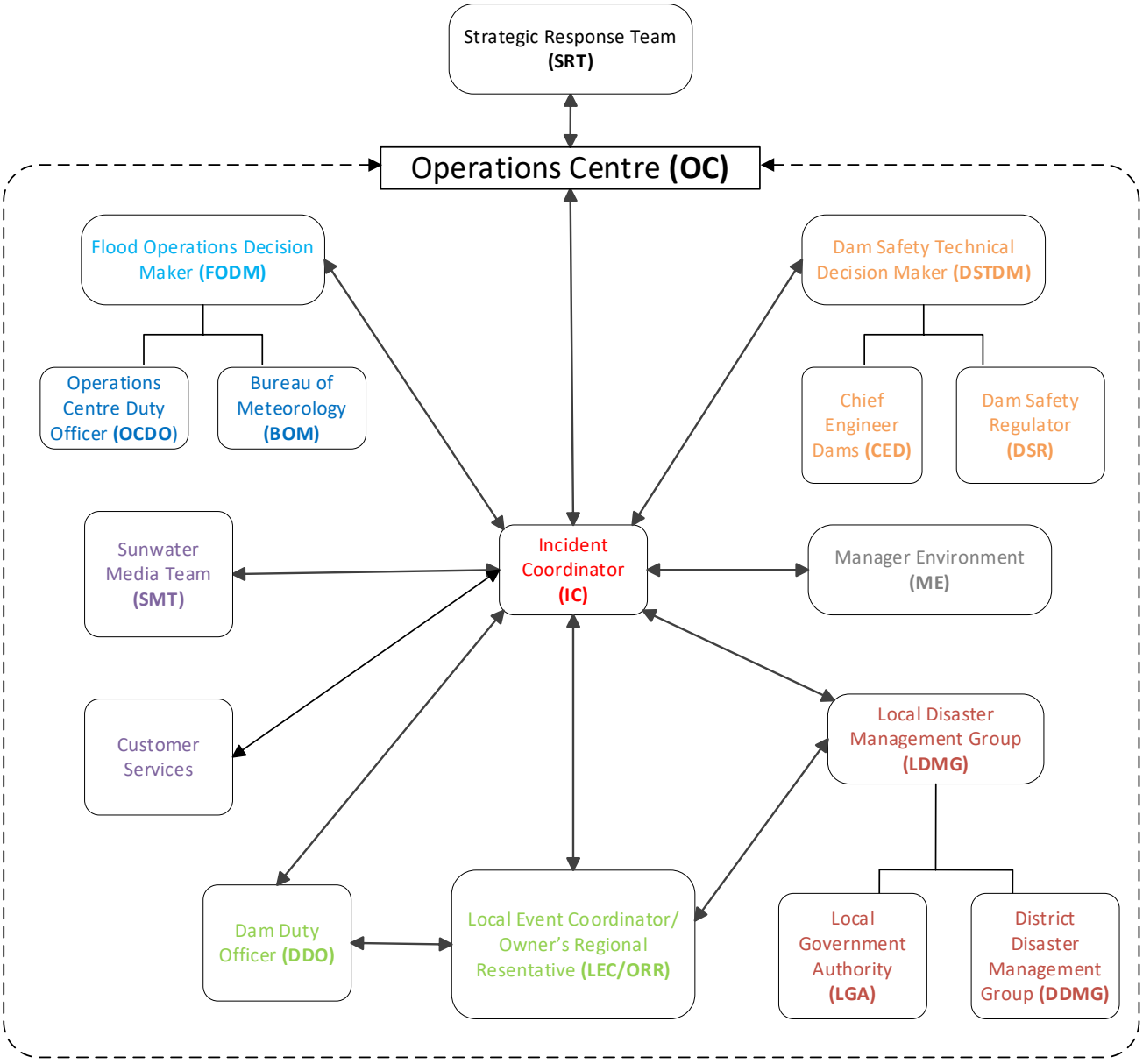
2.5 Fatigue Management Plan

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

2.6 Dam emergency management within Sunwater

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

Figure 1: Sunwater emergency response organisation



Key aspects of the emergency management framework are described below:

- Central to the framework is the role of IC for any dam hazard at a dam. The IC will maintain overall responsibility for a coordinated response to the dam hazard incident.
- The IC is responsible for the decision to activate the EAP. The IC is the lead coordinator in the implementation of any EAP in events for Sunwater. Should the IC be unavailable, the Local Event Coordinator (LEC) followed by the Dam Duty Officer (DDO) is responsible for the implementation of the EAP. If the IC loses all communications

during a dam hazard, then as a fail-safe position, the LEC followed by the DDO will assume the duties and responsibility of the IC. However, loss of communications could result in some communication processes defined in this EAP not being carried out.

- The DSTDM is primarily responsible for analysing dam safety and providing expert technical advice in this regard. They will be expected to discuss dam hazards with peers and other technical experts and make sound decisions to mitigate risks and to determine a response to incidents and emerging issues. The DSTDM is the key communication contact with the Dam Safety Regulator.
- The FODM has responsibility for all matters involving flood modelling and forecasting and determining the associated impact to Sunwater storages/infrastructure and EAP actions. The FODM may pre-emptively advise the IC to activate the EAP in accordance with available hydrology forecast information. For example, if an EAP trigger level is predicted to be exceeded based on forecast dam inflows derived from observed rainfall and streamflow conditions upstream of the dam, the EAP may be activated to the predicted level. Regarding the operation of the OC, the FODM must liaise with the IC as necessary to inform of decisions made.
- Sunwater's in-house engineering and technical staff will provide technical advice to the IC, LEC and DDO on an as needs basis. The Flood Operations Decision Maker (FODM) and Dam Safety Technical Decision Maker (DSTDM) will provide flood and dam engineering advice respectively during a dam hazard. Such advice will be provided within an established framework of Standing Operating Procedures (SOPs), models, standards, and manuals. This is an advisory role only and does not diminish the decision responsibility of the IC, LEC or DDO.
- If unusual circumstances develop during a dam hazard it will be necessary to escalate to either the FODM or DSTDM. These roles are filled by Registered Professional Engineers of Queensland (RPEQ) and are suitably qualified professionals as defined in the Professional Engineers Act of Queensland. These decision-making roles are providing direct engineering supervision to the advisors through the established framework of SOPs, models, standards, and manuals or through direct supervision.

2.7 Community information

Sunwater, with the assistance of local councils, will ensure community education around messaging and impacts of the EAP and its related events is undertaken and continually improved.

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

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 (SDCC). The process Sunwater follows is documented in Appendix A7.

The Teemburra Dam precinct also includes an emergency siren to warn D/S residents of imminent failure of the dam. Information regarding the location and use of the dam failure siren can be found in Appendix A8.

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

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

2.8 Lessons Learnt

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

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

3. Dam details

3.1 General dam information

Location: Teemburra Dam is situated on Teemburra Creek, AMTD 20.5 km, near Finch Hatton. The dam is 50 km west of the city of Mackay in Northern Queensland and is located approximately 6 km north-east of Pinnacle.

Catchment: Teemburra Creek is a tributary of Blacks Creek, which flows into the Pioneer River approximately 65 km upstream from its mouth at Mackay in Northern Queensland. The catchment area lies in hilly wooded country between the main parts of the Clarke Ranges and the easterly-southeast trending spur, Pinnacle Range. The topography of the catchment is gently undulating and changes gradually to hilly terrain from the Pinnacle Range towards the west and north. The area immediately downstream of the dam is mountainous, stretching approximately 40 km further down until the topography transforms to predominantly plains with large areas used for sugar cane plantations.

Construction: The dam was completed in 1996 to mainly supply irrigation water to sugarcane farms of Pioneer Valley. The dam also supplies water to town water supply and industrial users.

Specification: The table below lists general specifications of Teemburra dam.

Table 2: Teemburra Dam specifications

Description	Specification
Dam type	**Concrete-faced rock-fill embankment**
FSL	EL 290.00 m
Historical recorded max storage—Mar 2017	EL 291.32 m
Storage capacity at FSL	147,500 ML
Storage area at FSL	1,085 ha
Catchment area	67.45 km^2
Dam Crest Level (DCL)	EL 295.00 m at top of wave wall
Minimum foundation level	EL 238.00 m
Crest length along the axis	350 m
Maximum height of dam	57 m
Crest width	6 m
Spillway type	**Ungated concrete ogee crest with a partially lined stepped chute**
Spillway crest level	EL 290.00 m
Spillway crest length	60 m
Spillway Capacity (at DCL)	1,258 m^3/s (108,691 ML/d)
Outlet works—Main Embankment	**Inclined intake structure with selective withdrawal, outlet conduit, and valve chamber**
Outlet capacity	345.6 ML/d (4 m^3/s)
Outlet conduit	MSCL, 1915 mm OD with a RC surround
Length of conduit	152 m
Outlet conduit invert level	EL 240.53 m (at upstream end)

Description	Specification
Regulating valve	600 mm fixed cone dispersion
Guard valve	1,200 mm butterfly valve
Outlet works—Saddle Dam 2	**Inclined intake structure with selective withdrawal, outlet conduit, and valve chamber**
Outlet capacity	562 ML/d (6.5 m^3/s)
Outlet conduit	MSCL, 1290 mm OD with a RC surround
Length of conduit	165 m
Outlet conduit invert level	EL 267.97 m (at upstream end)
Guard valve	1,200 mm butterfly valve
Saddle Dam 1	**Zoned earth-fill with clay core**
Crest level	EL 294.70 m (design) EL 294.84 m (minimum surveyed)
Crest length along axis	220 m
Maximum height of dam	18 m (above min. foundation level)
Saddle Dam 2	**Zoned earth-fill with clay core**
Crest level	EL 295.00 m (design) EL 294.91 m (minimum surveyed)
Crest length along axis	740 m
Maximum height of dam	27 m (above min. foundation level)
Saddle Dam 3	**Homogeneous road embankment**
Crest level	EL 295.39 m (design) EL 295.57 m (minimum surveyed)
Crest length along axis	190 m
Maximum height of dam	3 m (above natural surface)

3.2 Population at risk

In the Consequence Assessment performed for the 2022 Comprehensive Risk Assessment:

- Teemburra Dam is rated as 'Extreme' Consequence Category for both flood failure and sunny day failure.
- The maximum flood PAR is 32,269 due to failure of the main dam during PMF (incremental PAR is 152).
- The maximum sunny day PAR is 237 due to failure of Saddle Dam 2.
- Modelling assumptions were made regarding concurrent downstream floodplain conditions during dam failure events. Analysis of historical data showed a strong correlation between rainfall in the Teemburra catchment and the downstream floodplain. As a result, the PMF failure scenario assumes PMP (~1 in 480,000 AEP) concurrent rainfall downstream of Teemburra Dam. No concurrent flooding occurs in a Sunny Day failure. All scenarios modelled adopted a conservative Mean High Water Springs (MHWS) tide level.

Flood mapping showing the location of the Population at Risk is provided in Appendix B.

3.3 General arrangement

The general arrangement drawings are in Appendix B1.

3.4 Emergency inspections and monitoring

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

3.4.1 Inspections

The following inspections are to be carried out:

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

4. Roles and responsibilities

Roles and responsibilities	Position holder
Owner (Sunwater) • Liaise with the Board and Minister. • Activate Sunwater Strategic Response and Business Continuity Plans if required. • Ensure necessary resources are available to manage any dam hazard and emergency events. • At all times, aim to provide timely advice and support to the local disaster management groups (LDMGs) in the affected local government areas and the district disaster management groups (DDMGs) in the affected disaster districts. • During a dam hazard event that occurs with little or no warning, undertake the following actions to ensure the community is informed as soon as possible: ○ notify the residents listed in the EAP via SMS. ○ contact the SDCC to request an Emergency Alert campaign as detailed in the emergency alert request and threat detection polygon. • Where a dam hazard event occurs with adequate time to warn downstream residents, notify the residents listed in the EAP via SMS (unless otherwise agreed with the LDMGs). • Record communications, notifications and observations as required.	CEO EGMO EGM E&WR
Owner's Head Office Representative • Authorise the issuing of EAPs, SOPs and O&M Manuals and amendments. • Facilitate Dam Safety Training Courses for Service Managers, Operations Supervisor, Dam Operators and other staff as appropriate and ensure that all staff required to undertake Dam Safety work are trained and accredited. • Ensure that risks identified in CRAs or other technical reports undertaken in relation to Dam Safety are included in the EAP. • Ensure visual inspections and instrumentation monitoring frequencies conform to ANCOLD Guidelines. • Ensure all Dam Safety work orders, work instructions and lesson learned outcomes are fully implemented. • Ensure requirements of the Dam Condition Schedule are met. • Ensure the work instructions are correct and the Logbooks, SOPs, Data Books and EAPs are reviewed annually as per the Dam Condition Schedule. • Undertake and prepare the five yearly Comprehensive Inspection Reports with suitably qualified personnel within the time specified and ensure 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 and ensure that work orders are created for recommendations and work is undertaken as required. • Review the Dam Safety Instrumentation database and evaluate data to verify the structural integrity of the dams on a regular basis and maintain a spread sheet for verification for audit and quality control. • Record communications, notifications and observations as required.	GM Asset Integrity GM Asset Management

Roles and responsibilities	Position holder
Owner's Regional Representative (ORR) • Liaise with the Senior Storage Operator /Operator Maintainer. • Arrange dam specific training and accreditation for relevant staff. • Ensure competent, trained and accredited personnel operate the storages. • Ensure necessary resources are available to manage any dam hazard and emergency events. • Undertake the role of LEC as required • Ensure all work orders, work instructions and lesson learned outcomes are fully implemented. • Record communications, notifications and observations as required.	GM Central OS
Strategic Response Team (SRT) • Facilitate the assessment, escalation and notification and management of strategic response and recovery for a high or extreme risk, or impact, event. • Initial and ongoing assessment of event status and requirements • Development, and revision of, strategic objectives based on requirements • Identifying, managing, and monitoring strategic risks • Monitor media and stakeholder/customer impacts • Managing/overseeing event communications including media, stakeholder, customer, and internal communications. • Record communications, notifications and observations as required.	Various ELT members as per SRT roster
Technical Advisor • Analyse the situation and provide expert technical advice. • Discuss issues with peers and other technical experts and make sound decisions to mitigate the risk • Determine response to incidents and emerging issues. • Record communications, notifications and observations as required.	GM Environment
Dam Safety Technical Decision Maker (DSTDM) • Maintain current RPEQ accreditation. • Analyse the situation and provide expert technical advice in relation to Dam Safety. • Discuss dam hazards with peers and other technical experts and make sound decisions to 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 DSR as required. • Record communications, notifications and observations as required.	Various personnel as per DSTDM roster

Roles and responsibilities	Position holder
Flood Operations Decision Maker (FODM) • Maintain current RPEQ accreditation. • Provide hydrological advice in relation to predicted and actual dam outflows including assessment of weather and flood warnings, and other related matters as identified in the OC Procedure. • Interpret and apply rainfall data in accordance with the OC Procedure, including, as required under the OC Procedure, liaising with BOM. • Ensure the EAP is implemented appropriately and carry out the FODM role as required. • Record communications, notifications and observations as required.	Various personnel as per FODM roster
Operations Centre Duty Officer (OCDO) • Decide if a flood 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 QDMC of flood events. • Record communications, notifications and observations as required.	Various personnel as per Media Team roster
Incident Coordinator (IC) • Notify LDMGs, or councils if LDMGs not Stood Up, of intent to use the Emergency Alert. • Activate the EAP, when necessary. • Ensure the EAP is implemented appropriately and carry out the IC role as required. • Arrange Situation Reports and determine frequency, as required. • Record communications, notifications and observations as required.	Various personnel as per OC 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 SSO OM
Council **Mackay Regional Council** Councils have legislated local government functions, as per Section 80 of the Queensland 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 DDMG for the disaster district in which area it is situated. • Perform other functions given to the local government. 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 LDMP.	
Queensland Police Service (QPS) Manage the initial situation based on local operational procedures; including but not limited to: • conduct emergency operations. • coordinate and support Sunwater during a declared emergency at the dam. • liaise with relevant organisations. • evacuation of persons if required. • control of essential traffic. • security of specific area.	Local Police

Roles and responsibilities	Position holder
Disaster Management Groups/Personnel – (In addition to requirements outlined in the Queensland 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 councils to initiate. • During a dam hazard/emergency event, **providing they are Stood Up**, the LDMGs in the affected local government areas will take the lead role in notifying the broader community. • Identify and provide advice to the relevant DDMGs about support services required by the LDMG to manage an EAP event. • Provide reports and make recommendations to the relevant DDMGs about matters relating to EAP events. QPS • Work with dam owner and LDMGs to ensure Emergency Alert polygons are prepared, stored and tested at the State Disaster Coordination Centre (SDCC). DDMG • May review the EAP for consistency with the DDMP. SCTN (Security and Counter Terrorism Network) Coordinator • Identifies areas of concerns during the preparation of disaster plans and provides advice during counter terrorism emergency events	LDMG QPS DDMG SCTN Coordinator
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 WSSR Act.	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 Teemburra Dam to Full Supply Level (FSL) 290.00 m and the rate of inflow exceeds the capacity of the outlet works. The spillway will then discharge water downstream into the Pioneer River. These flood flows can create a dam hazard. Inflows will also cause the storage to temporarily rise to above the full supply level of the storage. Note:
    - The greater the rate of inflow, the higher the storage will rise.
    - The higher the storage level rises, the greater the loads on the dam structure.
    - Although unlikely, the greater the loading, the higher the likelihood of a dam failure.
    - Typically, the level of surveillance is increased during flood operations (refer tables in this section).
- Spillway discharge from the dam where there have been no indications that a dam failure may be initiating or in progress.

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

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

The following table shows historical floods experienced at Teemburra Dam.

Table 3: Historical floods experienced at Teemburra Dam

Flood Rank	Date	Peak Height (m) EL	Peak Height (m) over spillway crest
1	March 2017	291.32	1.32
2	February 2000	291.32	1.32
3	March 2012	291.26	1.26
4	January 2023	291.24	1.24
5	December 2010	290.92	0.92

5.2 Emergency actions

In the emergency action tables following, each level of activation includes both its own actions and the actions of any lower level, unless those lower level actions are superseded.

5.2.1 Activation triggers

Table 4: Flood emergency activation trigger summary

EAP Flood Activation Trigger	Trigger Summary	AWS Warning Level
Alert	Storage above EL 290.00 m (FSL)	
Lean Forward	Storage above EL 291.32 m (flood of record)	**ADVICE**
Stand Up 1	Storage above EL 292.70 m (top of clay core—Saddle Dam 1)	**WATCH & ACT**
Stand Up 2	Storage above EL 294.70 m (Saddle Dam 1 overtopping, allowing for wave action) OR; As advised by the DSTDM	**EMERGENCY**
Stand Down	Storage level below EL 290.20 m with no forecast increase	

While this EAP is not triggered until Teemburra Dam reaches the Alert trigger, Sunwater and the Mackay LDMG 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.

The activation of Stand Up 2 requires consideration of wave action. For example, if the gauge reading was forecast to reach 1 m below the dam crest level and the DDO reported 1 m high waves, Stand Up 2 will be triggered. Furthermore, the DSTDM may also trigger this activation if there are any dam safety concerns as the storage approaches dam crest level. In respect of forecast rainfall, as is identified in the roles and responsibilities of the FODM, regard must be had to the OC Procedure.

5.2.2 Emergency actions

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

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

Table 5: Flood operations—DDO emergency action

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Storage above EL 290.00 m (FSL)	• Storage above EL 291.32 m (flood of record)	• Storage above EL 292.70 m (top of clay core—Saddle Dam 1)	• Storage above EL 294.70 m (Saddle Dam 1 overtopping, allowing for wave action), OR • As advised by the DSTDM	• Storage below EL 290.20 m with no forecast increase
Actions	• Record all communication • Inspect the Main Dam, Saddle Dam 1 and 2, and spillway daily (or as instructed by the DSTDM) including seepage instruments, and photograph/video and record using approved forms and send to IC & DSTDM • Attention shall be given to: ■ visual inspection of flow patterns over spillway and dissipator for evidence of scouring ■ inspect embankments for leaks, deformation, and erosion ■ obvious signs of seepage ■ monitor Saddle Dams for piping risk. • Undertake site preparations (if not already complete) including but not limited to the following checks: ■ fuel and operation of backup generator ■ communication systems (including radio, satellite, phones, and internet) ■ Chainsaw available onsite	• As per previous activation level, AND • Inspect the Main Dam, Saddle Dam 1 and 2, and spillway 6-hourly (or as instructed by the DSTDM) including seepage instruments, and photograph/video and record using approved forms and send to IC & DSTDM • When storage is approaching EL 292.42 m, toe of Saddle Dam 3, inspect Saddle Dam 3 as above. • Read digital piezometer data for Saddle Dam 2 daily (or as instructed by the DSTDM) • Install wave wall bulkhead into the upstream wave wall at top of the main dam intake stairs (O&M Section 9.1.1). **DDO ACTIONS CONTINUED NEXT PAGE**	• As per previous activation level, AND • Main embankment —monitor for potential for water to flow through bulkhead winch opening (EL 292.90 m) • NOTE: Storage level at top of clay core at Saddle Dam 1 (EL 292.70 m) and approaching top of clay core at Saddle Dam 2 (EL 293.00 m)	• As per previous activation level	• Return to routine surveillance activities and frequencies • Inspect the dam for any damage and photograph any damage identified during the event • Forward all EER material to IC email as required • Update Dam Logbook as per SOP 12

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

Table 5 (Continued): Flood operations—DDO emergency action

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Storage above EL 290.00 m (FSL)	• Storage above EL 291.32 m (flood of record)	• Storage above EL 292.70 m (top of clay core—Saddle Dam 1)	• Storage above EL 294.70 m (Saddle Dam 1 overtopping, allowing for wave action), OR • As advised by the DSTDM	• Storage below EL 290.20 m with no forecast increase
Actions	**(From previous page)** • Record the storage level twice daily (or as instructed by the DSTDM) using gauge boards and confirm accuracy of gauging station • Ensure Main Dam bulkhead winch cable conduit cover is installed • Record rainfall daily • Update Logbook as per SOP 12 • Report any unusual readings or observations to the DSTDM and IC as soon as practical • NOTE: Storage level at top of filters for Saddle Dam 1 and 2 FSL 290.00 m				
Notifications	• IC • SO • LEC/ORR	• As previous activation level	• As previous activation level	• As previous activation level	• Inform all previously notified contacts of stand down
AWS Warning Level		**ADVICE**	**WATCH & ACT**	**EMERGENCY**	

Table 6: Flood operations—LEC emergency action

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Storage above EL 290.00 m (FSL)	• Storage above EL 291.32 m (flood of record)	• Storage above EL 292.70 m (top of clay core—Saddle Dam 1)	• Storage above EL 294.70 m (Saddle Dam 1 overtopping, allowing for wave action), OR • As advised by the DSTDM	• Storage below EL 290.20 m with no forecast increase
Actions	• Record all communication • Liaise with DDO, IC and LDMG re: situation • Develop/implement staff roster • 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 and IC	• As per previous activation level	• As per previous activation level	• Forward all EER material to IC email as required • Return to routine activities
Notifications	• DDO • IC • LDMG	• As per previous activation level	• As per previous activation level	• As per previous activation level	• Inform all previously notified contacts of stand down
AWS Warning Level		**ADVICE**	**WATCH & ACT**	**EMERGENCY**	

Table 7: Flood operations—IC emergency action

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Storage above EL 290.00 m (FSL)	• Storage above EL 291.32 m (flood of record)	• Storage above EL 292.70 m (top of clay core—Saddle Dam 1)	• Storage above EL 294.70 m (Saddle Dam 1 overtopping, allowing for wave action), OR • As advised by the DSTDM	• Storage below EL 290.20 m with no forecast increase
Actions	• Record all communication • Note: Sunwater to continue public messaging until LDMG is *stood up*. • Liaise with Sunwater Media on-call, LDMG(s), FODM and/or DSTM to send appropriate messaging • Create Incident Report Record • Ensure all abnormal observations or damage has been reported to DSTDM • Update Sunwater intranet with dam status • Note: IC to carry out LEC actions unless LDMG is stood up	• As per previous activation level	• As per previous activation level	• As per previous activation level, AND • Liaise with the DSTDM to confirm that dam failure is in progress	• Complete all internal and external notifications • Forward all EER material to IC email as required • Close Incident Report Record • Update Sunwater intranet with dam status • Return to routine activities
Notifications	• DDO • FODM • DSTDM • LEC/ORR • SMT • SRT • DDMG	• As per previous activation level; and • D/S Residents	• As per previous activation level	• As per previous activation level, AND • Emergency siren • SDCC	• DDO • FODM • DSTDM • LEC/ORR • SMT • SRT • DDMG
AWS Warning Level		**ADVICE**	**WATCH & ACT**	**EMERGENCY**	

Table 8: Flood operations—LEC and IC external communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text	AWS Warning Level
Alert	• Storage above EL 290.00 m (FSL)	• LDMG • DDMG	• Phone •	Describe current situation with dam: What is the event? What is the status? Advise of current storage level Discuss any potential road/bridge closures	
Lean Forward	• Storage above EL 291.32 m (flood of record)	• LDMG • DDMG	• Phone	Describe current situation with dam: What is the event? What is the status? (storage is greater than flood of record) Advise of current storage level Advise of any forecasts you are aware of	**ADVICE**
		• D/S Residents	• SMS (Phone for those without mobiles)	Liaise with Sunwater Media on-call, LDMG(s), FODM and/or DSTM to send appropriate messaging Refer to Annexe for sample message	
Stand Up 1	• Storage above EL 292.70 m (top of clay core—Saddle Dam 1)	• LDMG • 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	**WATCH & ACT**
		• D/S Residents	• SMS (Phone for those without mobiles)	Liaise with Sunwater Media on-call, LDMG(s), FODM and/or DSTM to send appropriate messaging Refer to Annexe for sample message	

Table 8 (Continued): Flood operations—LEC and IC external communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text	
Stand Up 2	• Storage above EL 294.70 m (Saddle Dam 1 overtopping, allowing for wave action), OR • As advised by the DSTDM	• LDMG • 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	EMERGENCY
		• SDCC	• Phone & Email	**Complete Emergency Alert Request Form as per instructions and email to the SDCC to send to D/S Residents.** Liaise with Sunwater Media on-call, LDMG(s), FODM and/or DSTM to send appropriate messaging Refer to Annexe for sample message	
		• D/S Residents	• SMS (Phone for those without mobiles)	Liaise with Sunwater Media on-call, LDMG(s), FODM and/or DSTM to send appropriate messaging Refer to Annexe for sample message	
		• Emergency siren	• Phone & Email	Complete Emergency siren instructions in Appendix A8 and notify SRT. **Not to be used UNLESS confirmed dam failure is in progress and the Emergency Alert is being sent out.**	
Stand Down	• Storage level below EL 290.20 m	• LDMG • 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	

Table 9: Flood operations—DSTDM emergency action

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Storage above EL 290.00 m (FSL)	• Storage above EL 291.32 m (flood of record)	• Storage above EL 292.70 m (top of clay core—Saddle Dam 1)	• Storage above EL 294.70 m (Saddle Dam 1 overtopping, allowing for wave action), OR • As advised by the DSTDM	• Storage below EL 290.20 m with no forecast increase
Action	• Record all communication • Provide technical advice to DDO and IC on a needs basis • Review surveillance reports and instrumentation data and determine is any additional responses are required • NOTE: Storage level at top of filters for Saddle Dam 1 and 2 FSL 290.00 m	• As per previous activation level, AND • NOTE: Storage level approaching toe of Saddle Dam 3 embankment (EL 292.42 m).	• As per previous activation level, AND • NOTE: Storage level at top of clay core at Saddle Dam 1 (EL 292.70 m) and approaching at top of clay core at Saddle Dam 2 (EL 293.00 m).	• As per previous activation level, AND • Liaise with the IC and confirm need to sound Emergency siren due to dam failure	• Forward all EER material to IC email as required • Return to routine activities
Notifications	• DDO • IC • DSR	• As per previous activation level	• As per previous activation level	• As per previous activation level • CEO	• Inform all previously notified contacts of stand down
AWS Warning Level		**ADVICE**	**WATCH & ACT**	**EMERGENCY**	

Table 10: Flood operations—FODM emergency action

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation Trigger	• Storage above EL 290.00 m (FSL)	• Storage above EL 291.32 m (flood of record)	• Storage above EL 292.70 m (top of clay core—Saddle Dam 1)	• Storage above EL 294.70 m (Saddle Dam 1 overtopping, allowing for wave action), OR • As advised by the DSTDM	• Storage below EL 290.20 m with no forecast increase
Action	• Provide technical advice to DDO, DSTDM and IC on a need basis. • Liaise with IC • Review SDCC reports and determine if any additional responses are required. • Undertake inflow assessment as per the OC Procedure and update as necessary. • Update and issue Status Updates if required. • Record all communication and decisions made	• As per previous activation level	• As per previous activation level	• As per previous activation level	• Forward all EER material to IC email as required • Return to routine activities
Notifications	• IC • DDO • DSTDM • BOM	• As per previous activation level	• As per previous activation level	• As per previous activation level,	• Inform all previously notified contacts of stand down
AWS Warning Level		**ADVICE**	**WATCH & ACT**	**EMERGENCY**	

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

6.1 Overview

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

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

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

- Use the SDF outline when a dam failure is in progress or likely due to piping and no concurrent flooding or downstream releases are occurring or expected to occur, or
- Use the PMF outline when a dam failure is in progress or likely due to piping and concurrent flooding or downstream releases are occurring or expected to occur.

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

6.1.1 Assessment of circumstances that potentially indicates an increase in the likelihood of piping

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

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

6.2 Emergency action roles

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

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

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

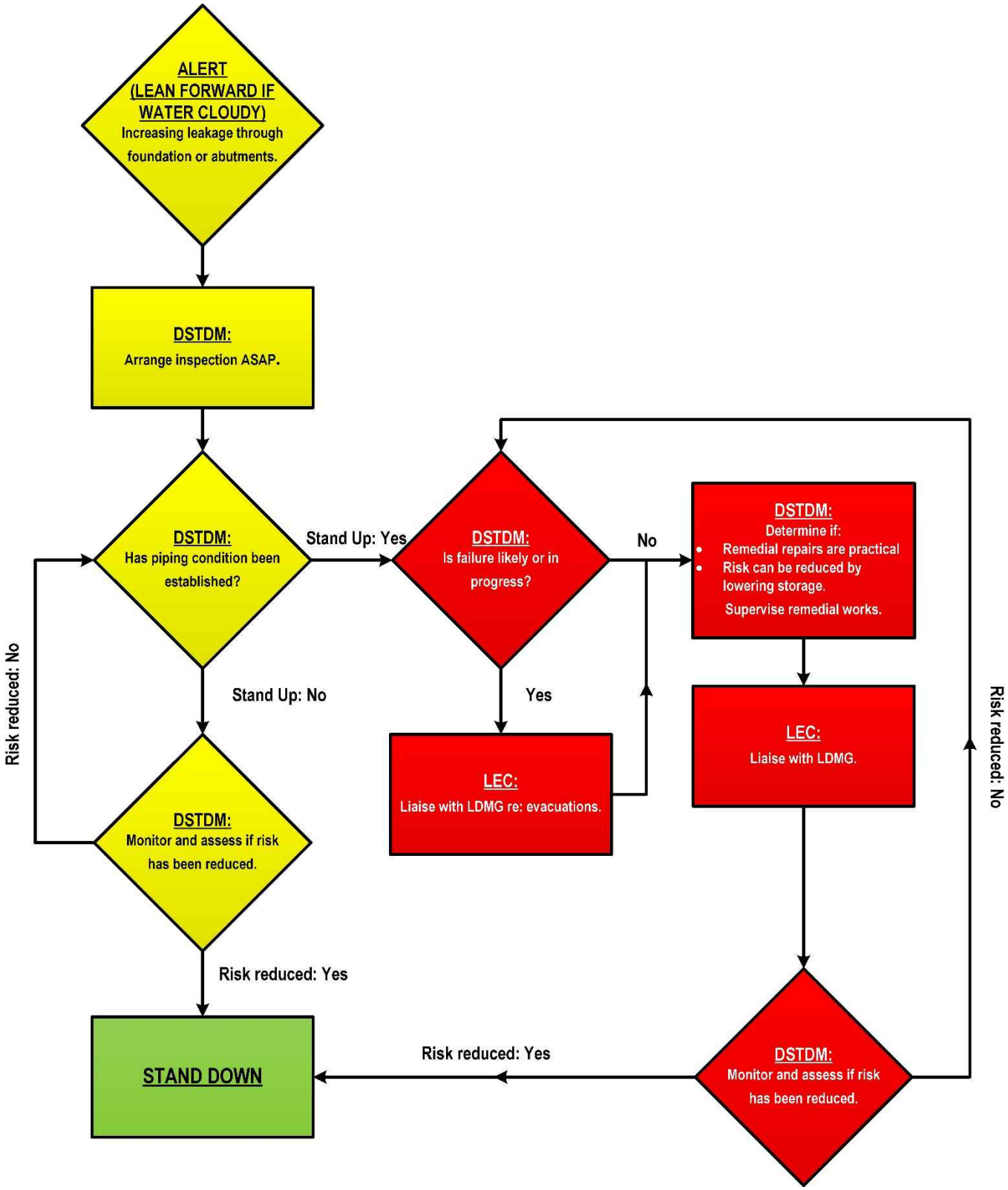


Table 11: Piping: embankment, foundation, or abutments—DDO emergency action

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, OR • Storage level at minimum natural surface of Saddle Dam 3 embankment (EL 292.42 m)	• 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 dam safety risk has reduced
Actions	• Record all communication • Monitor flows every 6 hours (or as otherwise instructed by the DSTDM) until a decreasing trend is observable • Photograph/video the piping from a safe point and record using approved forms and send to IC & DSTDM • Update Dam Logbook as per SOP 12	• As per previous activation level, AND • Inspect Saddle Dams or as instructed by the DSTDM), and photograph/video and record using approved forms and send to IC & DSTDM • NOTE: Top of clay core for Saddle Dam 1 EL 292.70 m and Saddle Dam 2 EL 293.00 m	• As per previous activation level, AND • Support/supervise remedial works as required. Supervise remedial repairs (if applicable). (Supervise means to provide technical oversight to the work. It does not necessarily mean on-site supervision) • 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 advise any members of the public to leave	• As per previous activation level, AND • Vacate the immediate vicinity of the piping condition • Ensure remedial works cease and plant and personnel have been moved to a safe location • Record/photograph the piping damage and/or dam failure from a safe point	• Forward all EER material to IC email as required • Update Dam Logbook as per SOP 12 • Return to routine activities
Notifications	• DSTDM • IC • SO • LEC/ORR	• As per previous activation level	• As per previous activation level	• As per previous activation level	• Inform all previously notified contacts of stand down

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

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Increasing leakage through the embankment, the foundations, or abutments	• Increasing leakage through the embankment, the foundations, or abutments with cloudy water, OR • Storage level at minimum natural surface of Saddle Dam 3 embankment (EL 292.42 m)	• 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 dam safety risk has reduced
Actions	• Record all communication • Liaise with DDO and IC re situation • Note: IC to carry out LEC actions unless LDMG is stood up	• As per previous activation level, AND • Liaise with LDMG re situation • NOTE: Top of clay core for Saddle Dam 1 EL 292.70 m and Saddle Dam 2 EL 293.00 m	• As per previous activation level, AND • Liaise with DDO and relevant council(s) regarding potential road/bridge closures	• As per previous activation level	• Forward all EER material to IC email as required • Return to routine activities
Notifications	• DDO • IC	• As per previous activation level, AND • LDMG	• As per previous activation level	• As per previous activation level	• Inform all previously notified contacts of stand down

Table 13: 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, OR • Storage level at minimum natural surface of Saddle Dam 3 embankment (EL 292.42 m)	• 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 dam safety risk has reduced
Actions	• Record all communication • Liaise with DDO, LEC and DSTDM re situation • 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 • 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. • NOTE: Top of clay core for Saddle Dam 1 EL 292.70 m and Saddle Dam 2 EL 293.00 m	• As per previous activation level, AND • Mobilise resources to undertake remedial works if directed by DSTDM	• As per previous activation level, AND • Confirm that remedial works have ceased if directed by the DSTDM and plant and personnel have been moved to a safe location • Liaise with DDO and DSTDM re: potential for evacuations Liaise with the DSTDM to confirm that dam failure is in progress	• Complete all internal and external notifications • Forward all EER material to IC email as required • Close Incident Report Record • Update Sunwater intranet with dam status • Return to routine activities
Notifications	• DDO • DSTDM • LEC/ORR • SMT • SRT	• As per previous activation level, AND • DDMG	• As per previous activation level, AND • D/S Residents • SDCC	• As per previous activation level • SMT • SRT AND • Emergency siren	• DDO • DSTDM • LEC/ORR • SMT • SRT • DDMG

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

Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	• Increasing leakage through an embankment, the foundations, or abutments			N/A — Internal communications only
Lean Forward	• Increasing leakage through the embankment, the foundations or abutments with cloudy water, OR • Storage level at minimum natural surface of Saddle Dam 3 embankment (EL 292.42 m)	• LDMG • DDMG	• Phone	Describe current situation with dam: What is the event? (Dam Safety Risk—piping condition) What is the status? (Unconfirmed piping—Investigation continues) Advise of current storage level Advise any issues you are aware of Standby for further advice
Stand Up 1	• Piping condition has been established	• LDMG • DDMG	• Phone	Describe current situation with dam: What is the event? (Dam Safety Risk—piping condition). What is the status? (Confirmed piping condition) Advise of current storage level Advise any issues you are aware of. Discuss any potential road/bridge closures Prepare for possible evacuations
		• SDCC	• Phone & Email	**Complete Emergency Alert Request Form as per instructions and email to SDCC to send to D/S Residents.**
		• D/S Residents	• SMS • (Phone for those without mobiles)	Liaise with Sunwater Media on-call, LDMG(s), and DSDTM to send appropriate messaging Refer to Annexe for sample message

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

Activation level	Trigger for communications	Group to contact	Method	Message text
Stand Up 2	• Failure likely due to piping, AND • Sufficient water in storage to create a dam hazard	• LDMG • DDMG	• Phone	Describe current situation with dam: What is the event? (Dam Safety Risk—piping condition) What is the status? (Possible Dam Failure) Advise of current storage level Prepare coordinated evacuations
		• SDCC	• Phone & Email	**Complete Emergency Alert Request Form as per instructions and email to the SDCC to send to D/S Residents.**
		• D/S Residents	• SMS • (Phone for those without mobiles)	Liaise with Sunwater Media on-call, LDMG(s), FODM and/or DSTM to send appropriate messaging Refer to Annexe for sample message
	• Dam failure in progress	• LDMG • DDMG	• Phone	Describe current situation with dam: What is the event? (Dam Safety Risk—piping condition) 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	• Email & Phone	**Complete Emergency Alert Request Form as per instructions and email to the SDCC to send to D/S Residents.**
		• D/S Residents	• SMS (Phone for those without mobiles)	Liaise with Sunwater Media on-call, LDMG(s), FODM and/or DSTM to send appropriate messaging Refer to Annexe for sample message
		• Emergency siren	• Phone & Email	**Complete Emergency siren instructions in Appendix A8 and notify SRT.** **Not to be used UNLESS confirmed dam failure is in progress and the Emergency Alert is being sent out.**
Stand Down	• Risk assessment has determined that dam safety risk has reduced	• LDMG • 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 failure risk has reduced, and EAP has been deactivated

Table 15: 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, OR • Storage level at minimum natural surface of Saddle Dam 3 embankment (EL 292.42 m)	• 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	• Record all communication • Arrange an inspection of the dam to assess its condition as soon as possible, when safe to do so • Determine if piping condition has been established • Monitor situation and assess risks	• As per previous activation level • NOTE: Top of clay core for Saddle Dam 1 EL 292.70 m and Saddle Dam 2 EL 293.00 m	• As per previous activation level, AND • Assess risk and determine if failure likely or in progress • Liaise with the LEC and IC • Determine if remedial repairs are practical • Determine if risks can be reduced by lowering storage (if the storage is required to be drawn down, then the DSTDM needs to assess the maximum rate of drawn down based on latest available data and advise in writing to IC and DDO) • Supervise remedial repairs (if applicable). Supervise means provide technical oversight to the work. It does not necessarily mean on-site supervision	• As per previous activation level, AND • Liaise with the IC and confirm need to sound emergency siren due to dam failure • Liaise with the IC and advise on need to recommend evacuations	• Forward all EER material to IC email as required • Return to routine activities
Notifications	• DDO • IC • DSR	• As per previous activation level	• As per previous activation level, AND • LEC/ORR	• As per previous activation level, AND • CEO	• Inform all previously notified contacts of stand down

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

- Use the SDF outline when a dam failure is in progress or likely due to earthquake and no concurrent flooding or downstream releases are occurring or expected to occur, or
- Use the PMF outline when a dam failure is in progress or likely due to earthquake and concurrent flooding or downstream releases are occurring or expected to occur.

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

7.2 Emergency action roles

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

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

Figure 3: Earthquake flowchart

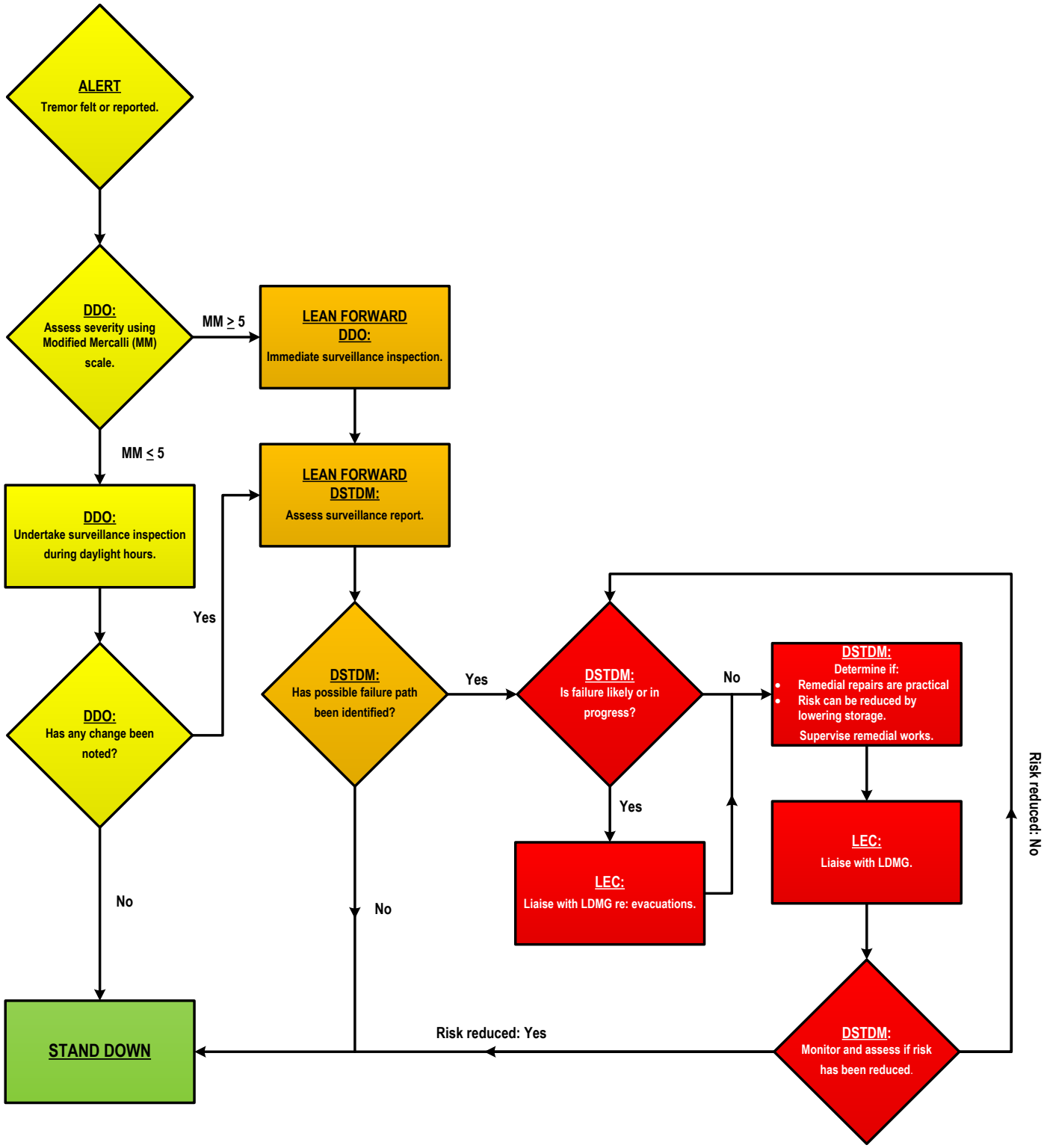


Table 16: Earthquake—DDO emergency action

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Earthquake confirmed* (by DSTDM) or felt in the area, AND • Intensity less than 5 MM	• Earthquake confirmed* (by DSTDM) or felt in the area, AND • Intensity greater than or equal to 5 MM, OR • Intensity less than 5 MM and change detected during surveillance inspection	• Earthquake confirmed* (by DSTDM) or felt in the area, AND • A possible failure path has been identified	• Failure in progress or likely due to earthquake, AND • Sufficient water in storage to create a dam hazard	• Risk assessment has been determined that failure risk has reduced
Actions	• DDO to assess magnitude (MM Scale at dam location as per HMT. • Record all communication • Inspect the main embankment, spillway structure, abutments, and Saddle Dams 1 and 2 in daylight hours (if safe to do so), and report to the DSTDM and IC — photograph/video and record using approved forms and send to IC & DSTDM • Check for leaks, deformation, erosion, cracking, and concrete damage • Update Dam Logbook as per SOP 12	• As per previous activation level, AND • Immediately inspect the main embankment, spillway structure, abutments and Saddle Dams 1, 2, and 3 (if safe to do so) and report to the DSTDM and IC (unless inspection completed in Alert Stage)—photograph/video and record using approved forms and send to IC & DSTDM • Inspect for leakage and evidence of initiation of piping of embankment slips on both upstream and downstream slopes and in the abutments • Repeat the inspection as directed	• As per previous activation level, AND • Support/supervise remedial work as required. • Lower the storage if directed • Close any affected roads, if not already closed by others • Maintain surveillance of area immediately downstream of dam or Saddle Dams (if safe to do so) and move on any members of the public • Vacate the immediate vicinity of the embankment	• As per previous activation level, AND • Ensure remedial works cease and plant and personnel have been moved to a safe location	• Forward all EER material to IC email as required • Update Dam Logbook as per SOP 12 • Return to routine activities
Notifications	• DSTDM • IC • SO • LEC/ORR	• As per previous activation level	• As per previous activation level	• As per previous activation level	• Inform all previously notified contacts of stand down

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

Table 17: Earthquake—LEC emergency action

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Earthquake confirmed* (by DSTDM) or felt in the area, AND • Intensity less than 5 MM	• Earthquake confirmed* (by DSTDM) or felt in the area, AND • Intensity greater than or equal to 5 MM, OR • Intensity less than 5 MM and change detected during surveillance inspection	• Earthquake confirmed* (by DSTDM) or felt in the area, AND • A possible failure path has been identified	• Failure in progress or likely due to earthquake, AND • Sufficient water in storage to create a dam hazard	• Risk assessment has been determined that failure risk has reduced
Actions	• Record all communication • Liaise with IC and DDO re situation • Note: IC to carry out LEC actions unless LDMG is stood up	• As per previous activation level, AND • Liaise with LDMG re situation	• As per previous activation level, AND • Liaise with DDO and relevant council(s) regarding potential road/bridge closures	• As per previous activation level	• Forward all EER material to IC email as required • Return to routine activities
Notifications	• IC • DDO	• As per previous activation level • LDMG	• As per previous activation level	• As per previous activation level	• Inform all previously notified contacts of stand down

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

Table 18: Earthquake—IC emergency action

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Earthquake confirmed* (by DSTDM) or felt in the area, AND • Intensity less than 5 MM	• Earthquake confirmed* (by DSTDM) or felt in the area, AND • Intensity greater than or equal to 5 MM, OR • Intensity less than 5 MM and change detected during surveillance inspection	• Earthquake confirmed* (by DSTDM) or felt in the area, AND • A possible failure path has been identified	• Failure in progress or likely due to earthquake, AND • Sufficient water in storage to create a dam hazard	• Risk assessment has been determined that failure risk has reduced
Actions	• Record all communication • Liaise with DDO, LEC and DSTDM re: situation • 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, • Liaise with DDO and relevant Council(s) regarding potential road/bridge closures • Mobilise resources to undertake remedial works if directed by DSTDM	• As per previous activation level, AND • Liaise with the DSTDM to confirm that dam failure is in progress • Cease remedial works if directed by the DSTDM and plant and personnel to be moved to a safe location	• Complete all internal and external notifications • Forward all EER material to IC email as required • Close Incident Report Record • Update Sunwater intranet with dam status • Return to routine activities
Notifications	• DDO • DSTDM • LEC/ORR • SMT • SRT	• As per previous activation level, AND • DDMG	• As per previous activation level, AND • D/S Residents • SDCC	• As per previous activation level	• DDO • DSTDM • LEC/ORR • SMT • SRT • DDMG

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

Table 19: Earthquake—LEC and IC external communication plan

Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	• Earthquake confirmed* (by DSTDM) or felt in the area, AND • Intensity less than 5 MM			N/A—Internal communications only
Lean Forward	• Earthquake confirmed* (by DSTDM) or felt in the area, AND • Intensity greater than or equal to 5 MM, OR • Intensity less than 5 MM and change detected during surveillance inspection	• LDMG • DDMG	• Phone	Describe current situation with dam: What is the event? (Dam Safety Risk—Earthquake felt or reported in area) What is the status? (Under investigation) Advise of current storage level Stand by for further information
Stand Up 1	• Earthquake confirmed* (by DSTDM) or felt in the area, AND • A change detected from surveillance, OR • A possible failure path has been identified	• LDMG • 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	• Email & Phone	**Complete Emergency Alert Request Form as per instructions and email to the SDCC to send to D/S Residents.**
		• D/S Residents	• SMS • (Phone for those without mobiles)	Liaise with Sunwater Media on-call, LDMG(s), FODM and/or DSTM to send appropriate messaging Refer to Annexe for sample message

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

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

Activation level	Trigger for communications	Group to contact	Method	Message text
Stand Up 2	• Failure likely due to earthquake, AND • Sufficient water in storage to create a dam hazard	• LDMG • 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 Prepare coordinated evacuation
		• SDCC	• Email & Phone	**Complete Emergency Alert Request Form as per instructions and email to the SDCC to send to D/S Residents.**
		• D/S Residents	• SMS (Phone for those without mobiles)	Liaise with Sunwater Media on-call, LDMG(s), FODM and/or DSTM to send appropriate messaging Refer to Annexe for sample message
	• Dam failure in progress	• LDMG • 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	• Phone & Email	**Complete Emergency Alert Request Form as per instructions and email to the SDCC to send to D/S Residents.**
		• D/S Residents	• SMS (Phone for those without mobiles)	Liaise with Sunwater Media on-call, LDMG(s), and DSTM to send appropriate messaging Refer to Annexe for sample message
		• Emergency siren	• Phone & Email	**Complete Emergency siren instructions in Appendix A8 and notify SRT.** **Not to be used UNLESS confirmed dam failure is in progress and the Emergency Alert is being sent out.**
Stand Down	• Risk assessment has been determined that failure risk has reduced	• LDMG • 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

Table 20: Earthquake—DSTDM emergency action

Activation level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Earthquake confirmed* or felt in the area, AND • Intensity less than 5 MM	• Earthquake confirmed* or felt in the area, AND • Intensity greater than or equal to 5 MM, OR • Intensity less than 5 MM and change detected during surveillance inspection	• Earthquake confirmed* or felt in the area, AND • A possible failure path has been identified	• Failure in progress or likely due to earthquake, AND • Sufficient water in storage to create a dam hazard	• Risk assessment has been determined that failure risk has reduced
Action	• Record all communication • Monitor situation and assess risks • Liaise with DDO and IC	• As per previous activation level, AND • Review surveillance inspection of the dam and assess its condition as soon as possible • Determine if there are any possible failure paths from reported damage	• As per previous activation level, AND • Arrange an inspection of the dam and assess its condition as soon as possible, when safe to do so • Assess risk and determine if failure likely or in progress • Liaise with the IC • Determine if remedial repairs are practical • Determine if risks can be reduced by lowering storage (if the storage is required to be drawn down, then the DSTDM needs to assess the maximum rate of drawn down based on latest available data and advise in writing to IC and DDO) • Supervise remedial repairs (if applicable). Supervise means provide technical oversight to the work It does not necessarily mean on-site supervision • Monitor situation and assess risks	• As per previous activation level, AND • Liaise with the IC and confirm need to sound emergency siren due to dam failure	• Forward all EER material to IC email as required • Return to routine activities
Notifications	• DDO • IC • DSR	• As per previous activation level	• As per previous activation level, AND • CEO	• As per previous activation level	• Inform all previously notified contacts of stand down

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

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

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 Teemburra Dam to a terrorist attack is low.

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

- Use the SDF outline when a dam failure is in progress or likely due to terrorist threat and no concurrent flooding or downstream releases are occurring or expected to occur, or
- Use the PMF outline when a dam failure is in progress or likely due to terrorist threat 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

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

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

8.2 Emergency action roles

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

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

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

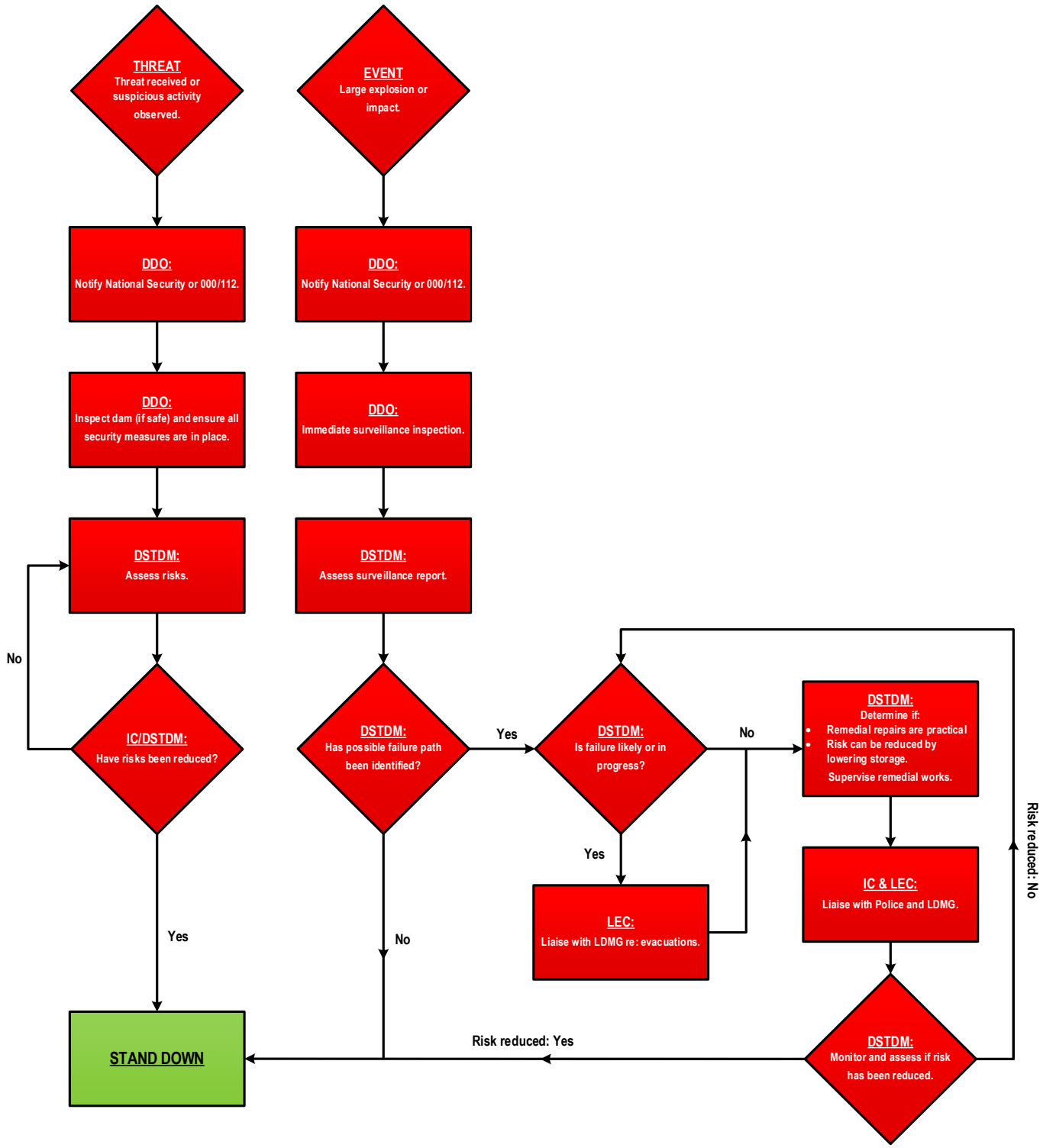


Table 21: Terrorist threat/activity or high energy impact—DDO emergency action

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

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

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

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

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

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

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

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

Activation level	Trigger for communications	Group to contact	Method	Message text
Alert	**ALERT NOT APPLICABLE**			
Lean Forward	**LEAN FORWARD NOT APPLICABLE**			
Stand Up 1	**THREAT** • Possible terrorist activity/suspicious behaviour notice at the dam, OR • Threat received	• LDMG • 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 • DDMG • CTG	• Phone	Describe current situation with dam: What is the event? (Dam Safety Risk—Security threat/ impact/explosion, etc.) What is the status? (Under Investigation) Discuss any potential road/bridge closures (if not discussed at Stand Up—1) Prepare coordinated evacuation
		• SDCC	• Email & Phone	**Complete Emergency Alert Request Form as per instructions and email to the SDCC to send to D/S Residents.**
		• D/S Residents	• SMS • (Phone for those without mobiles)	Liaise with Sunwater Media on-call, LDMG(s), FODM and/or DSTM to send appropriate messaging Refer to Annexe for sample message
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 • DDMG • CTG	• 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	• Email & Phone	**Complete Emergency Alert Request Form as per instructions and email to the SDCC to send to D/S Residents.**
		• D/S Residents	• SMS • (Phone for those without mobiles)	Liaise with Sunwater Media on-call, LDMG(s), FODM and/or DSTM to send appropriate messaging Refer to Annexe for sample message
		• Emergency siren	• Phone & Email	**Complete Emergency siren instructions in Appendix A8 and notify SRT.** **Not to be used UNLESS confirmed dam failure is in progress and the Emergency Alert is being sent out.**
Stand Down	• Risk assessment has determined that failure risk has reduced	• LDMG • DDMG • CT	• 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

Table 25: Terrorist threat/activity or high energy impact—DSTDM emergency action

Activation level	Alert/Lean Forward	Stand Up 1	Stand Up 2	Stand Up 3	Stand Down
Activation trigger	• Not applicable	**THREAT** • Possible terrorist activity/suspicious behaviour noticed at the dam, OR • Threat received	**EVENT** • Large explosion heard/observed at dam (e.g. bomb explosion, aircraft hit)	**RESPONSE** • Failure in progress or likely due to impact or explosion, AND • Sufficient water in storage to create a dam hazard	• Risk assessment has determined that failure risk has reduced
Action	• Not applicable	• Record all communication • Liaise with IC and DDO • Assess risks • Liaise with SRT	• As per previous activation level, AND • Arrange an inspection of the dam and assess its condition as soon as possible, when safe to do so • Assess risk and determine if failure likely or in progress • Liaise with LEC • Determine if remedial repairs are practical • Determine if risks can be reduced by lowering storage (if the storage is required to be drawn down, then the DSTDM needs to assess the maximum rate of drawn down based on latest available data and advise in writing to IC and DDO) • Supervise remedial repairs (if applicable). Supervise means provide technical oversight to the work. It does not necessarily mean on-site supervision • Monitor situation and assess risks	• As per previous activation level, AND • Liaise with the IC and confirm need to sound emergency siren due to dam failure • Liaise with the IC and LEC and advise on need to recommend evacuations	• Forward all EER material to IC email as required • Return to routine activities
Notifications	• Not applicable	• IC • DDO • SRT • DSR	• As per previous activation level, AND • LEC/ORR	• As per previous activation level	• Inform all previously notified contacts of stand down

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

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 26: Communications failure emergency activation trigger summary

Comms Failure – Site	Unable to communicate to or from dam site (usually affects DDO)
Comms Failure – Local area	Unable to communicate to or from local area (likely to affect LEC/ORR)
Comms Failure – Brisbane	Unable to communicate to or from Sunwater Brisbane (could affect DSTDM or FODM & 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 FODM will assess the weather and flood warnings daily in accordance with the OC Procedure. They will escalate to the IC any warnings that have the potential to cause a significant communications failure.

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

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

9.2.3 Emergency action roles

Table 27 to Table 32 specify emergency actions for the following roles:

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

Table 27: Communications failure—DDO emergency action

Activation level	Comms Failure – Local Area	Comms Failure – Brisbane
Activation trigger	• Unable to communicate to local area including LEC/ORR	• Unable to communicate to Sunwater Brisbane including IC or DSTDM or FODM

Actions	• As much as practicable, assume the role of LEC
	• Continue tasks in accordance with any other current emergency action
	• Every hour, attempt communications by all means noting the following:
	  ■ Mobile phone - try texting instead of voice, much higher probability of success
	  ■ Satellite phone - needs to access open sky unless external antenna fitted
	  ■ Social media - e.g. Facebook (Internet may be available via landline)
	• Record all communication and attempts via Dam Logbook entries as per SOP 12 and communications log if EAP event is current
		• Determine if LEC is in communication and if not, assume the LEC role as much as is practicable
		• Continue tasks in accordance with any other current emergency action
		• Every hour, attempt communications by all means noting the following:
		  ■ Mobile phone - try texting instead of voice, much higher probability of success
		  ■ Satellite phone - needs to access open sky unless external antenna fitted
		  ■ Social media - e.g. Facebook (Internet may be available via landline)
		• Record all communication and attempts via Dam Logbook entries as per SOP 12 and communications log if EAP event is current

Notifications	• IC • SO	• LEC/ORR • SO

Table 28: 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
	  ■ 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 and 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
		  ■ Social media - e.g. Facebook (Internet may be available via landline)
		• Record all communication and attempts
		• Liaise with the DDO and assume IC role
		• As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action

Notifications	• IC • DSTDM • SO • LDMG	• DDO • DSTDM • SO • LDMG • DDMG

Table 29: Communications failure—IC emergency action

Activation level	Comms Failure – Dam Site	Comms Failure – Local Area
Activation trigger	• Unable to communicate to dam site	• Unable to communicate to Local Area including LEC and ORR

Actions	• Issue Sunwater incident Alert
	• Every hour, attempt communications by all means noting the following:
	  ■ Mobile phone - try texting instead of voice, much higher probability of success
	  ■ Satellite phone - needs to access open sky unless external antenna fitted
	  ■ Social media - e.g. Facebook (Internet may be available via landline)
	• Record all communication and attempts
	• Liaise with LEC and 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
		  ■ failed
		  ■ Social media - e.g. Facebook (Internet may be available via landline)
		• Record all communication and attempts
		• Liaise with the DDO and carry out functions of the LEC as much as practicable
		• As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action

Notifications	• LEC/ORR • DSTDM • SO • DDMG	• DDO • DSTDM • SO • LDMG • DDMG

Table 30: Communications failure—LEC and IC external communication plan

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

Table 31: Communications failure—DSTDM emergency action

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

Table 32: Communications failure—FODM emergency action

Activation level	Comms Failure – Site	Comms Failure – Local Area
Activation trigger	• Unable to communicate to dam site	• Unable to communicate to local area including LEC/ORR
Actions	• Liaise with IC • Record all communication • As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action	• Liaise with IC • Record all communication • Assume that the DDO is assisting IC with LEC role • As much as is practicable, continue other tasks associated with the role in accordance with any other current emergency action
Notifications	• IC • LEC/ORR • DSTDM	• IC • DDO • DSTDM

APPENDIX A: Notification and communication lists

Appendix A1: Sunwater regional notification list

Appendix A2: Sunwater Brisbane notification list

Appendix A3: External notification list

Appendix A4: D/S residents' notification list

Appendix A5: Other reference contacts

Appendix A6: Emergency alert polygon

Appendix A7: Dam failure emergency alert request

Appendix A8: Dam failure emergency siren activation

Appendix A1 to Appendix 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\249586-D.pagx
Exported: 20/02/2025 4:09 PM

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

21°0'0"S
21°10'0"S
21°20'0"S
21°30'0"S
149°20'0"E
149°10'0"E
149°0'0"E
148°50'0"E
148°40'0"E
148°30'0"E

CAMPWIN BEACH
SARINA BEACH
GRASSTREE
HALF TIDE
ARMSTRONG BEACH
SLADE POINT
SARINA
MCEWENS BEACH
DOLPHIN HEADS
MACKAY
EIMEO
BUCASIA
BAKERS CREEK
GLENELLA
FARLEIGH
WALKERSTON
ETON
MARIAN
KUTTABUL
THREAT DIRECTION
MIRANI
MOUNT OSSA
PINNACLE
Teemburra Dam

LEGEND
- Emergency Alert Area
- PMF - Dam Failure (Main Dam)
- Dam Full Supply
- Local Authority Boundary
- Dam
- PMF Modelling Limits (Main Dam)
- State Roads (DMR)

MAP INFORMATION
Coordinate System: Geocentric Datum of Australia (GDA2020)
SCALE 1:400,000
0 4 8 12 16 20 km

REVISION	DATE	REMARKS		
C	10/10/23	ALERT AREA AMENDED	LH	MH
D	28/01/25	ALERT AREA AMENDED	ES	PSD
			CKD	MH

DRAWN MDB | DESIGNED
CHECKED ES | CHECKED MGH
APPROVED M.G. HUGHES 28/01/2025

sunwater

TEEMBURRA DAM
EMERGENCY ACTION PLAN
EMERGENCY ALERT AREA

CONTRACT NUMBER
DRAWING NUMBER 249586 | REV. D
SHEET 1 OF 1
DATE JANUARY 2025

Appendix A7: Dam failure emergency alert request

Queensland Emergency Alert Guidelines

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

Instructions

1. This form is not to be used for flood UNLESS a flood has triggered an emergency event.
2. Log on to the Sunwater area of the Disaster Management Portal in the EA area to complete the MS Word format form for appropriate dam.
3. Telephone the [redacted] and tell them your intention to use the EA for an emergency event for Teemburra Dam.
    a. A KML Polygon for this dam is stored in the Sunwater area of the Disaster Management Portal in the EA area. Ask the SDCC operative to locate the polygon. It will be a KML file called [redacted]
    b. Give them your phone number, confirm their name, and end the call after advising the form will be sent shortly.
4. IC and DSTDM will work together to craft a message relevant to the hazard and discuss with the LDMG, if there is time. If time does not permit use approved pre-filled form on Disaster Management Portal.
5. Send filled out EA form and the Teemburra Threat Direction polygon to SDCC email: [redacted] This form MUST be sent from a Sunwater email address and come from the IC, DSTDM, or member of the Executive.
6. Phone back SDCC to check that the message has been sent and ask for email confirmation.
7. The following page contains a pre-filled copy of the Teemburra Dam Emergency Alert Request form.

Filename:	Voice Message:	SMS:
[redacted]	FLOOD EMERGENCY WARNING from Sunwater. People downstream of Teemburra Dam including Pinnacle and Gargett must LEAVE IMMEDIATELY. Teemburra Dam possible failure/is failing. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. Get full warnings and what you should do at Mackay Regional Council disaster dot ma kay dot que el dee dot guv dot ay you.	FLOOD EMERGENCY WARNING from Sunwater: People downstream of Teemburra Dam including Pinnacle and Gargett must LEAVE IMMEDIATELY. Teemburra Dam possible failure/is failing. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. Get full warnings and what you should do at Mackay Regional Council disaster.mackay.qld.gov.au/

The next page contains a pre-filled copy of the Emergency Alert for Teemburra dam.

Queensland Government

PHONE THE [redacted] – ADVISE EA IS BEING DEVELOPED

EMERGENCY ALERT REQUEST

Location of Alert: Teemburra Dam (e.g. Suburb, Town)	**Date:**
LGA/Agency requesting:	**Time:**

Requesting Officer (e.g. Disaster Coordinator/Incident Controller)
Name:
Agency/Position:

Telephone:
(SDCC Watch Desk may telephone you)

Email:

Advised **LDC/LDMG**: ☐ YES **DDC/DDMG**: ☐ YES **Neighbouring LDMG/LGA**: ☐ YES ☐ N/A

Send Alert **Immediately**: ☐ YES **Scheduled**: ☐ YES Date & Time / / : hrs

Event Type
☐ Cyclone ☐ Storm Tide ☐ Flash Flood ☐ Flood
☐ Bushfire ☐ Fire Incident ☐ Smoke / Toxic Plume ☐ Chemical Spill
☐ Tsunami (Sent as Location Based Text Message ONLY)
☒ Other (please specify): Catastrophic Dam Failure

Distributed by: (Channel)
☒ Voice (Landline only) ☒ SMS – Location Based (Location of phone at time of distribution) ☐ SMS – Service Address Based (Registered billing address)

Message Severity
☒ Emergency Warning (Activates SEWS) ☐ Watch & Act ☐ Advice

Threat Direction Required? (e.g. Fire, Dam Spill) ☐ YES ☐ N/A

Threat location indicated on map? Only For Emergency Warning Voice & Service Address SMS ☒ YES ☐ N/A

EA Messaging Filename (Doc, Pdf):

Polygon Filename, (Kml, Kmz, Gml, GeoJSON):

Number of polygons _____ (if multiple, attach list in order of priority)

Supplied via: ☒ DM Portal ☐ Email ☐ Verbal ☐ Other
Other (please specify):

Supplied via: ☒ DM Portal ☐ Email ☐ Verbal ☐ Other
Other (please specify):

Voice: Type or handwrite, max 4000 characters incls spaces. (Ideally message should be < 450 characters)

FLOOD EMERGENCY WARNING from Sunwater. People downstream of Teemburra Dam including Pinnacle and Gargett must LEAVE IMMEDIATELY. Teemburra Dam possible failure/is failing. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. Get full warnings and what you should do at Mackay Regional Council disaster dot ma kay dot que el dee dot guv dot ay you.

SMS: Type or handwrite, use capitals for clarity, max 612 characters incls spaces. (Ideally should be < 160 characters incl. spaces)

FLOOD EMERGENCY WARNING from Sunwater: People downstream of Teemburra Dam including Pinnacle and Gargett must LEAVE IMMEDIATELY. Teemburra Dam possible failure/is failing. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. Get full warnings and what you should do at Mackay Regional Council disaster.mackay.qld.gov.au/

Remove EA from websites:
☐ 12 hrs ☐ 24 hrs ☐ 48 hrs ☐ Specify Date & Time: ☐ Check back in 12 hrs:
☐ Replace previous EA message / / : hrs Contact #:_____

Requesting Officer: **Signature:** **Date:** / /

Send to [redacted] to confirm receipt

FOR USE BY SDCC

EA Request Form completed by: SDCC Watch Desk ☐ Requesting Officer ☐

Notification of any delays provided to Requestor: ☐ YES ☐ NO

EA User Name:
Signature: Date: / /

Emergency Alert No:

Authorising Officer Name:
Signature: Date: / /

EMS EA Campaign Report ID:

Report provided to Requestor on EA outcomes: ☐ YES ☐ NO

The EA Manual, EA Quick Reference Guide, EA Request Form Template are available at: www.disaster.qld.gov.au

Appendix A8: Dam failure emergency siren activation

Emergency siren activation

Notes: The emergency siren is not to be activated UNLESS; a confirmed dam failure is in progress, the appropriate EAP trigger has been exceeded and the Emergency Alert is being sent out via the SDCC and/or an Emergency broadcast by ABC radio.

The IC will take the lead to initiate the activation of the emergency siren but may delegate to on-call DSTDM or FODM depending on the situation; noting that EA and emergency broadcast are priority. The CEO or Executive Leadership Team member should be made aware if time permits.

Instructions

1. Telephone the [redacted] and tell them your intention to use the dam failure emergency siren for an emergency event for Teemburra Dam.
2. Email previously sent Emergency Alert Request form to: [redacted]
3. Advise the LDMGs and media if time permits, or ASAP after siren activation otherwise.
4. Sound emergency siren following Technical Instructions below.
5. Create Sunwater Incident Report Record to advise of the completion of the sounding of the siren.

Technical Instructions

The siren alarm sequence is activated remotely via the SiSA software. The SiSA software is accessed via the SiSA web portal which can be accessed via the SunWater "Jump Box" infrastructure. Jump Box can be accessed by following this procedure:

1. Access [redacted]
2. Log in using your **Sunwater user credentials** via Authenticator.
   [redacted] using your **Sunwater user credentials**.
4. Click [redacted] which will download a Remote desktop link [redacted]
5. Click the **Remote Desktop Connection** link and log in.

Once the User has access to the SiSA software, the alarm is activated by following this procedure:

Open the **Microsoft Edge** browser and enter URL

- Log on as **Tech** to test system – this **<u>WILL NOT</u>** sound the sirens
  1) Logon:
  2) Password:

- Log on as **Operator** to sound the siren – this **<u>WILL</u>** sound the siren/s
  1) Logon:
  2) Password:

- Click 'Select Units' and select the siren/s that you wish to activate or test.

- Click the appropriate RED BUTTON:
  1) "Silent Test Selected Sirens"
  2) "Get Selected Siren Status"
  3) "Test Alarm"
  4) "DAM EMERGENCY"

APPENDIX B: Drawings and maps

Appendix B1: General Arrangement drawings

Appendix B2: Downstream notification area

Appendix B3: Dam Break Analysis Inundation Plans

Appendix B4: Access routes during fair and adverse weather conditions

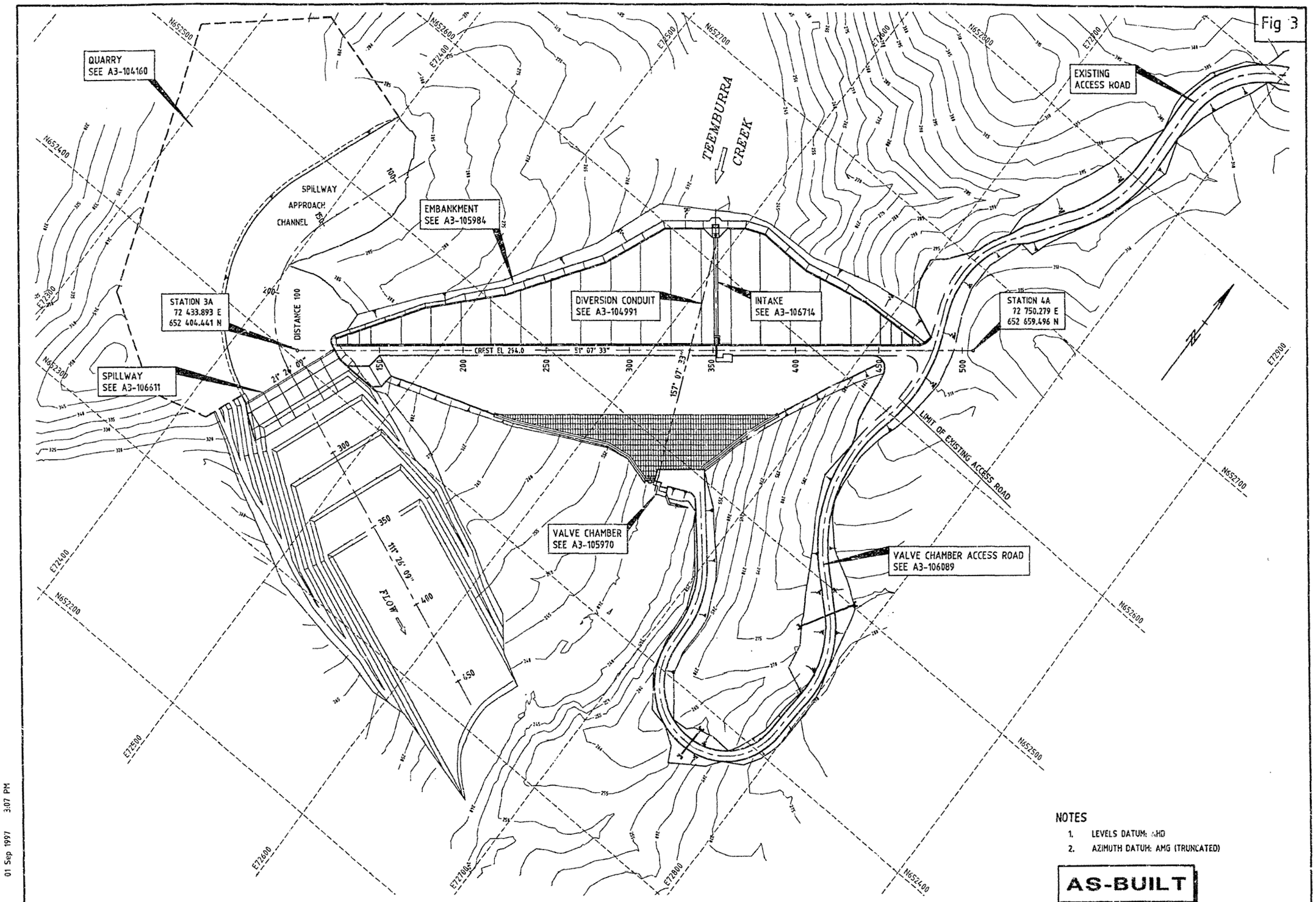
Appendix B5: Teemburra Dam locality plan

Appendix B6: Teemburra Dam Alert Siren Location

Appendix B7: Teemburra Dam Catchment area map

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.

Fig 3



NOTES

1. LEVELS DATUM: AHD
2. AZIMUTH DATUM: AMG (TRUNCATED)

AS-BUILT

REVISION	DATE		REMARKS		
	6.1.97	B	AS-BUILT		
	21.2.95	A	APPROACH CHANNEL ALIGNMENT	AN	JR
	DATE		REMARKS	CKD	PSD

REFERENCE DRAWINGS	
A3-104160	QUARRY
A3-106089	VALVE CHAMBER ACCESS ROAD
A3-106714	INTAKE
A3-106611	SPILLWAY
A3-105984	EMBANKMENT
A3-105970	VALVE CHAMBER
A3-104991	DIVERSION CONDUIT

SCALES

0 50 100 METRES
1:2000

DRAFTING	AJN	RECOMMENDED B J SHANNON PRINCIPAL ENGINEER
DRAFTING CHK		
DESIGN	JR	APPROVED J POTTS GENERAL MANAGER
DESIGN CHK		

Services Engineering — NATURAL RESOURCES

TEEMBURRA DAM - MAIN DAM

GENERAL ARRANGEMENT

CONTRACT NUMBER

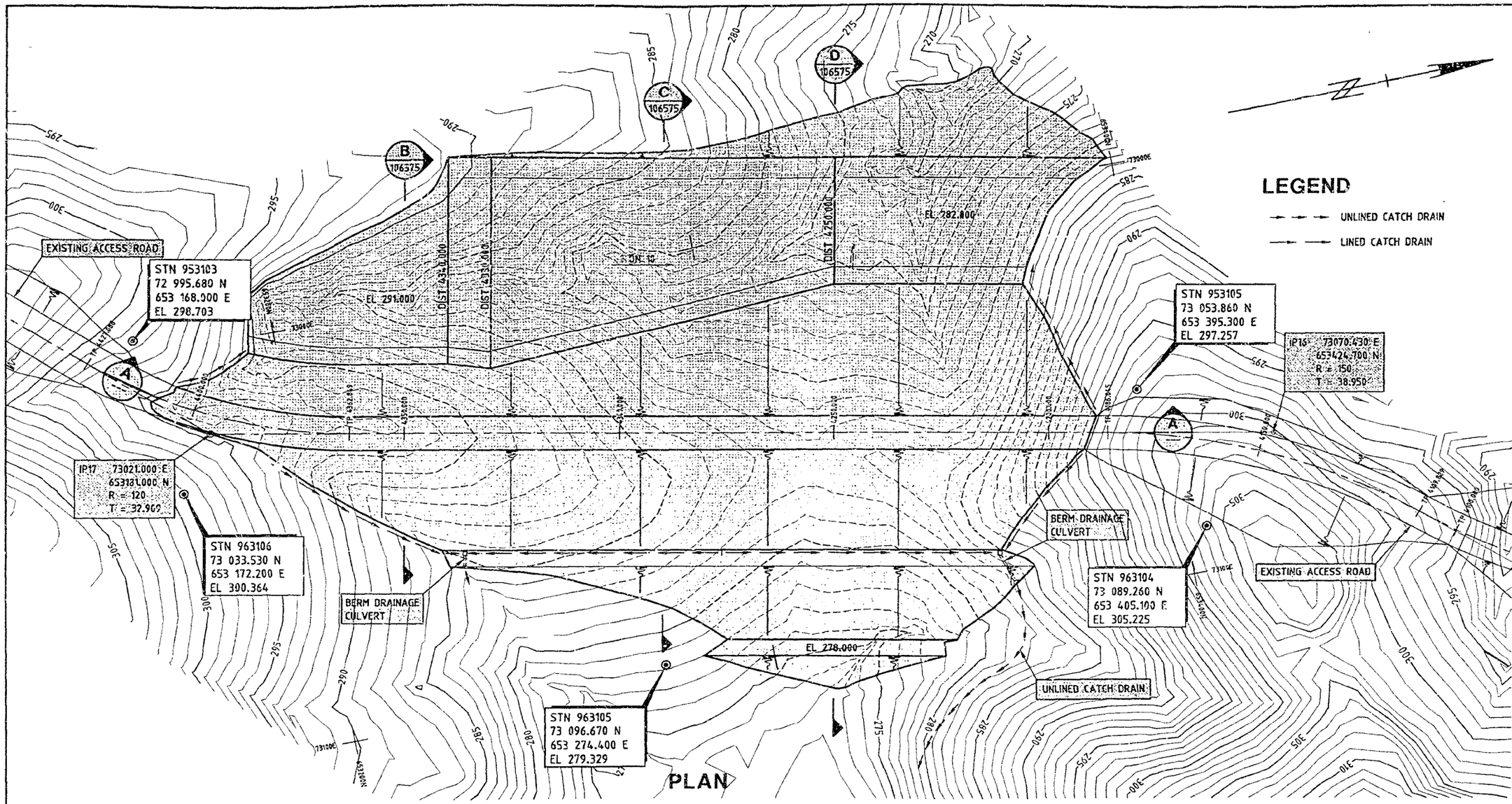
DRAWING NUMBER A3-105149

DATE NOV 1994

A B

Q:\TEEMBURR\w105149.dwg
01 Sep 1997 3:07 PM

DWG 105149B.tif



AS-BUILT

NOTES

1. AXIS DISTANCES SHOWN ARE BASED ON ROAD CENTRELINE DISTANCES.
2. ALL CATCH DRAINS TO BE CONCRETE LINED IN ACCORDANCE WITH DETAIL (W) ON DRAWING A3-106576 UNLESS NOTED OTHERWISE. UNLINED CATCH DRAINS TO BE IN ACCORDANCE WITH DETAIL (X) ON DRAWING A3-106021.
3. NO STIFFENER PLATES REQUIRED AT INTERMEDIATE POSTS.
4. NO SPACER BLOCKS REQUIRED.

REVISION				
20.8.98	A	AS BUILT		PAJ
DATE		REMARKS	CKD	PSD

REFERENCE DRAWINGS

A3-106021	SADDLE DAM 2 – GENERAL ARRANGEMENT
A3-106583	EMBANKMENT – ARRANGEMENT – SHEET 4 OF 4
A3-106576	EMBANKMENT – ARRANGEMENT – SHEET 3 OF 4
A3-106575	EMBANKMENT – ARRANGEMENT – SHEET 2 OF 4
A3-106573	EMBANKMENT – EXCAVATION

SCALES
0 10 20 30 40 50 METRES
1:1000

DRAFTING	JJN
DRAFTING CHK	GP
DESIGN	JR
DESIGN CHK	
RECOMMENDED	R A GEDDES, MANAGER CIVIL DESIGN
APPROVED	B J SHANNON, PRINCIPAL ENGINEER

Services Engineering — NATURAL RESOURCES

TEEMBURRA DAM - SADDLE DAM 1
EMBANKMENT
ARRANGEMENT

CONTRACT NUMBER	309/0012
DRAWING NUMBER	A3-106574
DATE	NOV 1994
	A

SH 1 OF 4

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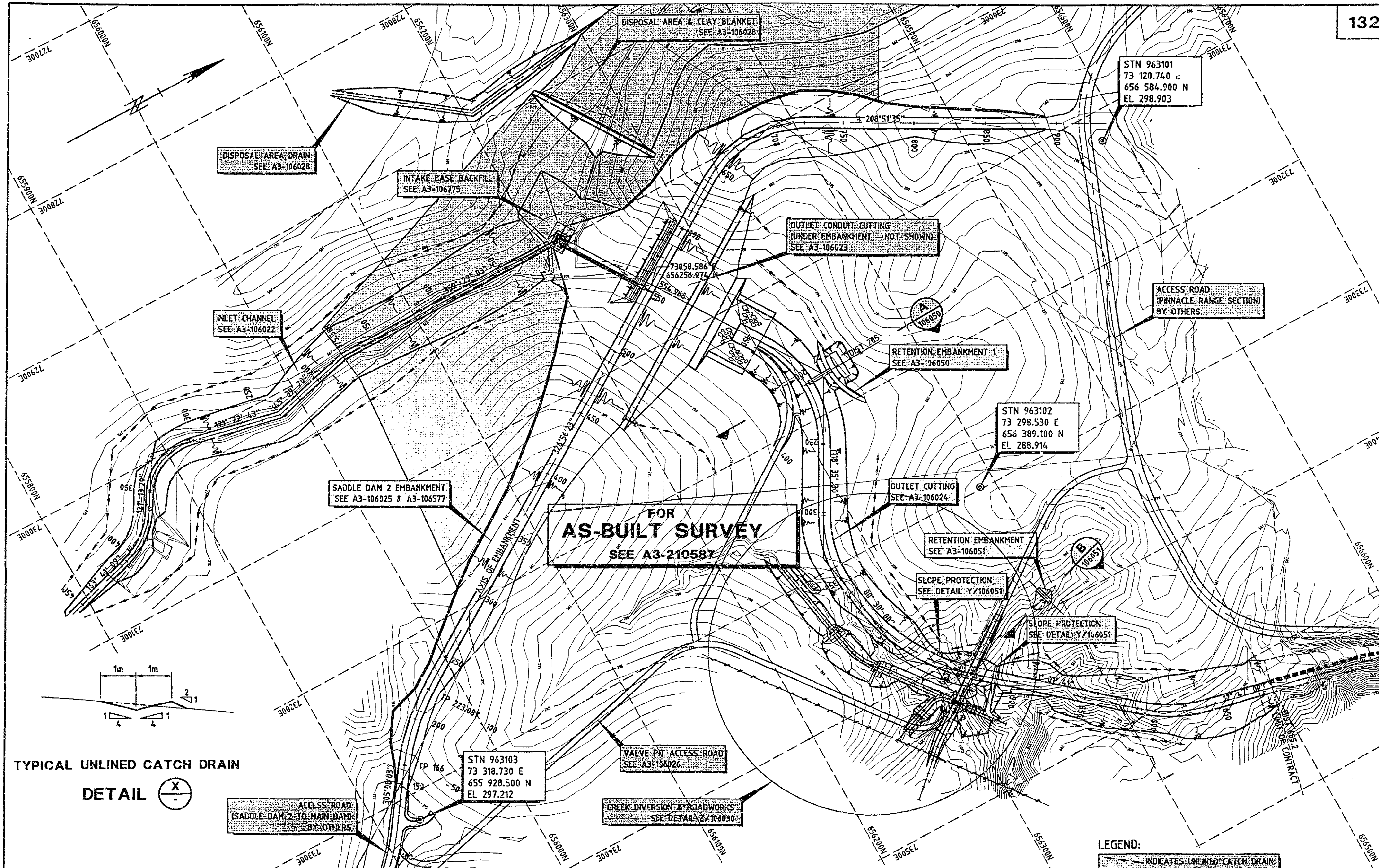

FOR 'AS BUILT' SURVEY REFER CIVILCAD JOB 491A

A3-106775	INTAKE BASE – BACKFILL
A3-106030	CREEK DIVERSION & ROADWORKS
A3-106028	DISPOSAL AREA & IMPERVIOUS BLANKET
A3-106026	VALVE PIT ACCESS ROAD
A3-106025	EMBANKMENT – EXCAVATION
A3-106050	OUTLET CUTTING – DRAINAGE SH 1
A3-106024	OUTLET CUTTING – EXCAVATION
A3-106023	OUTLET CONDUIT CUTTING – EXCAVATION
A3-106022	INLET CHANNEL – EXCAVATION

REFERENCE DRAWINGS

DATE		REMARKS	CKD	PSD
20.8.98	D	AS BUILT		PAJ
9.4.96	C	CATCH DRAIN REMOVED	JR	RAG
4.10.95	B	RETENTION EMBANK 1 MOVED TO DIST 205		JR
25.9.95	A	OUTLET CUTTING BERMS DELETED	MS	JR

REVISION

SCALES

0 25 50 75 100 125 METRES
1:2500

DRAFTING KFP	RECOMMENDED B J SHANNON PRINCIPAL ENGINEER
DRAFTING CHK JJN	
DESIGN JR	APPROVED J POTTS GENERAL MANAGER
DESIGN CHK	

Engineering Services

NATURAL RESOURCES

TEEMBURRA DAM - SADDLE DAM 2
GENERAL ARRANGEMENT

CONTRACT NUMBER 309/0012

DRAWING NUMBER A3-106021

DATE NOV 1994

A B C D

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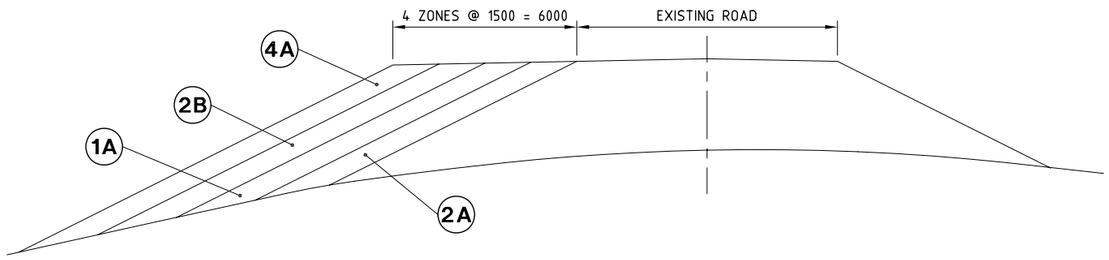
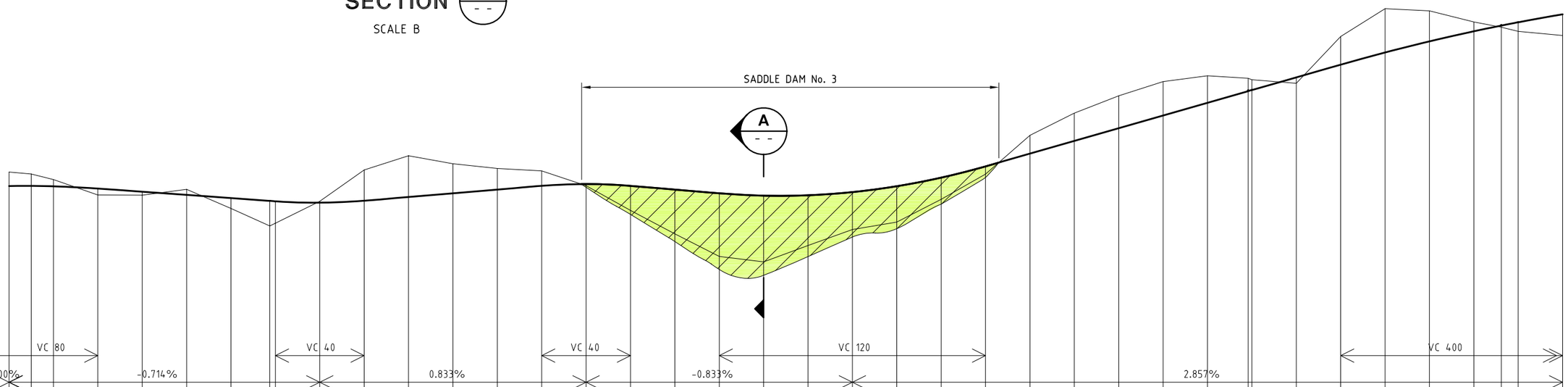
D6



1A	IMPERVIOUS CORE
2A	FINE FILTER
2B	TRANSITION ZONE
4A	ROCKFILL

SECTION A

SCALE B



Datum R.L.285.0

EARTHWORKS QUANTITIES	CUT	42	26	14		12	12			9	138	318	307	197	131	53								68	199	296	348	323	179	8	45	128	347	356	166	20	1	
	FILL			34	54	22	47	149	29	116	8	1	1	1	1	19	137	352	611	794	691	480	393	291	143	40	1	1	1	1	1		29	29	1	1	1	9	21	152
CUT (DEPTH)		0.63	0.54	0.31			0.25			0.06	1.39	1.85	1.33	0.95	0.68									0.82	1.25	1.46	1.53	1.22	0.58	0.47		1.27	1.97	1.37	0.42			
FILL (HEIGHT)				0.29	0.16		0.47	1.13	0.99							0.07	1.10	1.99	2.84	2.98	2.26	1.68	1.61	0.98	0.35							0.26					0.07	0.41	0.95
DESIGN		295.83	295.83	295.81	295.71	295.57	295.43	295.29	295.16	295.14	295.08	295.17	295.33	295.50	295.67	295.83	295.92	295.83	295.67	295.50	295.39	295.41	295.55	295.82	296.20	296.71	297.29	297.86	298.43	299.00	299.57	300.10	300.14	300.71	301.29	301.83	302.33	302.79	303.04	303.19	303.55
NATURAL SURFACE		296.46	296.37	296.12	295.42	295.42	295.68	294.82	294.03	294.16	295.14	296.55	297.19	296.83	296.62	296.51	295.84	294.73	293.68	292.66	292.42	293.15	293.87	294.21	295.23	296.36	298.11	299.11	299.89	300.53	300.79	300.67	300.61	300.45	302.55	303.80	303.70	303.21	302.97	302.79	302.60
PEGGED CHAINAGE		900.00	910.00	920.00	940.00	960.00	980.00	1000.00	1017.47	1020.00	1040.00	1060.00	1080.00	1100.00	1120.00	1140.00	1160.00	1180.00	1200.00	1220.00	1240.00	1260.00	1280.00	1300.00	1320.00	1340.00	1360.00	1380.00	1400.00	1420.00	1440.00	1458.34	1460.00	1480.00	1500.00	1520.00	1540.00	1560.00	1572.36	1580.00	1600.00

SCALE A

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23 Sep 2008 3:06 PM

DRAWING PRODUCED BY:
ASSET SOLUTIONS
LEVEL 9, 120 EDWARD ST.
BRISBANE QLD 4002
TEL: (07) 3120 0000

REVISION					REFERENCE DRAWINGS
DATE	REMARKS	CKD	PSD		

SCALES (A3 SIZE)

A
HOR 0 50 100 METRES 1:2000
VERT 0 5000 10000 MILLIMETRES 1:200

B
0 5000 10000 MILLIMETRES 1:200

DRAWN	DESIGNED
RET/DJ	
CHECKED	CHECKED
APPROVED	
B. RUSSO	
MANAGER CIVIL DESIGN	

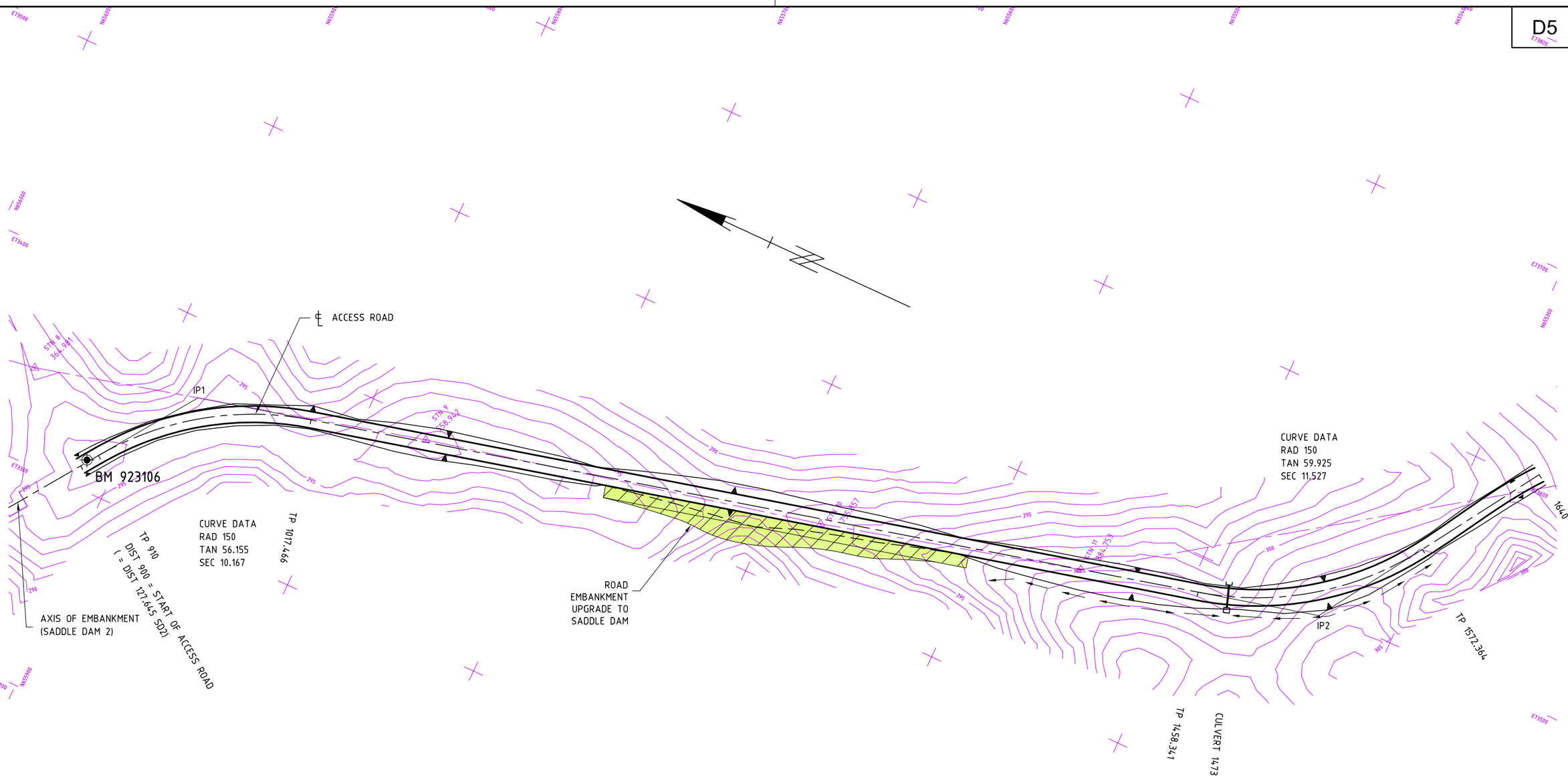
TEEMBURRA DAM
ACCESS ROAD
CONCEPT DESIGN
SADDLE DAM No. 3

CONTRACT NUMBER

DRAWING NUMBER 232188

DATE SEP 2008

D5



BENCH MARKS

BM	EASTING	NORTHING	ELEVATION
923106	73 314.269	655 913.947	296.519

SETOUT COORDINATES

POINT	EASTING	NORTHING
DIST 900	73 310.388	655 915.913
IP1	73 364.490	655 877.840
IP2	73 497.500	655 337.000

LEGEND

CATCH DRAIN

T:\Asset Solutions\SW-Pioneer River WSS\N-WKBP-04-01-AF Teemburra Dam Risk Assessment Spillway\Drawings\AutoCAD\Drafting\232189.DWG
23 Sep 2008 3.07 PM

DRAWING PRODUCED BY:
ASSET SOLUTIONS
LEVEL 9, 120 EDWARD ST,
BRISBANE QLD 4002
TEL: (07) 3120 0000

REVISION						REFERENCE DRAWINGS		
DATE		REMARKS	CKD	PSD				

SCALES (A3 SIZE)

0 50 100 METRES
1:2000

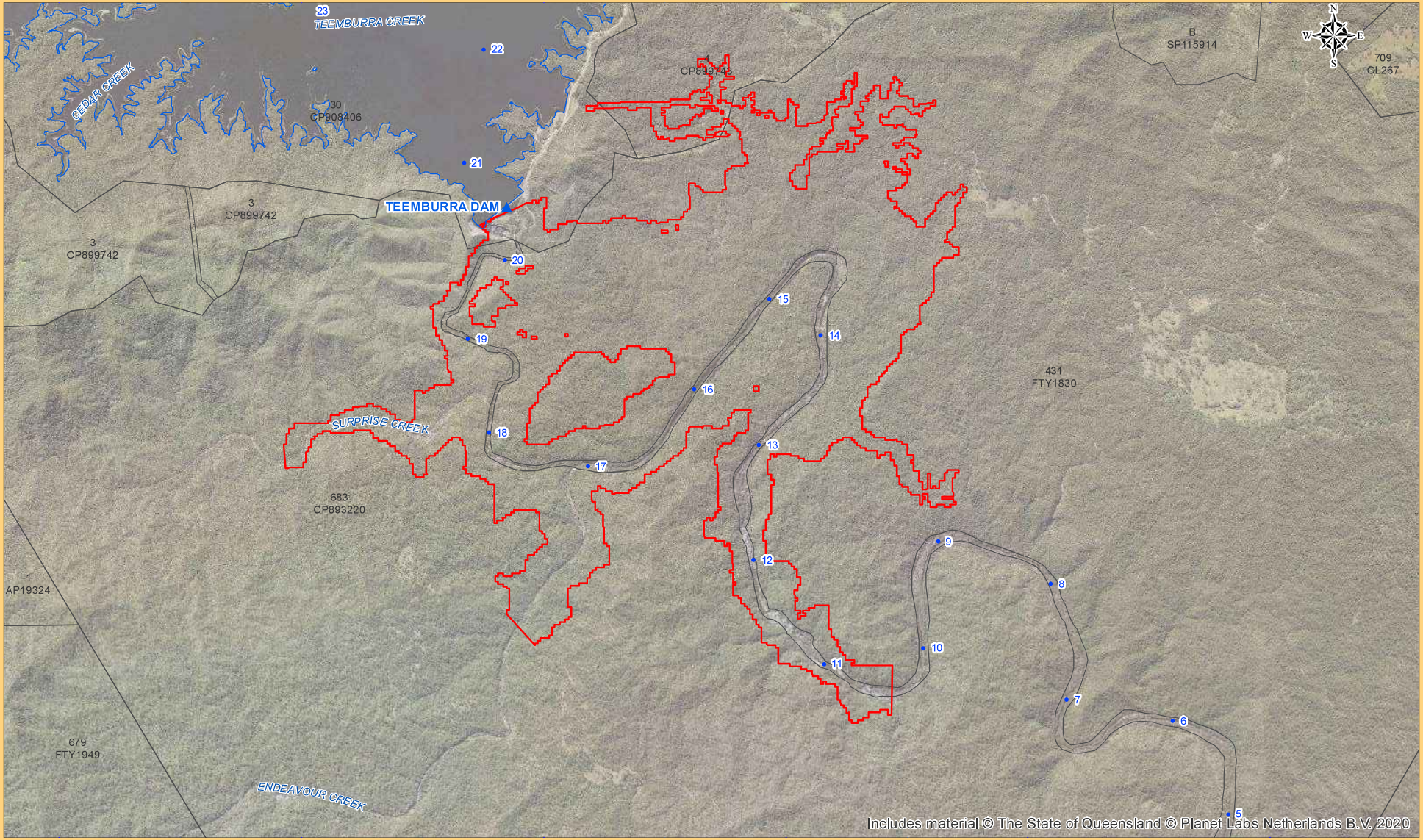
DRAWN	DESIGNED
RET	
CHECKED	CHECKED
APPROVED	
B. RUSSO	
MANAGER CIVIL DESIGN	

TEEMBURRA DAM
ACCESS ROAD
CONCEPT DESIGN
SADDLE DAM No. 3

CONTRACT NUMBER

DRAWING NUMBER
232189

DATE SEP 2008



MAP INFORMATION
Coordinate System: Geocentric Datum of Australia (GDA20).

SCALE (A4 SIZE)
0 400 800 1,200 1,600 2,000 m 1:40,000

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

TEEMBURRA DAM 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).

sunwater

DRAWING No. 250721 C

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-WSRW-38-01-05-01 EAP Mapping\Drawings\ArcMap\DS Notification Area\250721-C.mxd
Printed: Thursday, 05/10/2023 04:15:13 PM

[redacted]: Dam Break Analysis Inundation plans

The following maps have been produced from the Teemburra dam Comprehensive Risk Assessment (CRA) 2022.

Drawings:

- Keymap
- Sunny Day Failure (Main dam and Saddle Dam 2)
- Probable Maximum Flood (Main dam and Saddle Dam 2)

Note: Inundation extents for Saddle Dams 1 and 3 are less than the inundation extents for Main Dam and Saddle Dam 2 respectively. These maps have not been included in the EAP because they do not impact any additional PAR. Inundation mapping for Saddle Dams 1 and 3 is available in the 2022 CRA. For an indication of potential inundation and PAR for Saddle Dam 1 failure, see maps for Main Dam failure. For an indication of potential inundation and PAR for Saddle Dam 3 failure, see maps for Saddle Dam 2 failure.

Disclaimer: Every effort has been made to ensure the currency of the flood inundation maps reproduced in this EAP. However, as the maps have been extracted from external sources, their accuracy cannot be guaranteed.

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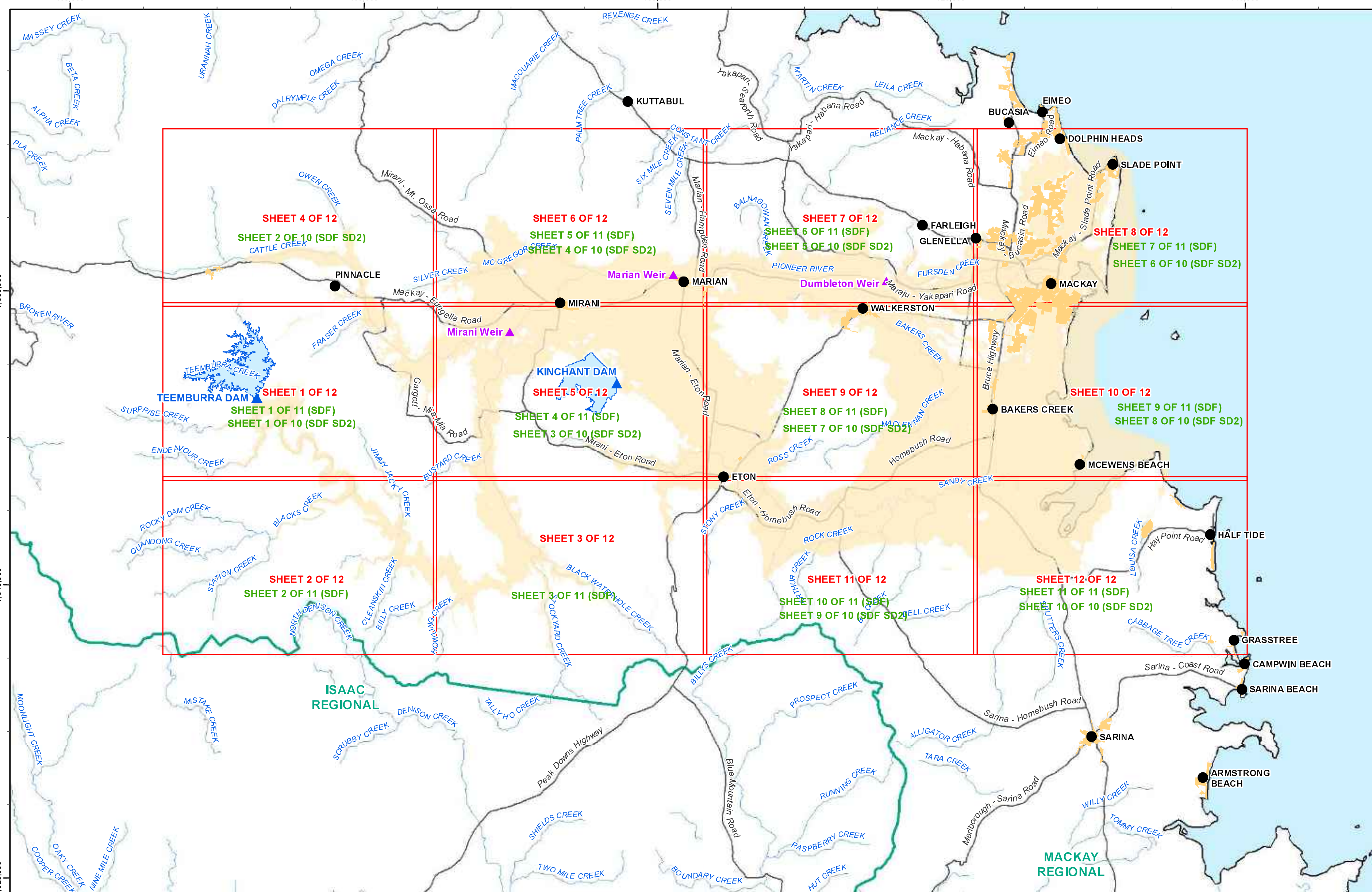
660,000
680,000
700,000
720,000
740,000
7,660,000
7,640,000
7,620,000
SHEET 1 OF 12
SHEET 1 OF 11 (SDF)
SHEET 1 OF 10 (SDF SD2)
SHEET 2 OF 12
SHEET 2 OF 11 (SDF)
SHEET 3 OF 12
SHEET 3 OF 11 (SDF)
SHEET 4 OF 12
SHEET 2 OF 10 (SDF SD2)
SHEET 5 OF 12
SHEET 4 OF 11 (SDF)
SHEET 3 OF 10 (SDF SD2)
SHEET 6 OF 12
SHEET 5 OF 11 (SDF)
SHEET 4 OF 10 (SDF SD2)
SHEET 7 OF 12
SHEET 6 OF 11 (SDF)
SHEET 5 OF 10 (SDF SD2)
SHEET 8 OF 12
SHEET 7 OF 11 (SDF)
SHEET 6 OF 10 (SDF SD2)
SHEET 9 OF 12
SHEET 8 OF 11 (SDF)
SHEET 7 OF 10 (SDF SD2)
SHEET 10 OF 12
SHEET 9 OF 11 (SDF)
SHEET 8 OF 10 (SDF SD2)
SHEET 11 OF 12
SHEET 10 OF 11 (SDF)
SHEET 9 OF 10 (SDF SD2)
SHEET 12 OF 12
SHEET 11 OF 11 (SDF)
SHEET 10 OF 10 (SDF SD2)
TEEMBURRA DAM
KINCHANT DAM
Marian Weir
Dumbleton Weir
Mirani Weir
KUTTABUL
EIMEO
BUCASIA
DOLPHIN HEADS
SLADE POINT
FARLEIGH
GLENELLA
PINNACLE
MIRANI
MARIAN
MACKAY
WALKERSTON
BAKERS CREEK
MCEWENS BEACH
ETON
HALF TIDE
GRASSTREE
CAMPWIN BEACH
SARINA BEACH
SARINA
ARMSTRONG BEACH
ISAAC REGIONAL
MACKAY REGIONAL
Mirani - Mt. Ossa Road
Mackay - Eungella Road
Gargett - Mia Mia Road
Mirani - Eton Road
Marian - Hampden Road
Marian - Eton Road
Eton - Homebush Road
Homebush Road
Mackay - Habana Road
Yakapari - Seaforth Road
Yakapari - Habana Road
Marian - Yakapari Road
Bruce Highway
Mackay - Bucasia Road
Eimeo Road
Mackay - Slade Point Road
Hay Point Road
Sarina - Coast Road
Sarina - Homebush Road
Peak Downs Highway
Blue Mountain Road
Marlborough - Sarina Road
PIONEER RIVER
BROKEN RIVER
TEEMBURRA CREEK
MASSEY CREEK
BETA CREEK
ALPHA CREEK
PLA CREEK
URANNAH CREEK
OMEGA CREEK
DALRYMPLE CREEK
MACQUARIE CREEK
REVENGE CREEK
PALM TREE CREEK
CONSTANT CREEK
SIX MILE CREEK
SEVEN MILE CREEK
MARTIN CREEK
LEILA CREEK
RELIANCE CREEK
BALNAGOWAN CREEK
OWEN CREEK
CATTLE CREEK
SILVER CREEK
MC GREGOR CREEK
FURSDEN CREEK
FRASER CREEK
BAKERS CREEK
SURPRISE CREEK
ENDEAVOUR CREEK
JIMMY JACKY CREEK
BUSTARD CREEK
MACLENNAN CREEK
ROSS CREEK
SANDY CREEK
STONY CREEK
ROCK CREEK
ROCKY DAM CREEK
QUANDONG CREEK
BLACKS CREEK
STATION CREEK
NORTH DENISON CREEK
CLEANSKIN CREEK
BILLY CREEK
HOWARD CREEK
BLACK WATERHOLE CREEK
COCKYARD CREEK
ARTHUR CREEK
BELL CREEK
LOUISA CREEK
CABBAGE TREE CREEK
FLUTTERS CREEK
BILLYS CREEK
MISTAKE CREEK
MOONLIGHT CREEK
DENISON CREEK
TALLY HO CREEK
SCRUBBY CREEK
PROSPECT CREEK
ALLIGATOR CREEK
TARA CREEK
RUNNING CREEK
WILLY CREEK
TOMMY CREEK
SHIELDS CREEK
RASPBERRY CREEK
HUT CREEK
TWO MILE CREEK
BOUNDARY CREEK
COOPER CREEK
OAKY CREEK
NINE MILE CREEK

REVISION				
10/10/23	B	UPDATED PMF EXTENT	LH	MGH
03/12/18	A	ISSUED FOR USE	IDH	MGH
DATE		REMARKS	CKD	PSD

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA20) Zone 55.

REFERENCE DRAWINGS
250755 - Sunny Day Failure
250757 - Probable Maximum Flood
260302 - Probable Maximum Flood Saddle Dam
260301 - Sunny Day Failure Saddle Dam

SCALES (A3 SIZE)
0 2.5 5 7.5 10 12.5 km 1:250,000

DRAWN: IDH
DESIGNED:
CHECKED:
CHECKED: MGH
APPROVED: M.G. HUGHES 3/12/2018 RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
INUNDATION PLANS
KEYMAP

CONTRACT NUMBER:
DRAWING NUMBER: 250754
REV.: B
SHEET: 1 OF 1
DATE: SEPTEMBER 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\Teemburra\250755-B.mxd
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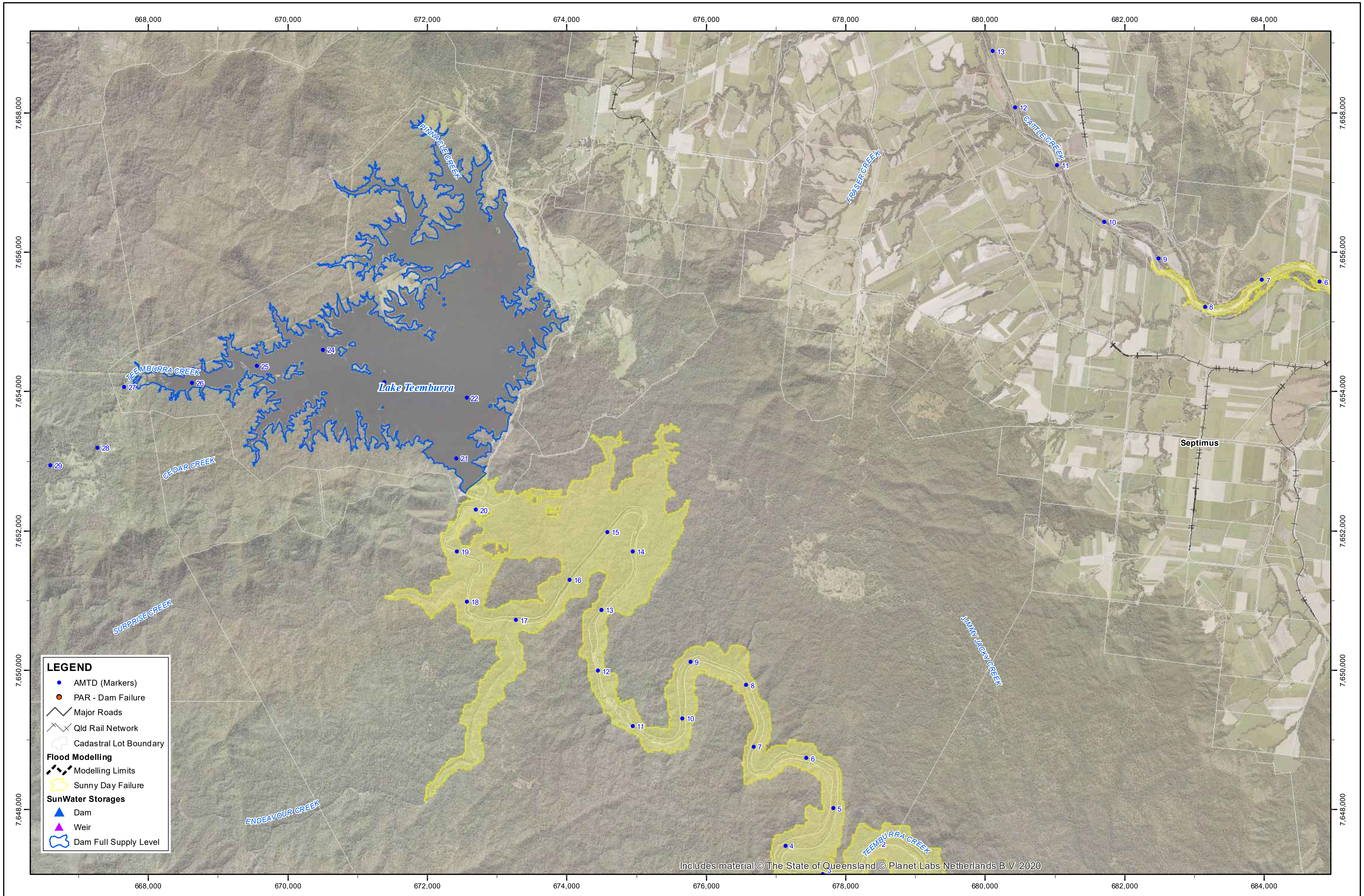

MAP PRODUCED BY:
WATER RESOURCES AND DAM SAFETY
TEL: (07) 3120 0000

REVISION				
10/10/23	B	UPDATED SDF EXTENT	LH	MGH
03/12/18	A	ISSUED FOR USE	IDH	MGH
DATE		REMARKS	CKD	PSD

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA20) Zone 55.

REFERENCE DRAWINGS
250754 - Keymap

SCALES (A3 SIZE)
0 500 1,000 1,500 2,000 2,500 m
1:50,000

DRAWN: IDH
DESIGNED:
CHECKED:
CHECKED: MGH
APPROVED: M.G. HUGHES 3/12/2018 RPEQ: 18351

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© SunWater Limited ACN 131 034 985

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
SUNNY DAY FAILURE
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER
DRAWING NUMBER: 250755
REV.: B
SHEET 1 OF 11
DATE SEPTEMBER 2018

Document: S:\BW Asset Delivery\SW-BW Service Delivery\R-Wxxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Teemburra\250755-B.mxd
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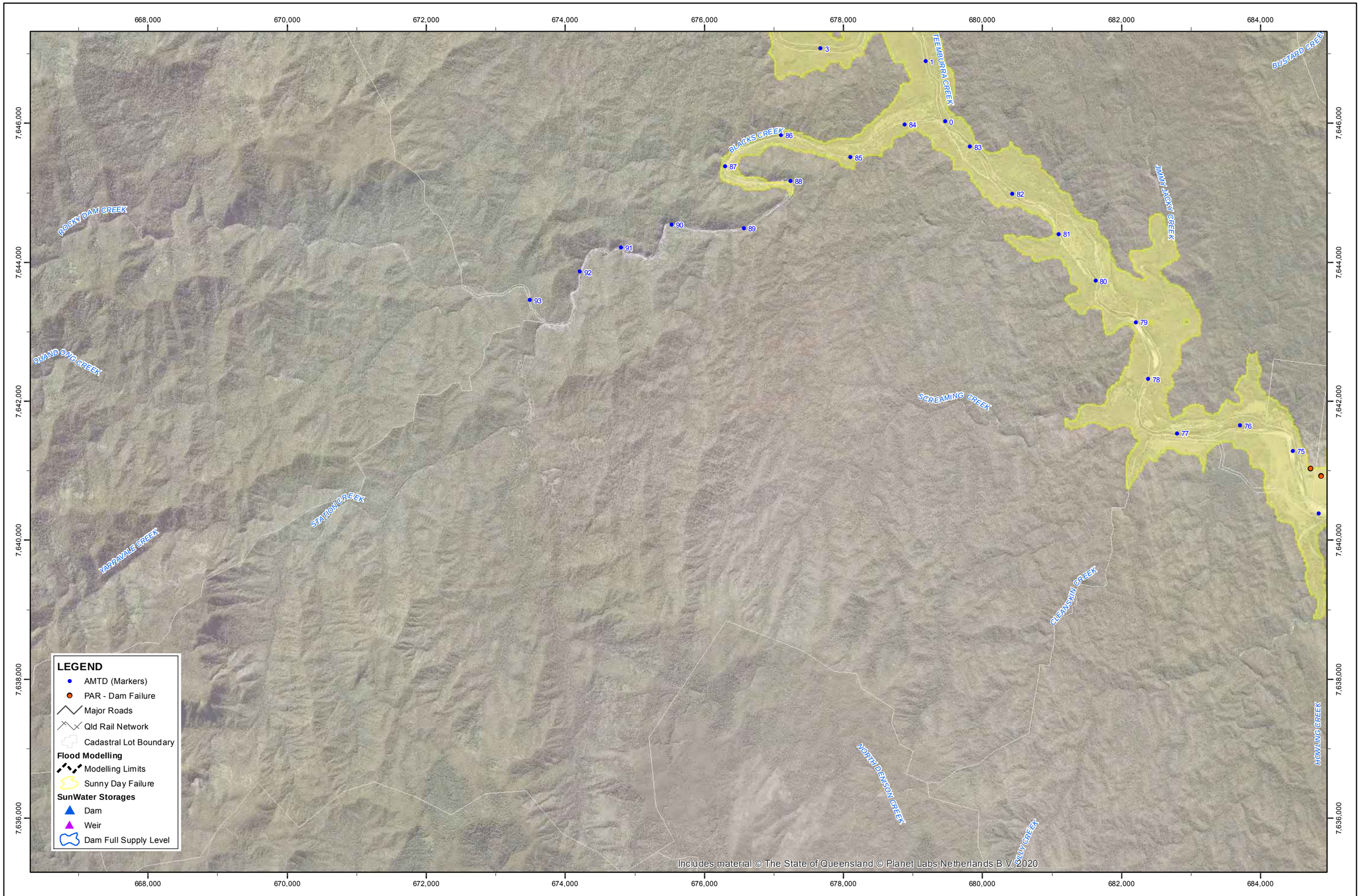
MAP PRODUCED BY:
WATER RESOURCES AND DAM SAFETY
TEL: (07) 3120 0000



REVISION				
10/10/23	B	UPDATED SDF EXTENT	LH	MGH
03/12/18	A	ISSUED FOR USE	IDH	MGH
DATE		REMARKS	CKD	PSD

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA20) Zone 55.

REFERENCE DRAWINGS
250754 - Keymap

SCALES (A3 SIZE)
0 500 1,000 1,500 2,000 2,500 m
1:50,000

DRAWN	IDH
DESIGNED	
CHECKED	
CHECKED	MGH
APPROVED	M.G. HUGHES 3/12/2018
RPEQ: 18351	

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
SUNNY DAY FAILURE
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
250755	B

SHEET 2 OF 11
DATE SEPTEMBER 2018

Document: S:\BW Asset Delivery\SWBW Service Delivery\R Wxx-01-07-01 EAP Flood Inundation Mapping\Drawings\ArcMap\Teemburra\250755-B.mxd
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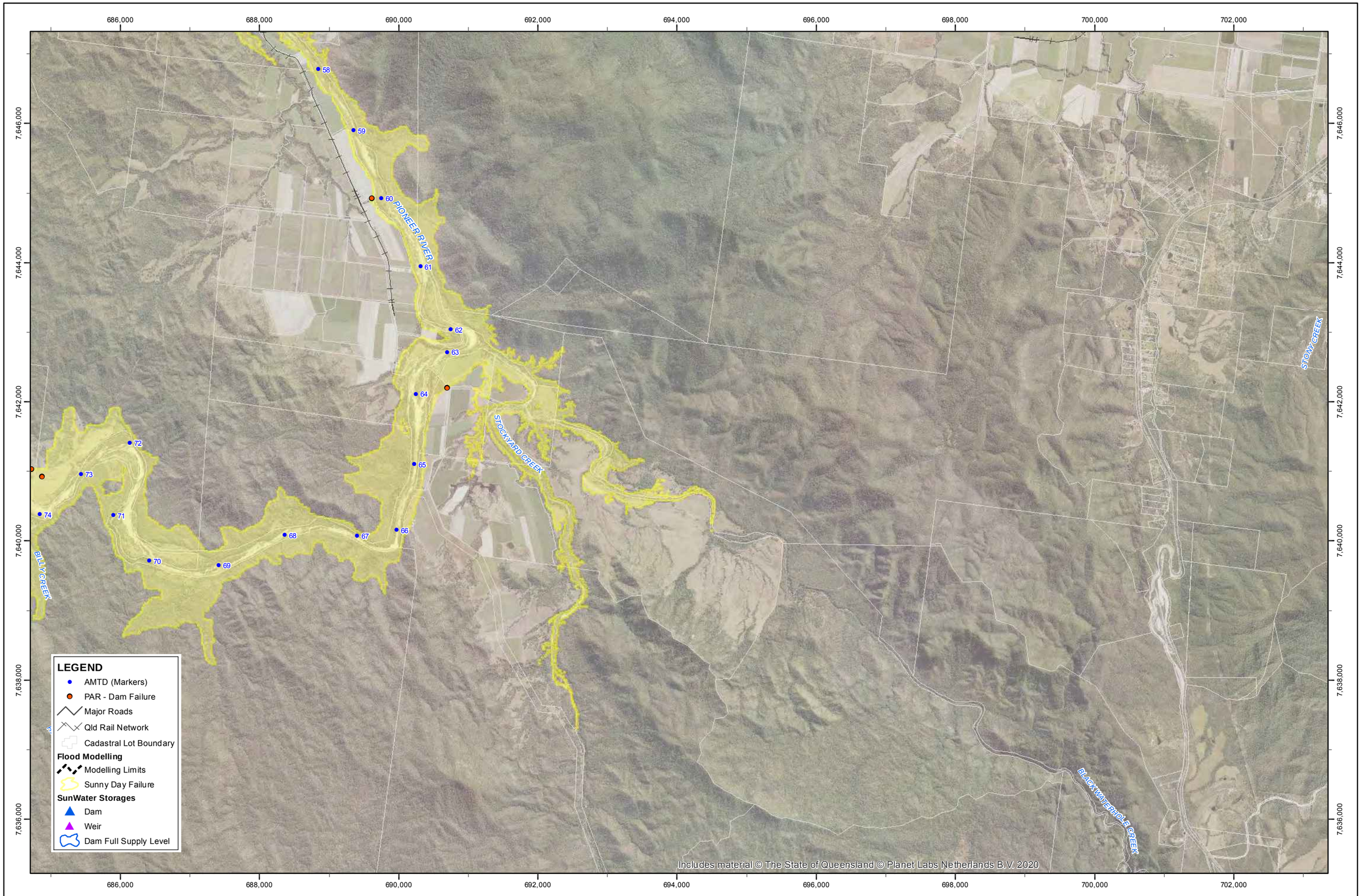

REVISION					
10/10/23	B	UPDATED SDF EXTENT	LH	MGH	
03/12/18	A	ISSUED FOR USE	IDH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA20) Zone 55.

REFERENCE DRAWINGS
250754 - Keymap

SCALES (A3 SIZE)
0 500 1,000 1,500 2,000 2,500 m
1:50,000

DRAWN	DESIGNED
IDH	
CHECKED	CHECKED
	MGH
APPROVED	
M.G. HUGHES 3/12/2018	RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
SUNNY DAY FAILURE
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER	
DRAWING NUMBER	REV.
250755	B
SHEET 3 OF 11	
DATE SEPTEMBER 2018	

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

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

686,000 688,000 690,000 692,000 694,000 696,000 698,000 700,000 702,000

7,658,000 7,656,000 7,654,000 7,652,000 7,650,000 7,648,000

PIONEER RIVER
CATTLE CREEK
SANDY CREEK
Lake Kinchant
Mia Mia

AMTD markers: 0, 1, 2, 3, 4, 5, 6, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57

LEGEND
- AMTD (Markers)
- PAR - Dam Failure
- Major Roads
- Qld Rail Network
- Cadastral Lot Boundary

Flood Modelling
- Modelling Limits
- Sunny Day Failure

SunWater Storages
- Dam
- Weir
- Dam Full Supply Level

REVISION				
10/10/23	B	UPDATED SDF EXTENT	LH	MGH
03/12/18	A	ISSUED FOR USE	IDH	MGH
DATE		REMARKS	CKD	PSD

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA20) Zone 55.

REFERENCE DRAWINGS
250754 - Keymap

SCALES (A3 SIZE)
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1:50,000

DRAWN	IDH
DESIGNED	
CHECKED	
CHECKED	MGH
APPROVED	M.G. HUGHES 3/12/2018
RPEQ: 18351	

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
SUNNY DAY FAILURE
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER	
DRAWING NUMBER	250755
REV.	B
SHEET	4 OF 11
DATE	SEPTEMBER 2018

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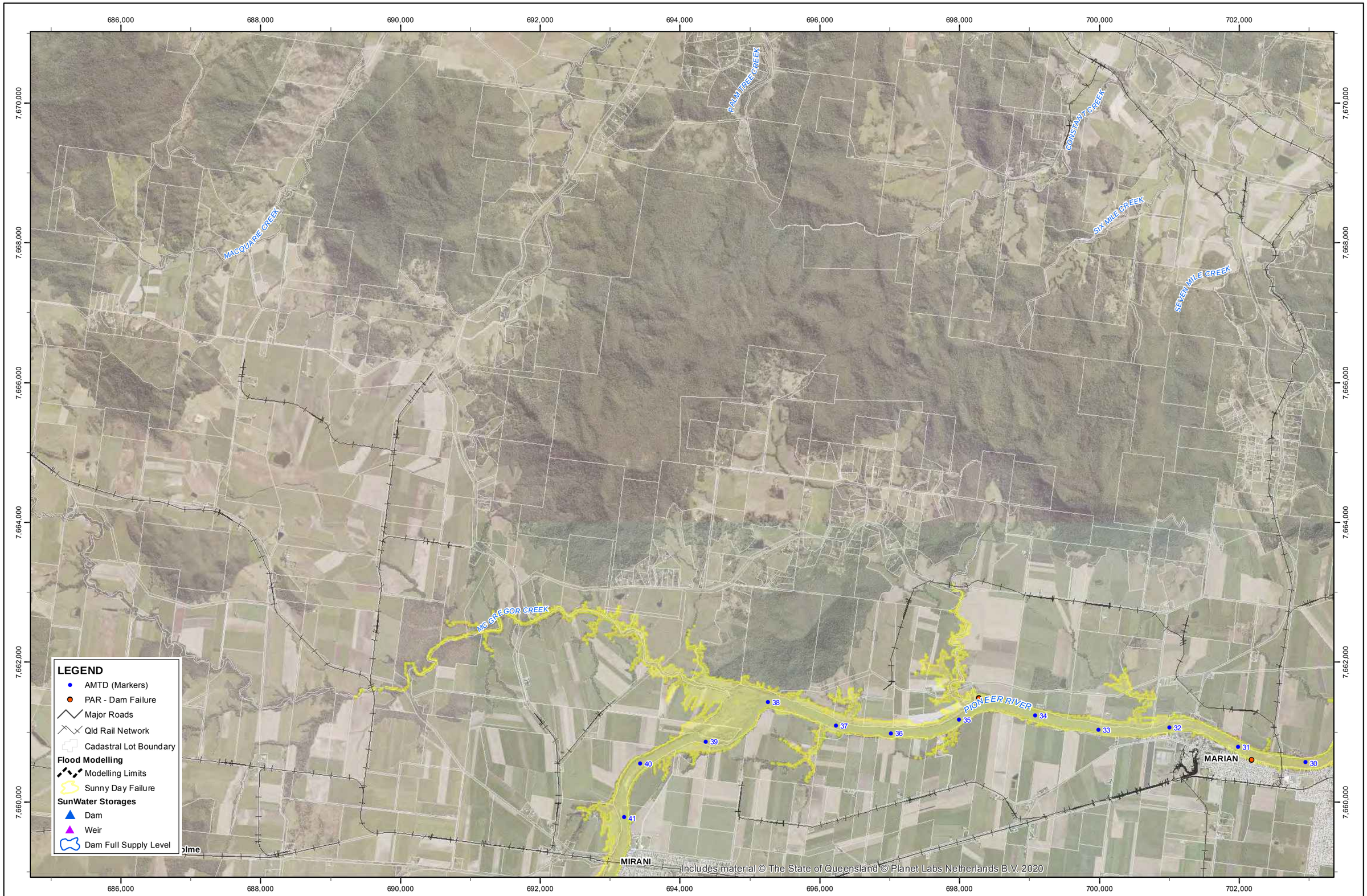

MAP PRODUCED BY:
WATER RESOURCES AND DAM SAFETY
TEL: (07) 3120 0000

REVISION				
10/10/23	B	UPDATED SDF EXTENT	LH	MGH
03/12/18	A	ISSUED FOR USE	IDH	MGH
DATE		REMARKS	CKD	PSD

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA20) Zone 55.

REFERENCE DRAWINGS
250754 - Keymap

SCALES (A3 SIZE)
0 500 1,000 1,500 2,000 2,500 m
1:50,000

DRAWN	DESIGNED
IDH	
CHECKED	CHECKED
	MGH

APPROVED
M.G. HUGHES
3/12/2018
RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
SUNNY DAY FAILURE
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER 250755 | REV. B

SHEET 5 OF 11

DATE SEPTEMBER 2018

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

704,000 706,000 708,000 710,000 712,000 714,000 716,000 718,000 720,000

7,670,000 7,668,000 7,666,000 7,664,000 7,662,000 7,660,000

CONSTANT CREEK
Arminungo
BALNACOWAN CREEK
RELIANCE CREEK
FARLEIGH
GLENELLA
PIONEER RIVER
FURSDEN CREEK
BAKERS CREEK
Narbilla
Pleystowe

28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 29

LEGEND

- AMTD (Markers)
- PAR - Dam Failure
- Major Roads
- Qld Rail Network
- Cadastral Lot Boundary

Flood Modelling

- Modelling Limits
- Sunny Day Failure

SunWater Storages

- Dam
- Weir
- Dam Full Supply Level

REVISION					
10/10/23	B	UPDATED SDF EXTENT	LH	MGH	
03/12/18	A	ISSUED FOR USE	IDH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA20) Zone 55.

REFERENCE DRAWINGS
250754 - Keymap

N W E S

SCALES (A3 SIZE)
0 500 1,000 1,500 2,000 2,500 m
1:50,000

DRAWN	DESIGNED
IDH	
CHECKED	CHECKED
	MGH

APPROVED
M.G. HUGHES
3/12/2018
RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
SUNNY DAY FAILURE
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
250755	B

SHEET 6 OF 11

DATE SEPTEMBER 2018

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

722,000 724,000 726,000 728,000 730,000 732,000 734,000 736,000 738,000 740,000

7,670,000 7,668,000 7,666,000 7,664,000 7,662,000 7,660,000

DOLPHIN HEADS
Blacks Beach
SLADE POINT
Outer Harbour
Andergrove
GLENELLA
Mount Pleasant
North Mackay
FURSDEN CREEK
PIONEER RIVER
MACKAY
West Mackay
East Mackay
South Mackay
10 9 8 7 6 5 4 3 2 1 0

LEGEND
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DAM BREAK ANALYSIS 2022
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DAM BREAK ANALYSIS 2022
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CONTRACT NUMBER	
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7,658,000 7,656,000 7,654,000 7,652,000 7,650,000 7,648,000

South Mackay
Paget
BAKERS CREEK
MCEWENS BEACH
SANDY CREEK

LEGEND
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704,000 706,000 708,000 710,000 712,000 714,000 716,000 718,000 720,000

7,646,000 7,644,000 7,642,000 7,640,000 7,638,000 7,636,000

SANDY CREEK
ROSS CREEK
STONY CREEK
Oakenden
Homebush
OAKY CREEK
ROCK CREEK
FRENCHMANS CREEK
Balberra
ARTHUR CREEK
BL CREEK
The Chase
BELL CREEK
BILLYS CREEK

LEGEND

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7,646,000 7,644,000 7,642,000 7,640,000 7,638,000 7,636,000

Dunnrock
SANDY CREEK
Hay Point
Bay Point
HALF TIDE
Salonika Beach
LOUISA CREEK
Alligator Creek
BELL CREEK
ALLIGATOR CREEK
SPLITTERS CREEK
Clifton Vale
CABBAGE TREE CREEK
GRASSTREE

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TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
SUNNY DAY FAILURE
MAIN EMBANKMENT
INUNDATION PLAN

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

668,000 670,000 672,000 674,000 676,000 678,000 680,000 682,000 684,000

7,658,000 7,656,000 7,654,000 7,652,000 7,650,000 7,648,000

Lake Teemburra
PINNACLE CREEK
FRASER CREEK
CATTLE CREEK
TEEMBURRA CREEK
CEDAR CREEK
SURPRISE CREEK
ENDEAVOUR CREEK
JIMMY JACK CREEK
Septimus

AMTD markers: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29

LEGEND
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	LH
APPROVED	
M.G. HUGHES 11/10/2023	RPEQ: 18351

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
SUNNY DAY FAILURE
SADDLE DAM TWO
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
260301	A

SHEET 1 OF 10
DATE OCTOBER 2023

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7,670,000 7,668,000 7,666,000 7,664,000 7,662,000 7,660,000

OWEN CREEK
MC GREGOR CREEK
FINCH HATTON CREEK
CATTLE CREEK
SILVER CREEK
Finch Hatton
Trueman
PINNACLE
Gargett
20 19 18 17 16 15 14 13

LEGEND
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- Modelling Limits
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SunWater Storages
- Dam
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MAP PRODUCED BY:
WATER RESOURCES AND DAM SAFETY
TEL. (07) 3120 0000

REVISION				
			LH	MGH
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APPROVED
M.G. HUGHES
11/10/2023
RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
SUNNY DAY FAILURE
SADDLE DAM TWO
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
260301	A

SHEET 2 OF 10
DATE OCTOBER 2023

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

686,000 688,000 690,000 692,000 694,000 696,000 698,000 700,000 702,000

7,658,000 7,656,000 7,654,000 7,652,000 7,650,000 7,648,000

PIONEER RIVER 0
CATTLE CREEK
SANDY CREEK
Lake Kinchant
Mia Mia

AMTD (Markers): 1 2 3 4 5 6 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57

LEGEND
- AMTD (Markers)
- PAR - Dam Failure
- Major Roads
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			LH	MGH
11/10/23	A	ISSUED FOR USE	IDH	MGH
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DRAWN	DESIGNED
FMT	
CHECKED	CHECKED
	LH
APPROVED	
M.G. HUGHES 11/10/2023	RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
SUNNY DAY FAILURE
SADDLE DAM TWO
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
260301	A

SHEET 3 OF 10
DATE OCTOBER 2023

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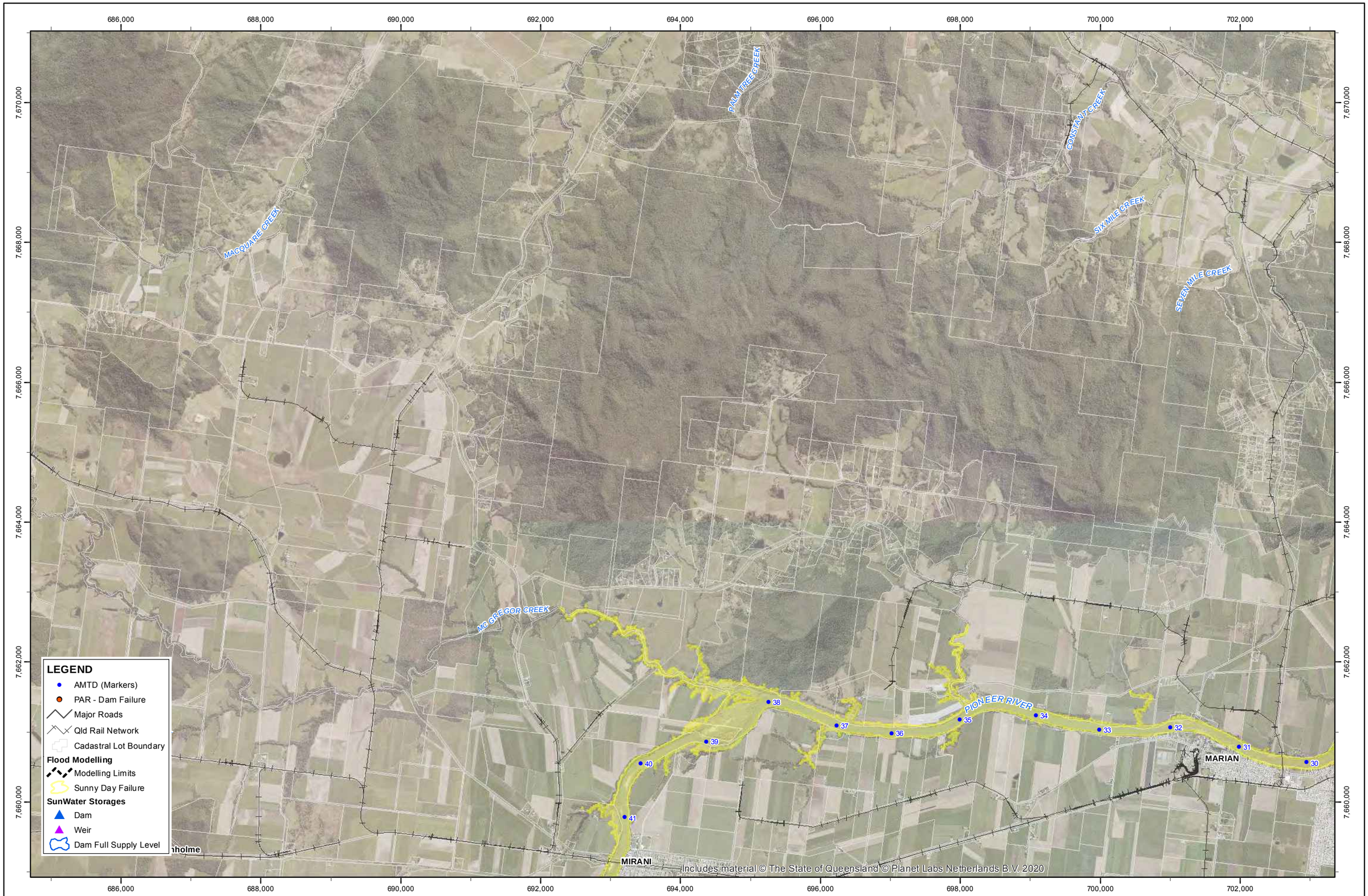
MAP PRODUCED BY:
WATER RESOURCES AND DAM SAFETY
TEL: (07) 3120 0000



REVISION					
				LH	MGH
11/10/23	A	ISSUED FOR USE		IDH	MGH
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M.G. HUGHES
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sunwater

TEEMBURRA DAM
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LEGEND

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- Dam Full Supply Level

Arminungo
BALNAGOWAN CREEK
RELIANCE CREEK
FARLEIGH
GLENELLA
PIONEER RIVER
FURSDEN CREEK
BAKERS CREEK
Narbilla
Pleystowe

29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11

REVISION					
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Andergrove
GLENELLA
Mount Pleasant
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MACKAY
East Mackay
West Mackay
South Mackay
0 1 2 3 4 5 6 7 8 9 10

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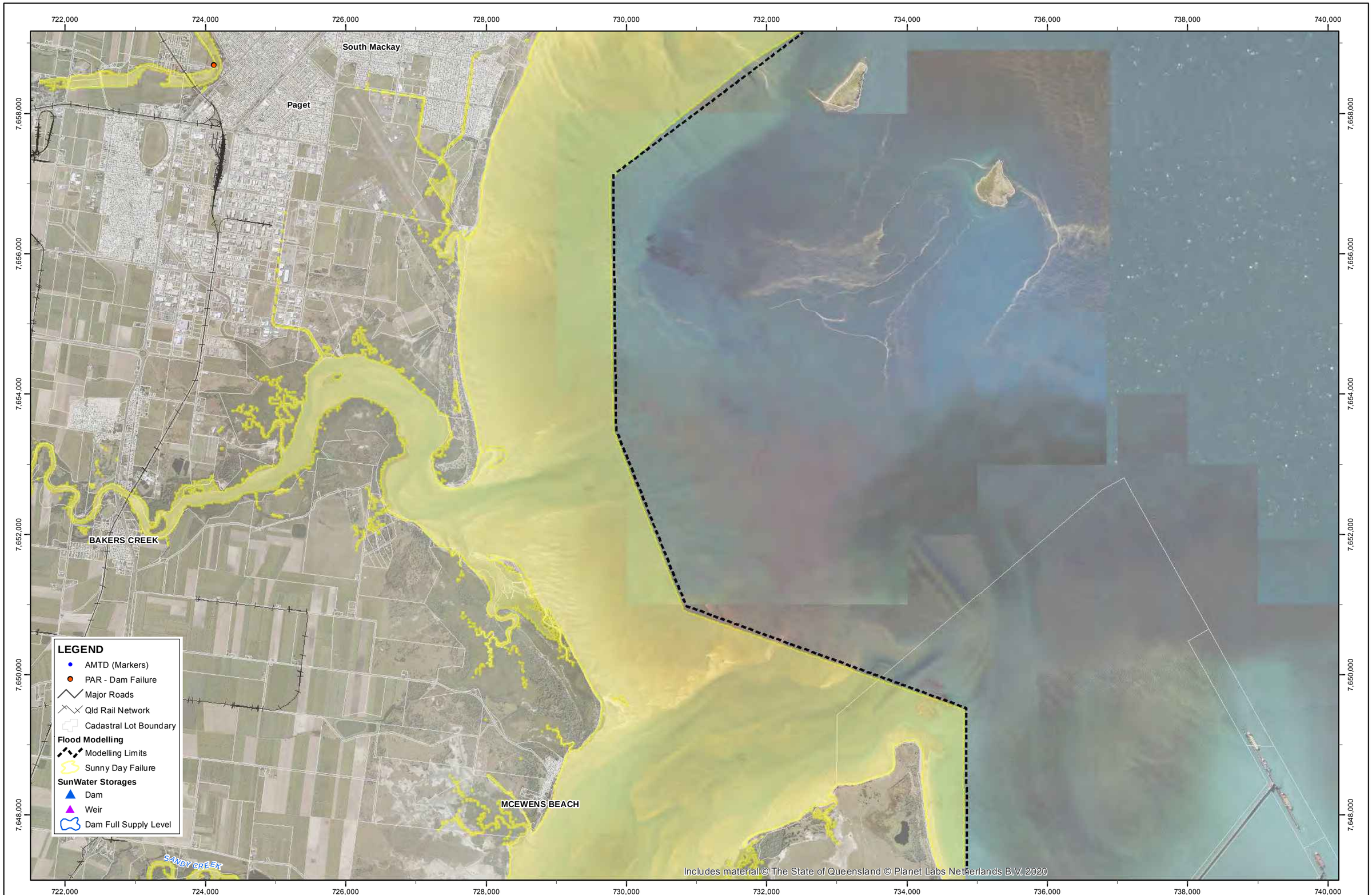

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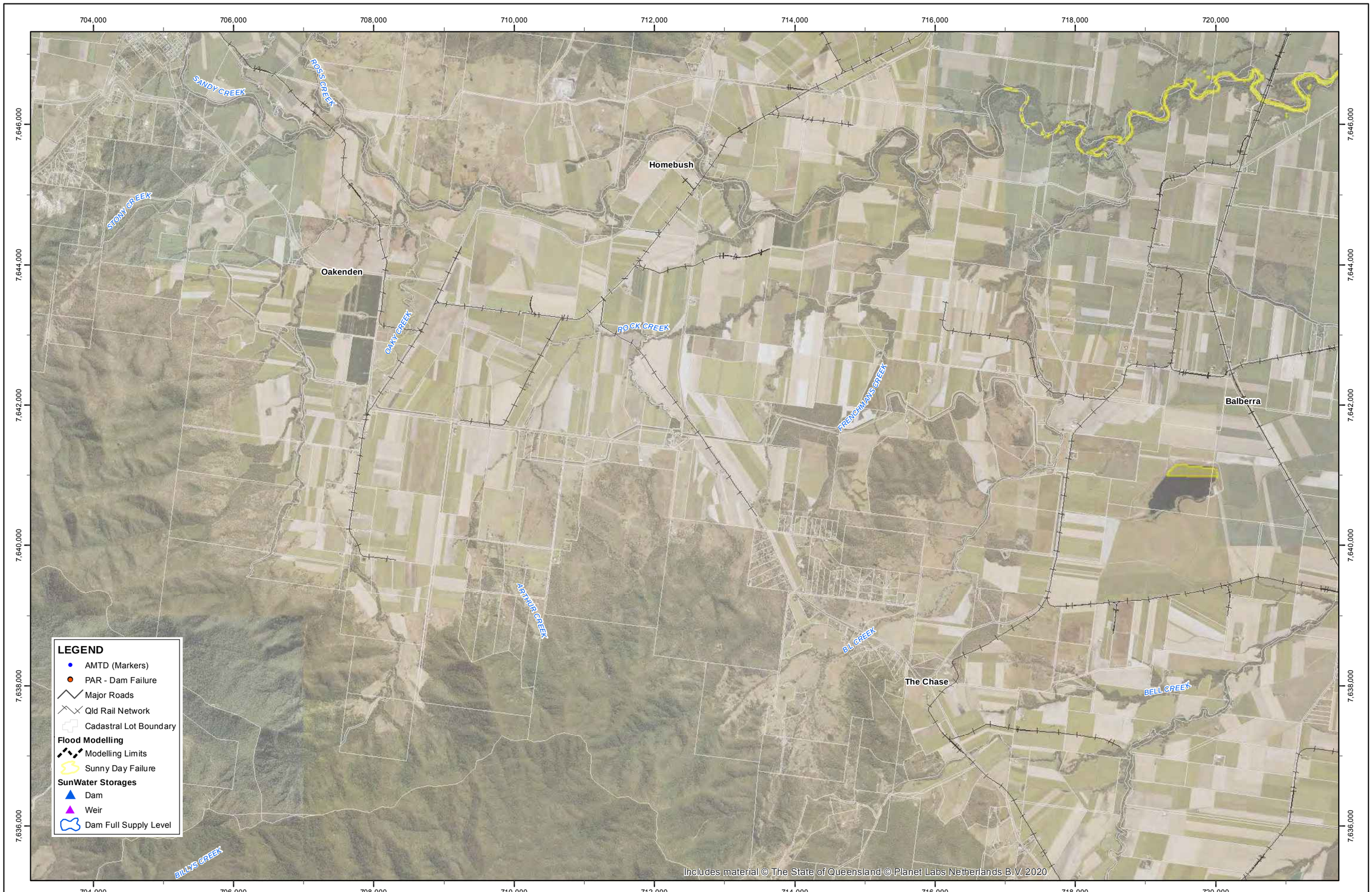

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MAP PRODUCED BY:
WATER RESOURCES AND DAM SAFETY
TEL: (07) 3120 0000

722,000 724,000 726,000 728,000 730,000 732,000 734,000 736,000 738,000 740,000

7,646,000 7,644,000 7,642,000 7,640,000 7,638,000 7,636,000

SANDY CREEK
Dunnrock
Hay Point
Bay Point
HALF TIDE
Salonika Beach
LOUISA CREEK
Alligator Creek
BELL CREEK
Clifton Vale
SPLITTERS CREEK
CABBAGE TREE CREEK
GRASSTREE

LEGEND
- AMTD (Markers)
- PAR - Dam Failure
- Major Roads
- Qld Rail Network
- Cadastral Lot Boundary

Flood Modelling
- Modelling Limits
- Sunny Day Failure

SunWater Storages
- Dam
- Weir
- Dam Full Supply Level

REVISION					
				LH	MGH
11/10/23	A	ISSUED FOR USE		IDH	MGH
DATE		REMARKS		CKD	PSD

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA20) Zone 55.

REFERENCE DRAWINGS
250754 - Keymap

SCALES (A3 SIZE)
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DRAWN	DESIGNED
FMT	
CHECKED	CHECKED
	LH

APPROVED
M.G. HUGHES
11/10/2023
RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
SUNNY DAY FAILURE
SADDLE DAM TWO
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
260301	A

SHEET 10 OF 10
DATE OCTOBER 2023

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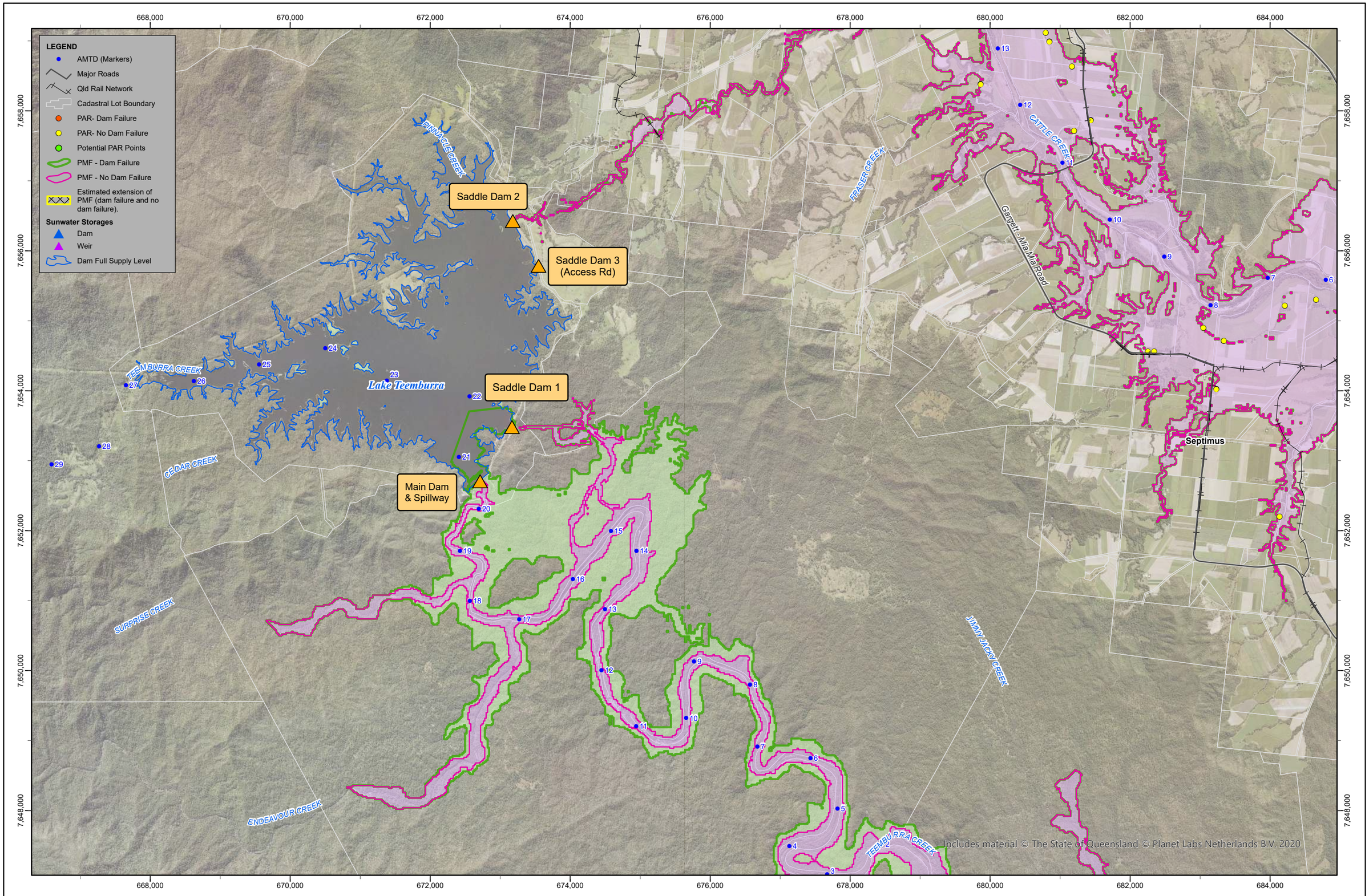

REVISION				
28/01/25	C	PMF AREA EXTENSION	ES	MGH
10/10/23	B	UPDATED PMF EXTENT	LH	MGH
03/12/18	A	ISSUED FOR USE	IDH	MGH
DATE		REMARKS	CKD	PSD

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REFERENCE DRAWINGS
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DRAWN	DESIGNED
MDB	
CHECKED	CHECKED
ES	RGS

APPROVED
M.G. HUGHES
28/01/2025
RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
250757	C

SHEET 1 OF 12
DATE JANUARY 2025

MAP PRODUCED BY:
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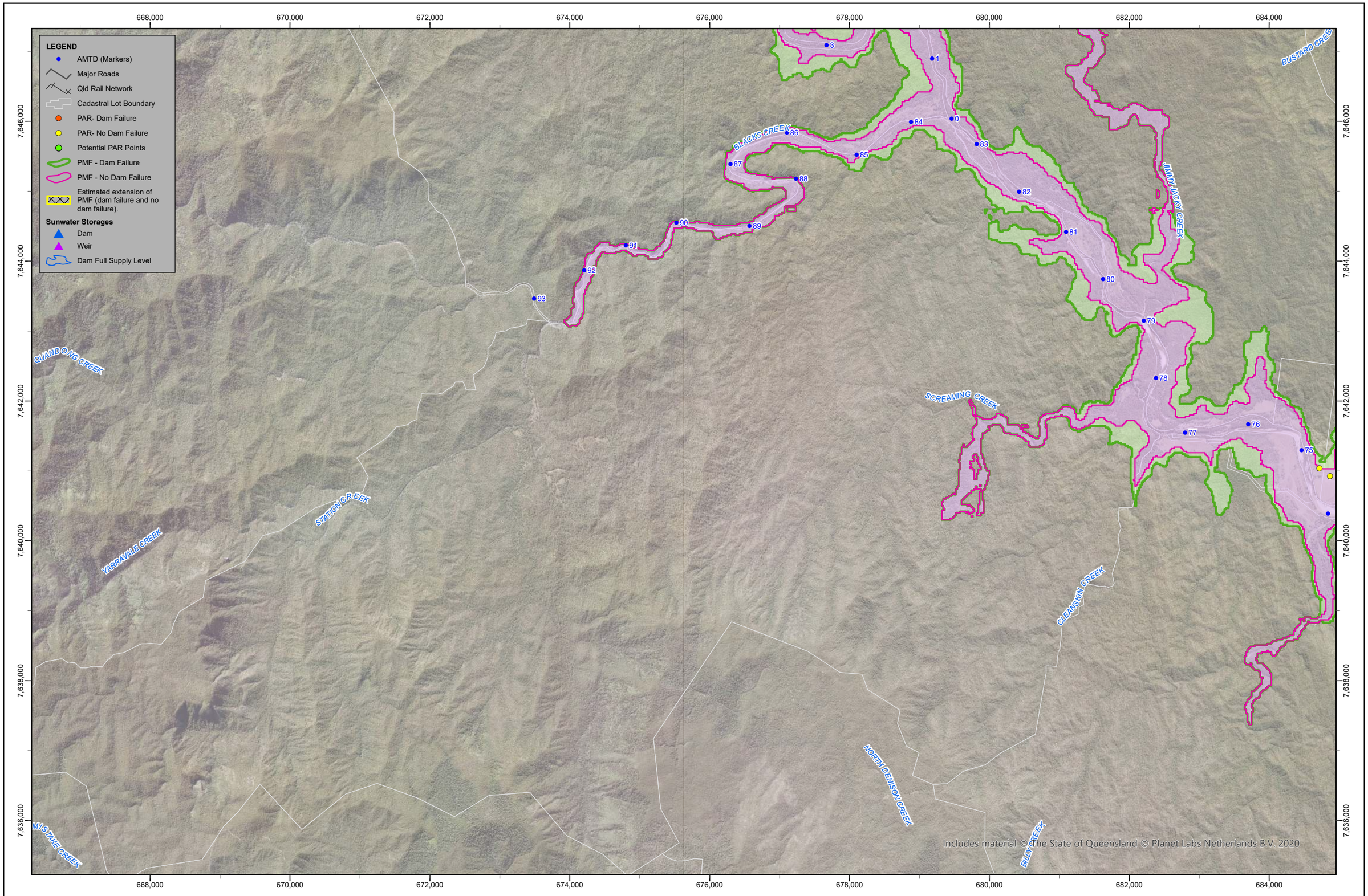

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REVISION				
28/01/25	C	PMF AREA EXTENSION	ES	MGH
10/10/23	B	UPDATED PMF EXTENT	LH	MGH
03/12/18	A	ISSUED FOR USE	IDH	MGH
DATE		REMARKS	CKD	PSD

MAP INFORMATION
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DRAWN	DESIGNED
MDB	
CHECKED	CHECKED
ES	RGS
APPROVED	
M.G. HUGHES 28/01/2025	RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER 250757 | REV. C

SHEET 2 OF 12

DATE JANUARY 2025

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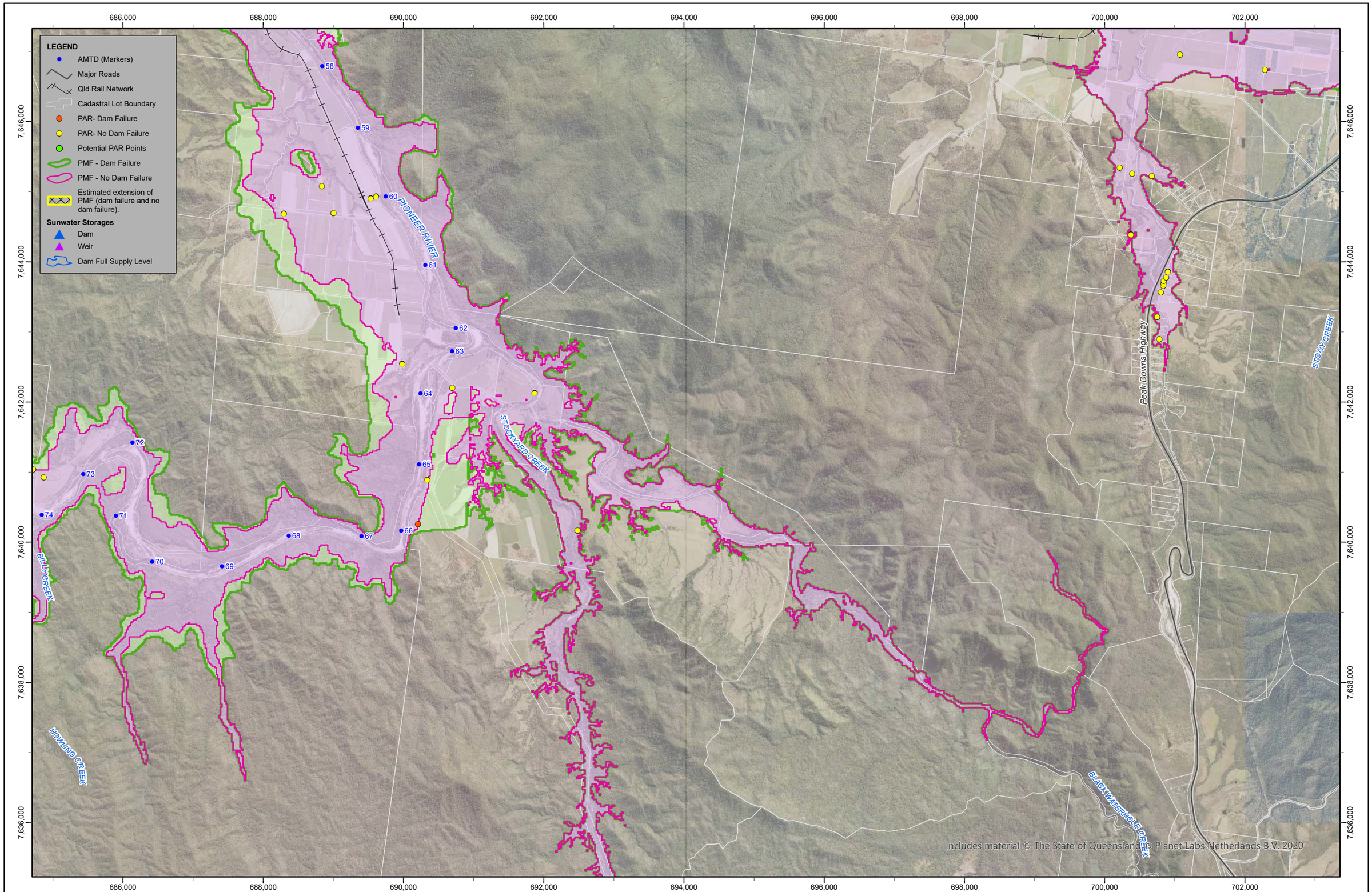
Map Produced By:
Water Resources and Dam Safety
Tel: (07) 3120 0000



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10/10/23	B	UPDATED PMF EXTENT	LH	MGH	
03/12/18	A	ISSUED FOR USE	IDH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION
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CHECKED	CHECKED
ES	RGS
APPROVED	
M.G. HUGHES 28/01/2025	
RPEQ: 18351	

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
250757	C

SHEET 3 OF 12

DATE JANUARY 2025

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Exported: 28/01/2025 1:17 PM

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

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LEGEND

- AMTD (Markers)
- Major Roads
- Qld Rail Network
- Cadastral Lot Boundary
- PAR- Dam Failure
- PAR- No Dam Failure
- Potential PAR Points
- PMF - Dam Failure
- PMF - No Dam Failure
- Estimated extension of PMF (dam failure and no dam failure).

Sunwater Storages

- Dam
- Weir
- Dam Full Supply Level

Mirani - Mt. Ossa Road
OWEN CREEK
MC GREGOR CREEK
FINCH HATTON CREEK
CATTLE CREEK
Mackay - Eungella Road
Finch Hatton
Trueman
PINNACLE
SILVER CREEK
Gargett
20 19 18 17 16 15 14

REVISION					
28/01/25	C	PMF AREA EXTENSION	ES	MGH	
10/10/23	B	UPDATED PMF EXTENT	LH	MGH	
03/12/18	A	ISSUED FOR USE	IDH	MGH	
DATE		REMARKS	CKD	PSD	

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1:50,000

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CHECKED	CHECKED
ES	RGS
APPROVED	
M.G. HUGHES 28/01/2025	RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
250757	C

SHEET 4 OF 12

DATE JANUARY 2025

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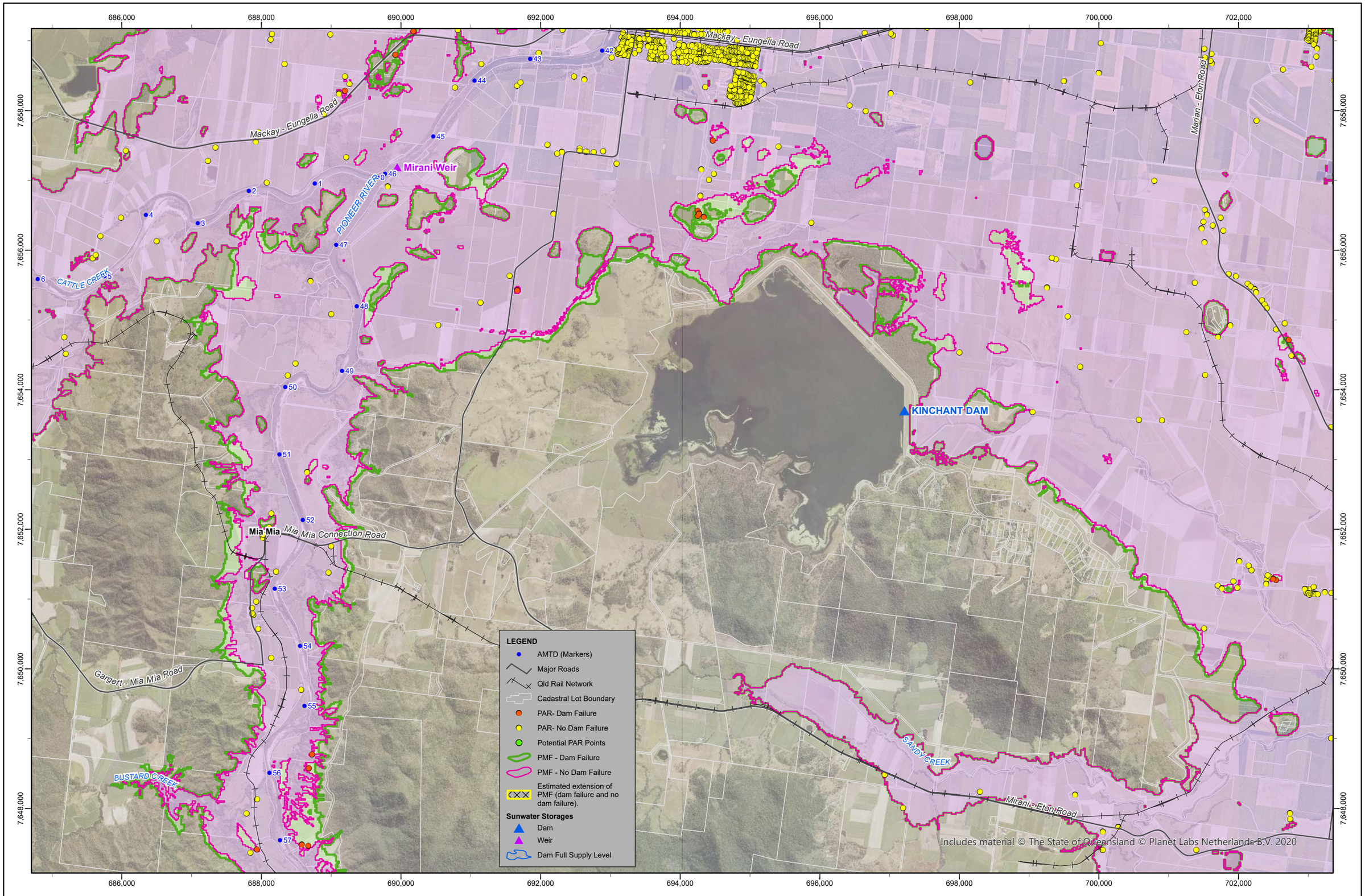
Water Resources and Dam Safety
Tel: (07) 3120 0000



REVISION					
28/01/25	C	PMF AREA EXTENSION	ES	MGH	
10/10/23	B	UPDATED PMF EXTENT	LH	MGH	
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DATE		REMARKS	CKD	PSD	

MAP INFORMATION
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SCALES (A3 SIZE)
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1:50,000

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CHECKED ES	CHECKED RGS
APPROVED M.G. HUGHES 28/01/2025	RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER
DRAWING NUMBER 250757
REV. C
SHEET 5 OF 12
DATE JANUARY 2025

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

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LEGEND

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- Major Roads
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- Estimated extension of PMF (dam failure and no dam failure).

Sunwater Storages

- Dam
- Weir
- Dam Full Supply Level

MACQUARIE CREEK
PALM TREE CREEK
CONSTANT CREEK
SIX MILE CREEK
SEVEN MILE CREEK
Bruce Highway
MC GREGOR CREEK
PIONEER RIVER
SILVER CREEK
Mirani - Mt. Ossa Road
Mackay - Eungella Road
Marian - Hampden Road
Marian - Eton Road
Marian Weir
MARIAN
MIRANI
Benholme
38 37 36 35 34 33 31 30 39 40 41

REVISION				
28/01/25	C	PMF AREA EXTENSION	ES	MGH
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DRAWN MDB | DESIGNED
CHECKED ES | CHECKED RGS
APPROVED M.G. HUGHES 28/01/2025 RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER
DRAWING NUMBER 250757 | REV. C
SHEET 6 OF 12
DATE JANUARY 2025

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MAP PRODUCED BY:
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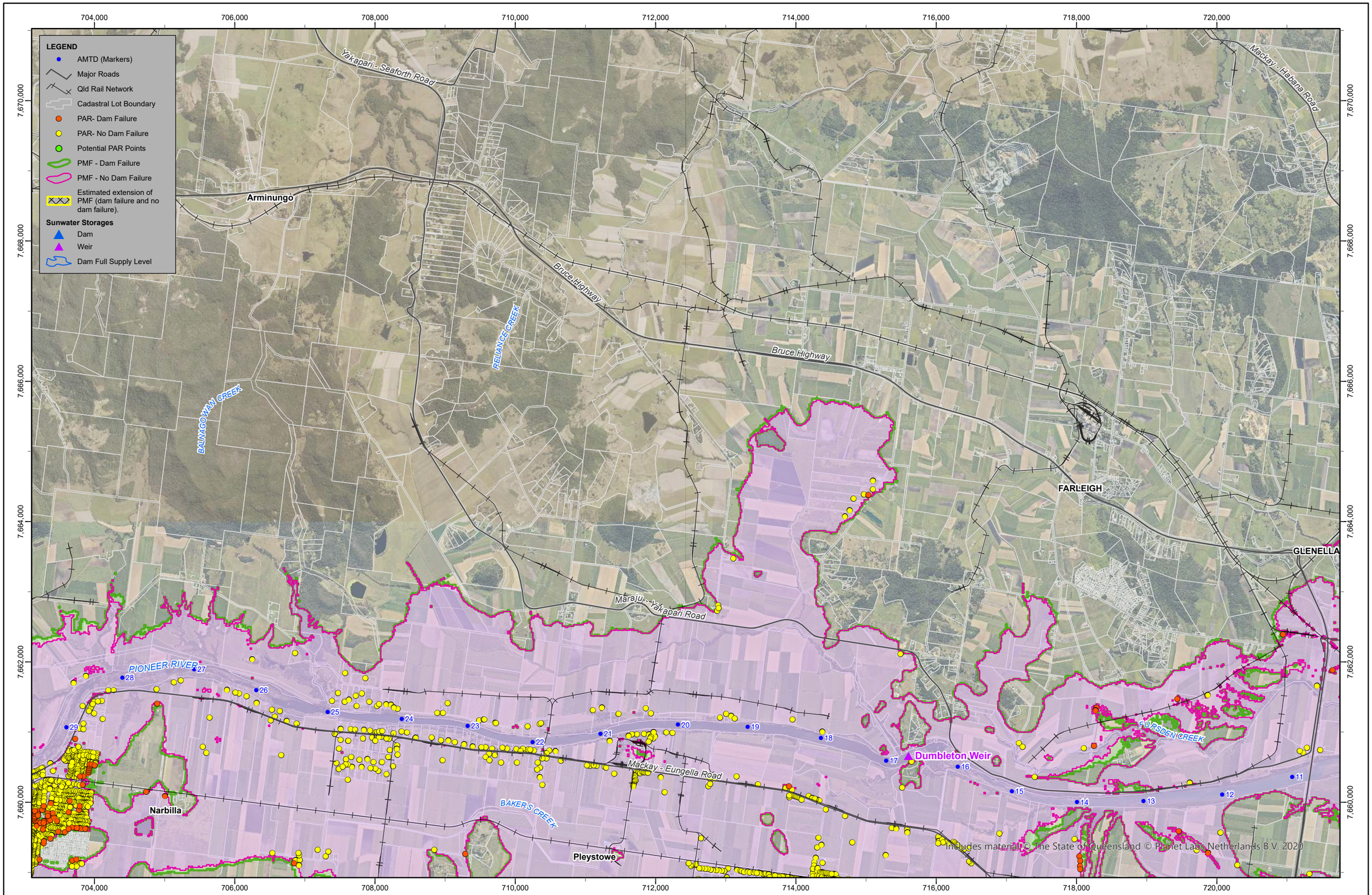
TEL: (07) 3120 0000



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10/10/23	B	UPDATED PMF EXTENT	LH	MGH
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1:50,000

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MDB	
CHECKED	CHECKED
ES	RGS

APPROVED
M.G. HUGHES
28/01/2025
RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER 250757 | REV. C

SHEET 7 OF 12

DATE JANUARY 2025

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MAP PRODUCED BY:
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TEL: (07) 3120 0000

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7,670,000 7,668,000 7,666,000 7,664,000 7,662,000 7,660,000

LEGEND

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- Major Roads
- Qld Rail Network
- Cadastral Lot Boundary
- PAR- Dam Failure
- PAR- No Dam Failure
- Potential PAR Points
- PMF - Dam Failure
- PMF - No Dam Failure
- Estimated extension of PMF (dam failure and no dam failure).

Sunwater Storages

- Dam
- Weir
- Dam Full Supply Level

DOLPHIN HEADS
Blacks Beach
SLADE POINT
Outer Harbour
Andergrove
Eimeo Road
Mackay - Habana Road
Mackay - Bucasia Road
GLENELLA
Mount Pleasant
North Mackay
Rockleigh - North Mackay Road
Maraju - Yakapari Road
FURSDEN CREEK
Bruce Highway
Slade Point Road
Mackay - Slade Point Road
PIONEER RIVER
Glenella Connection Road
MACKAY
West Mackay
East Mackay
South Mackay
0 1 2 3 4 5 6 7 8 9 10

REVISION					
28/01/25	C	PMF AREA EXTENSION	ES	MGH	
10/10/23	B	UPDATED PMF EXTENT	LH	MGH	
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SCALES (A3 SIZE)
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1:50,000

DRAWN	DESIGNED
MDB	
CHECKED	CHECKED
ES	RGS
APPROVED	
M.G. HUGHES 28/01/2025	
RPEQ: 18351	

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER 250757 | REV. C

SHEET 8 OF 12

DATE JANUARY 2025

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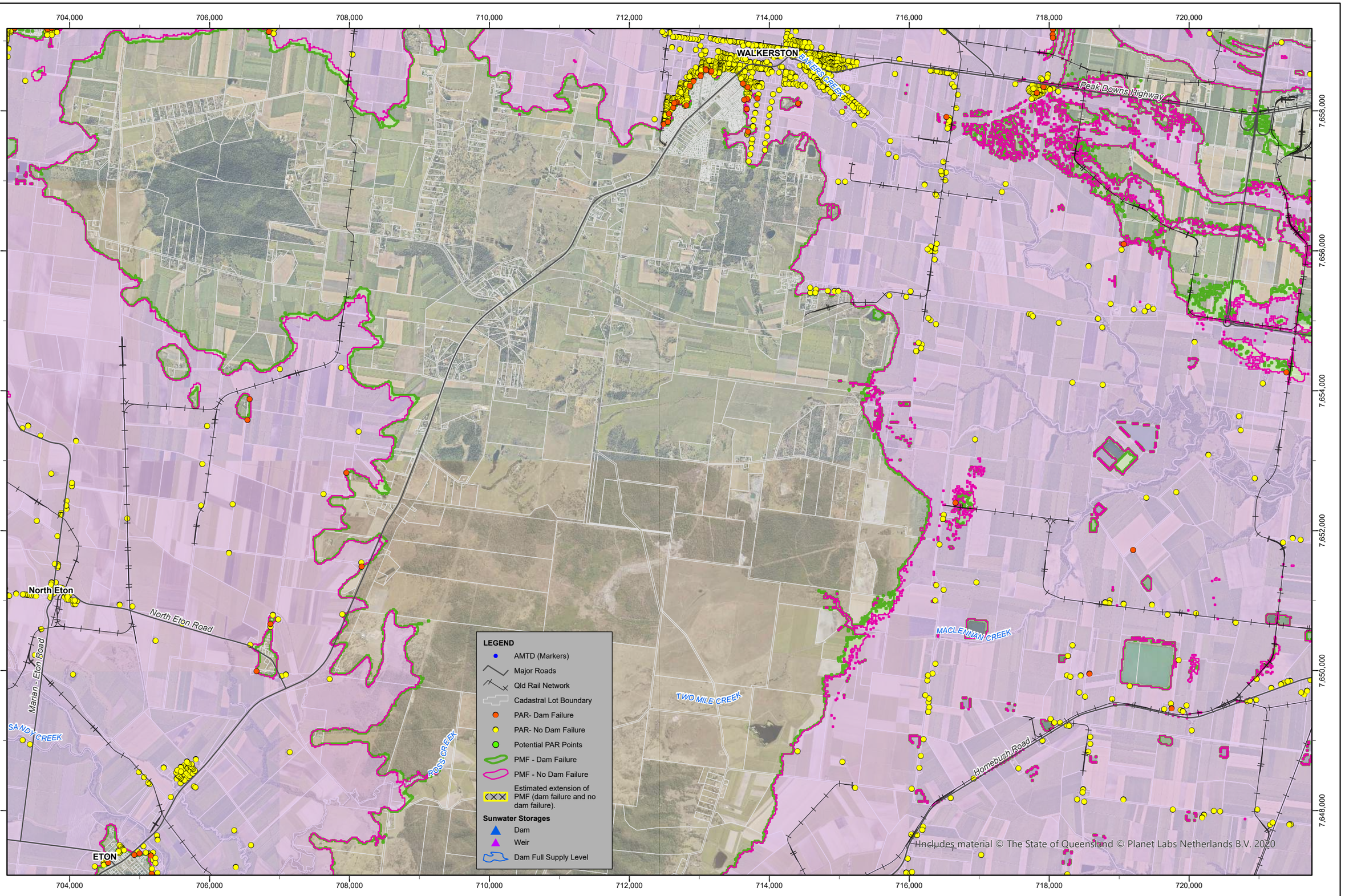

REVISION					
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10/10/23	B	UPDATED PMF EXTENT	LH	MGH	
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MDB	
CHECKED ES	CHECKED RGS
APPROVED M.G. HUGHES 28/01/2025	RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER
DRAWING NUMBER 250757
REV. C
SHEET 9 OF 12
DATE JANUARY 2025

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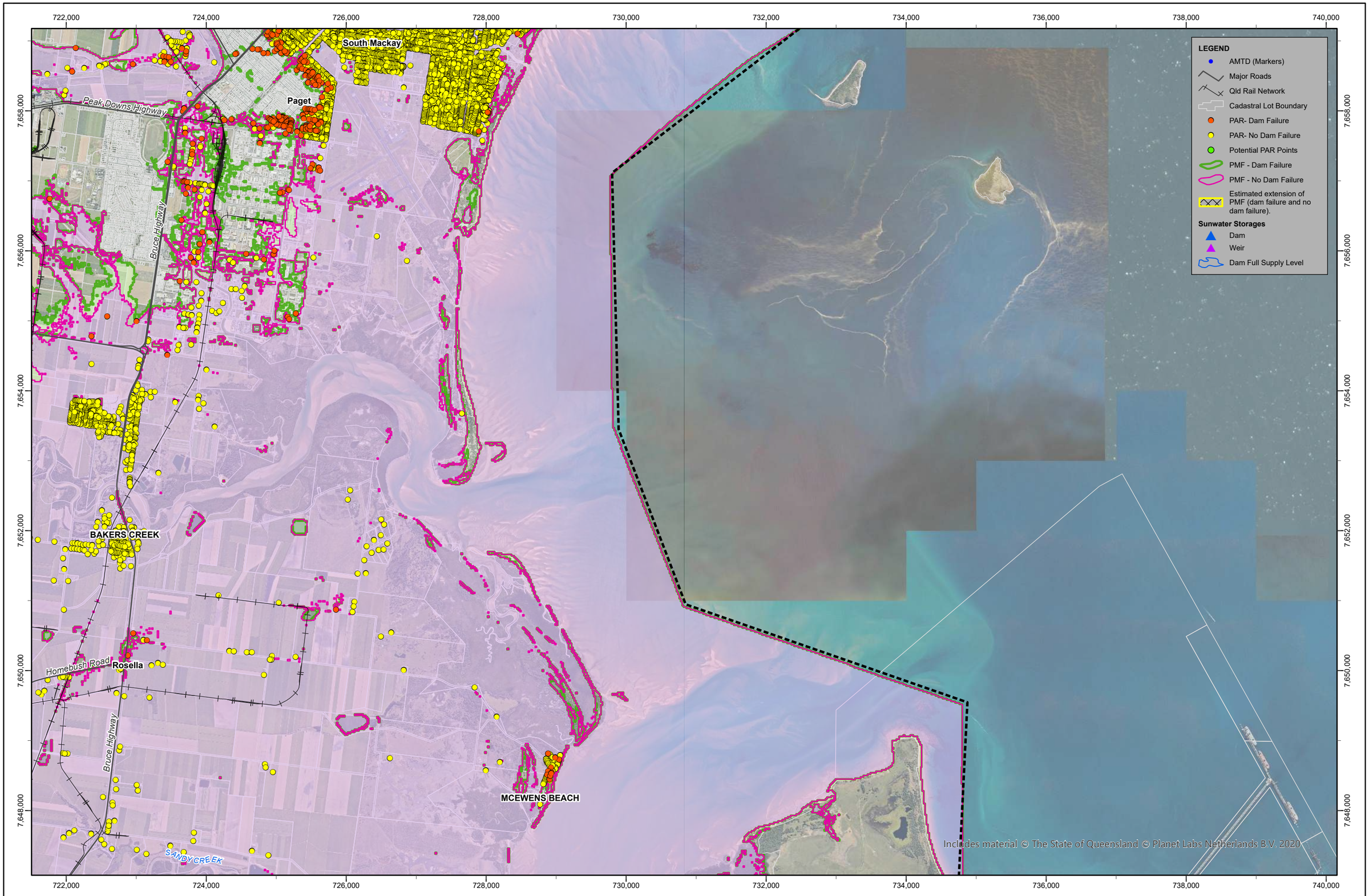
Map Produced By:
Water Resources and Dam Safety
Tel: (07) 3120 0000



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M.G. HUGHES 28/01/2025	RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
250757	C

SHEET 10 OF 12

DATE JANUARY 2025

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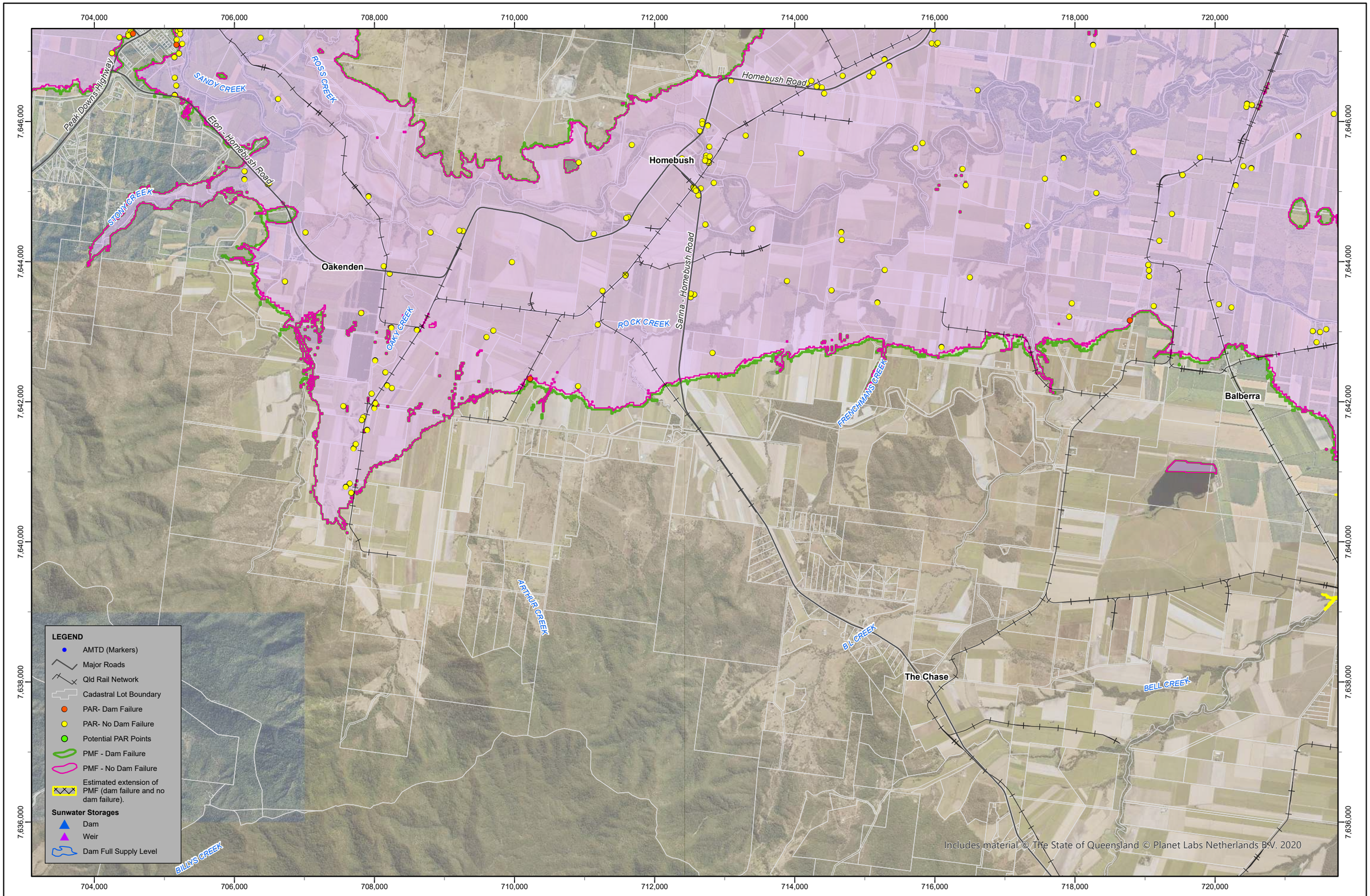

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M.G. HUGHES 28/01/2025	RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
250757	C

SHEET 11 OF 12

DATE JANUARY 2025

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Map Produced By:
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Hay Point
Bay Point
HALF TIDE
Salonika Beach
Alligator Creek
Clifton Vale
Munburra
GRASSTREE
SANDY CREEK
Bruce Highway
Hay Point Road
LOUISA CREEK
BELL CREEK
ALLIGATOR CREEK
SPLITTER'S CREEK
CABBAGE TREE CREEK

LEGEND

- AMTD (Markers)
- Major Roads
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Sunwater Storages

- Dam
- Weir
- Dam Full Supply Level

REVISION					
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N W E S

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28/01/2025
RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
MAIN EMBANKMENT
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
250757	C

SHEET 12 OF 12
DATE JANUARY 2025

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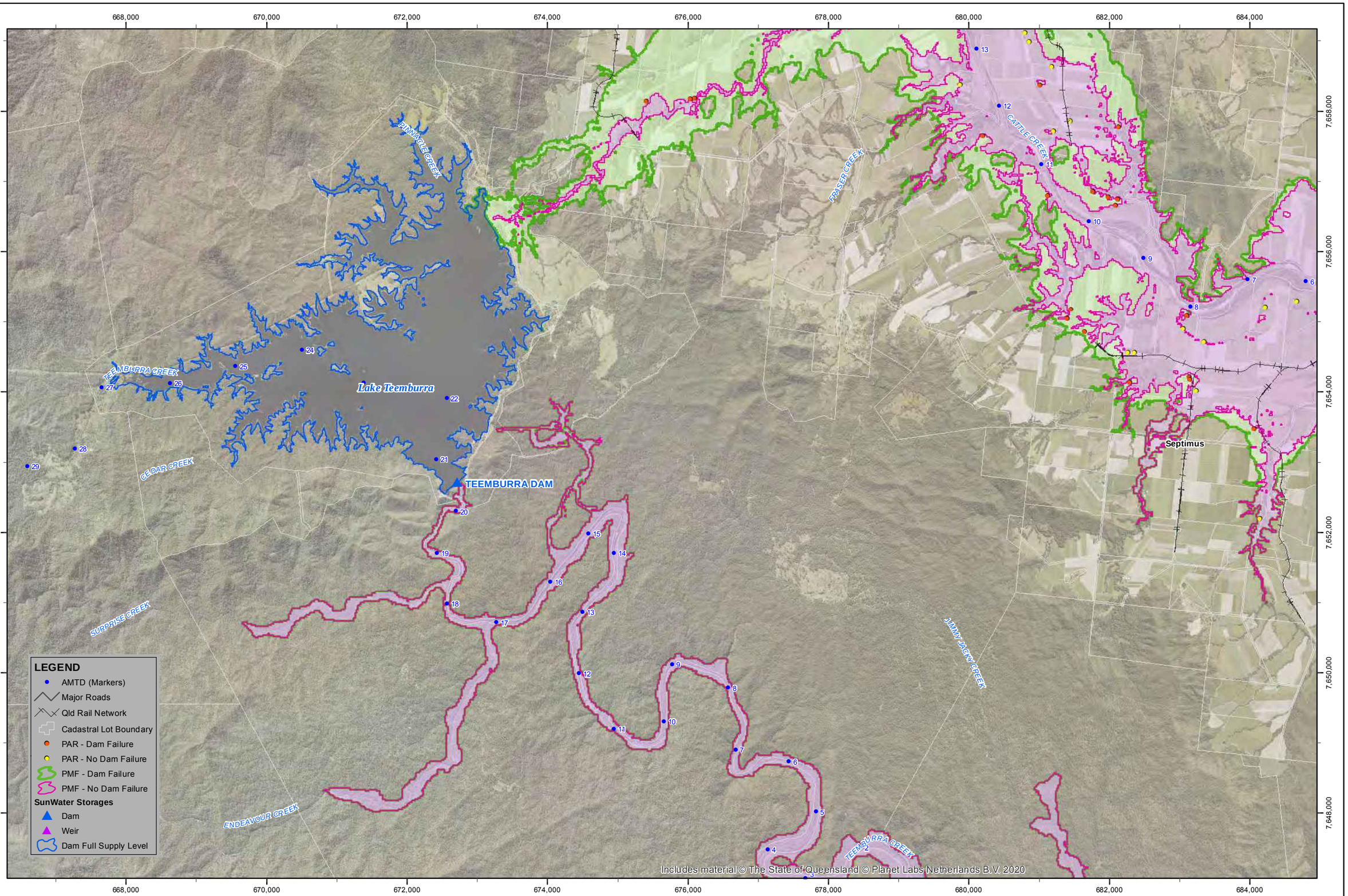

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TEL: (07) 3120 0000

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DATE		REMARKS	CKD	PSD	

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1:50,000

DRAWN	DESIGNED
FMT	
CHECKED	CHECKED
	LH

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11/10/2023
RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
SADDLE DAM TWO
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
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SHEET 1 OF 12
DATE OCTOBER 2023

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

668,000 670,000 672,000 674,000 676,000 678,000 680,000 682,000 684,000

7,646,000 7,644,000 7,642,000 7,640,000 7,638,000 7,636,000

TEEMBURRA CREEK
BUSTARD CREEK
BLACKS CREEK
JIMMY JACKY CREEK
ROCKY DAM CREEK
QUANDONG CREEK
SCREAMING CREEK
STATION CREEK
YARRAVALE CREEK
CLEANSKIN CREEK
NORTH DENISON CREEK
SILLY CREEK
HOWLING CREEK

0 1 2 3 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

LEGEND
- AMTD (Markers)
- Major Roads
- Qld Rail Network
- Cadastral Lot Boundary
- PAR - Dam Failure
- PAR - No Dam Failure
- PMF - Dam Failure
- PMF - No Dam Failure

SunWater Storages
- Dam
- Weir
- Dam Full Supply Level

REVISION					
11/10/23	A	ISSUED FOR USE	IDH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA20) Zone 55.

REFERENCE DRAWINGS
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APPROVED	
M.G. HUGHES 11/10/2023	RPEQ: 18351

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
SADDLE DAM TWO
INUNDATION PLAN

CONTRACT NUMBER	
DRAWING NUMBER	REV.
260302	A
SHEET 2 OF 12	
DATE OCTOBER 2023	

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

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58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74

PIONEER RIVER
STOCKYARD CREEK
STONY CREEK
BILLY CREEK
HOWLING CREEK
BLACKWATERHOLE CREEK

LEGEND
- AMTD (Markers)
- Major Roads
- Qld Rail Network
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- PAR - No Dam Failure
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SunWater Storages
- Dam
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- Dam Full Supply Level

REVISION				
11/10/23	A	ISSUED FOR USE	IDH	MGH
DATE		REMARKS	CKD	PSD

MAP INFORMATION
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REFERENCE DRAWINGS
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APPROVED
M.G. HUGHES
11/10/2023
RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
SADDLE DAM TWO
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
260302	A

SHEET 3 OF 12

DATE OCTOBER 2023

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MAP PRODUCED BY:
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TEL: (07) 3120 0000

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OWEN CREEK
MC GREGOR CREEK
FINCH HATTON CREEK
CATTLE CREEK
20 19 18 17 16 15 14
Finch Hatton
Trueman
PINNACLE
Gargett

LEGEND
- AMTD (Markers)
- Major Roads
- Qld Rail Network
- Cadastral Lot Boundary
- PAR - Dam Failure
- PAR - No Dam Failure
- PMF - Dam Failure
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SunWater Storages
- Dam
- Weir
- Dam Full Supply Level

REVISION					
DATE		REMARKS	CKD	PSD	
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MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA20) Zone 55.

REFERENCE DRAWINGS
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APPROVED
M.G. HUGHES
11/10/2023
RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
SADDLE DAM TWO
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
260302	A

SHEET 4 OF 12
DATE OCTOBER 2023

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MAP PRODUCED BY:
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TEL: (07) 3120 0000

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7,658,000 7,656,000 7,654,000 7,652,000 7,650,000 7,648,000

Mirani Weir
KINCHANT DAM
Mia Mia
PIONEER RIVER
CATTLE CREEK
BUSTARD CREEK
SANDY CREEK

LEGEND
- AMTD (Markers)
- Major Roads
- Qld Rail Network
- Cadastral Lot Boundary
- PAR - Dam Failure
- PAR - No Dam Failure
- PMF - Dam Failure
- PMF - No Dam Failure

SunWater Storages
- Dam
- Weir
- Dam Full Supply Level

REVISION					
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DATE		REMARKS	CKD	PSD	

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA20) Zone 55.

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APPROVED	
M.G. HUGHES 11/10/2023	RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
SADDLE DAM TWO
INUNDATION PLAN

CONTRACT NUMBER
DRAWING NUMBER 260302
REV. A
SHEET 5 OF 12
DATE OCTOBER 2023

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LEGEND
- AMTD (Markers)
- Major Roads
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- PMF - Dam Failure
- PMF - No Dam Failure

SunWater Storages
- Dam
- Weir
- Dam Full Supply Level

MACQUARIE CREEK
PALM TREE CREEK
CONSTANT CREEK
SIX MILE CREEK
SEVEN MILE CREEK
MC GREGOR CREEK
PIONEER RIVER
SILVERCREEK
Marian Weir
MARIAN
Benholme
MIRANI
38 37 36 35 34 33 39 40 41 31 30

REVISION					
11/10/23	A	ISSUED FOR USE	IDH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA20) Zone 55.

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M.G. HUGHES
11/10/2023
RPEQ: 18351

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TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
SADDLE DAM TWO
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
260302	A

SHEET 6 OF 12
DATE OCTOBER 2023

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

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LEGEND

- AMTD (Markers)
- Major Roads
- Qld Rail Network
- Cadastral Lot Boundary
- PAR - Dam Failure
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- PMF - Dam Failure
- PMF - No Dam Failure

SunWater Storages

- Dam
- Weir
- Dam Full Supply Level

Arminungo
BALNAGOWAN CREEK
RELIANCE CREEK
FARLEIGH
GLENELLA
PIONEER RIVER
FURSDEN CREEK
Dumbleton Weir
BAKERS CREEK
Narbilla
Pleystowe

27 28 26 25 24 23 22 21 20 19 18 29 17 16 15 14 13 12 11

REVISION				
11/10/23	A	ISSUED FOR USE	IDH	MGH
DATE		REMARKS	CKD	PSD

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA20) Zone 55.

REFERENCE DRAWINGS
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SCALES (A3 SIZE)
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APPROVED
M.G. HUGHES
11/10/2023
RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
SADDLE DAM TWO
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
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SHEET 7 OF 12

DATE OCTOBER 2023

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

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LEGEND

- AMTD (Markers)
- Major Roads
- Qld Rail Network
- Cadastral Lot Boundary
- PAR - Dam Failure
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- PMF - Dam Failure
- PMF - No Dam Failure

SunWater Storages

- Dam
- Weir
- Dam Full Supply Level

DOLPHIN HEADS
Blacks Beach
SLADE POINT
Outer Harbour
Andergrove
GLENELLA
Mount Pleasant
North Mackay
FURSDEN CREEK
PIONEER RIVER
MACKAY
East Mackay
West Mackay
South Mackay
0 1 2 3 4 5 6 7 8 9 10

REVISION					
11/10/23	A	ISSUED FOR USE	IDH	MGH	
DATE		REMARKS	CKD	PSD	

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA20) Zone 55.

REFERENCE DRAWINGS
250754 - Keymap

SCALES (A3 SIZE)
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CHECKED	CHECKED
	LH

APPROVED
M.G. HUGHES
11/10/2023
RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
SADDLE DAM TWO
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
260302	A

SHEET 8 OF 12

DATE OCTOBER 2023

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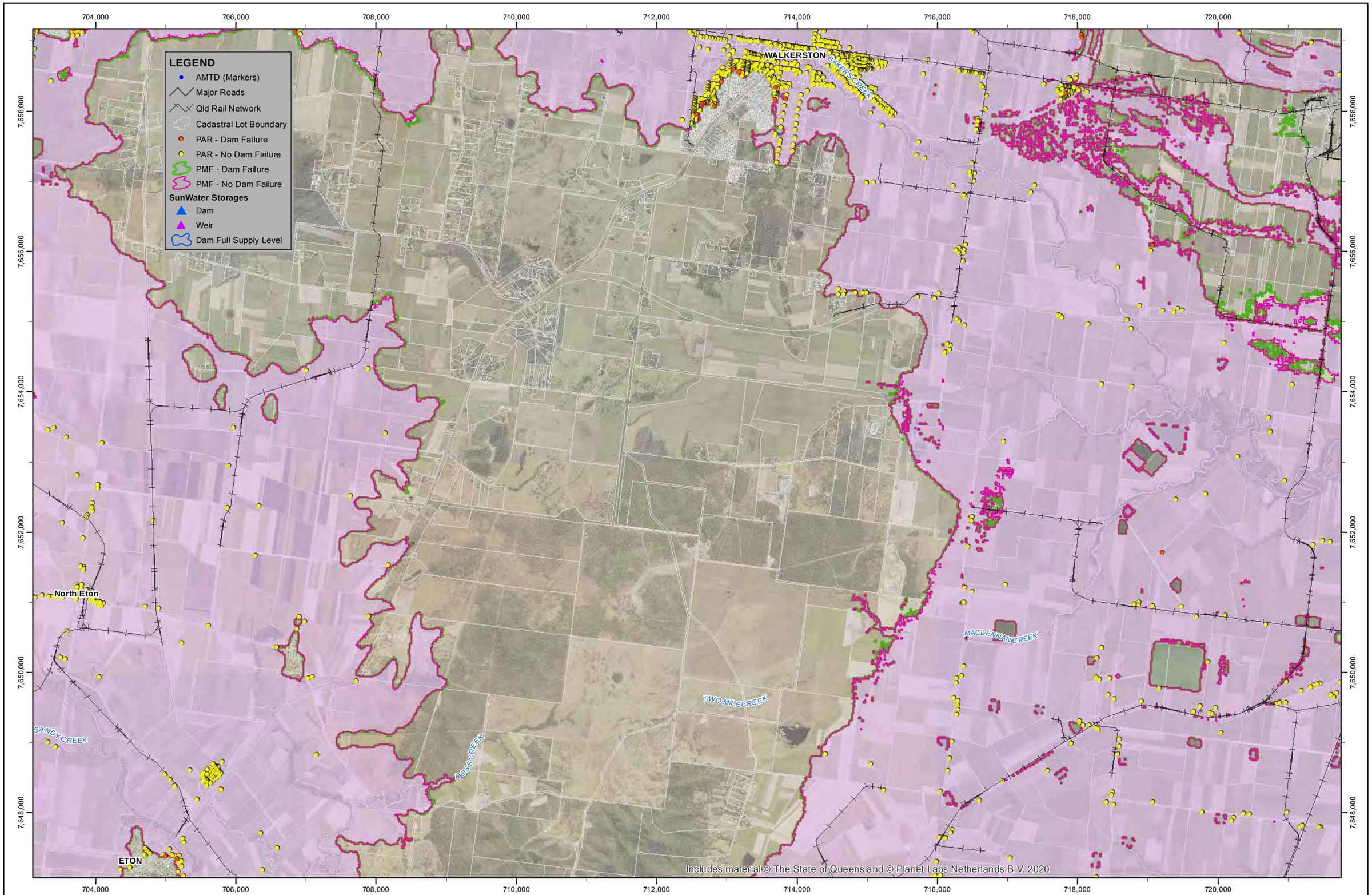
MAP PRODUCED BY:
WATER RESOURCES AND DAM SAFETY
TEL: (07) 3120 0000



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DATE		REMARKS	CKD	PSD	

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA20) Zone 55.

REFERENCE DRAWINGS
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SCALES (A3 SIZE)
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DRAWN	DESIGNED
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CHECKED	CHECKED
	LH

APPROVED
M.G. HUGHES
11/10/2023
RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
SADDLE DAM TWO
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
260302	A

SHEET 9 OF 12

DATE OCTOBER 2023

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

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South Mackay
Paget
BAKERS CREEK
Rosella
MCEWENS BEACH
SANDY CREEK

LEGEND
- AMTD (Markers)
- Major Roads
- Qld Rail Network
- Cadastral Lot Boundary
- PAR - Dam Failure
- PAR - No Dam Failure
- PMF - Dam Failure
- PMF - No Dam Failure

SunWater Storages
- Dam
- Weir
- Dam Full Supply Level

REVISION					
DATE		REMARKS	CKD	PSD	
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MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA20) Zone 55.

REFERENCE DRAWINGS
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APPROVED
M.G. HUGHES
11/10/2023
RPEQ: 18351

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TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
SADDLE DAM TWO
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
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SHEET 10 OF 12

DATE OCTOBER 2023

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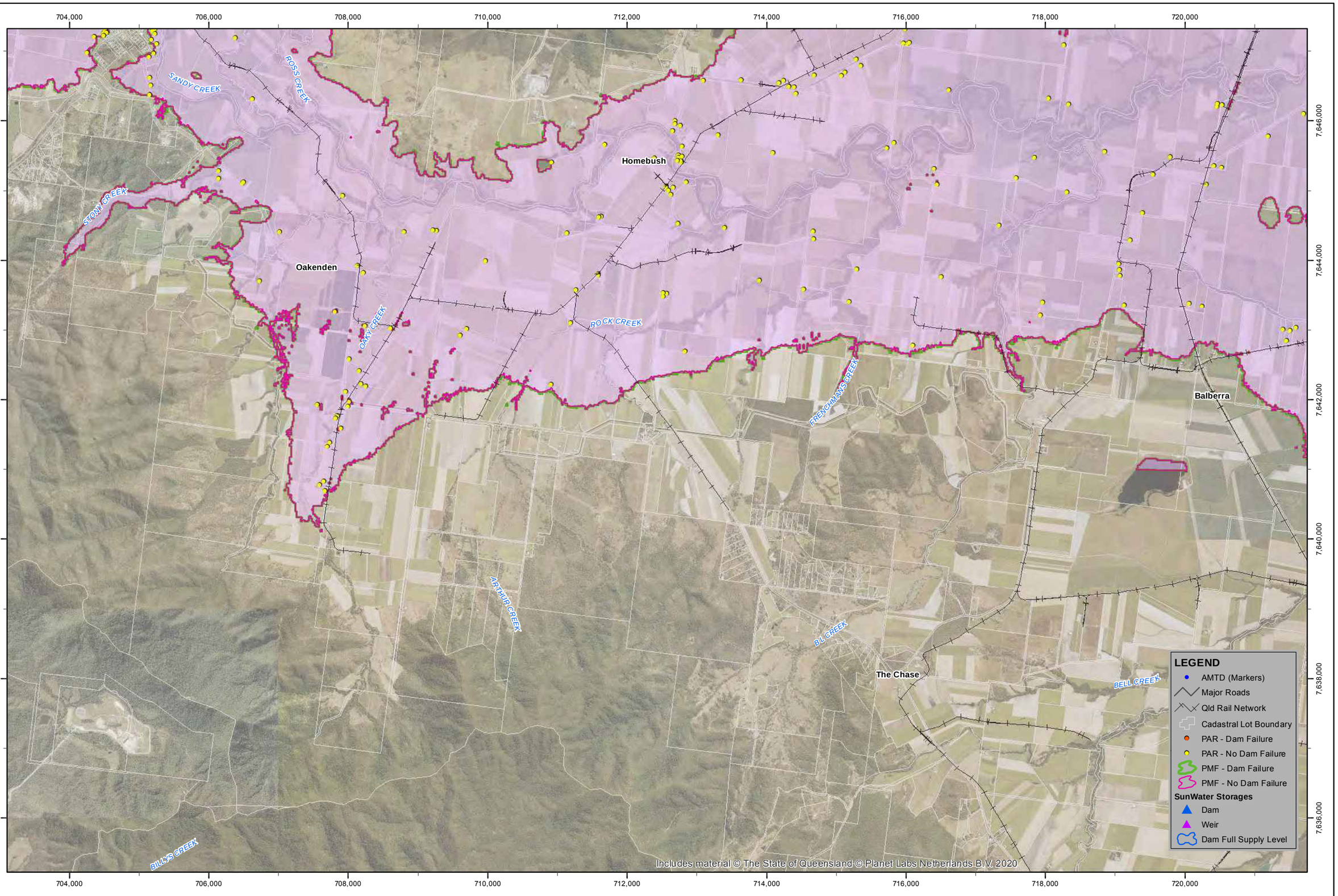
WATER RESOURCES AND DAM SAFETY
TEL: (07) 3120 0000



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DATE		REMARKS	CKD	PSD

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA20) Zone 55.

REFERENCE DRAWINGS
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SCALES (A3 SIZE)
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APPROVED
M.G. HUGHES
11/10/2023
RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
SADDLE DAM TWO
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
260302	A

SHEET 11 OF 12
DATE OCTOBER 2023

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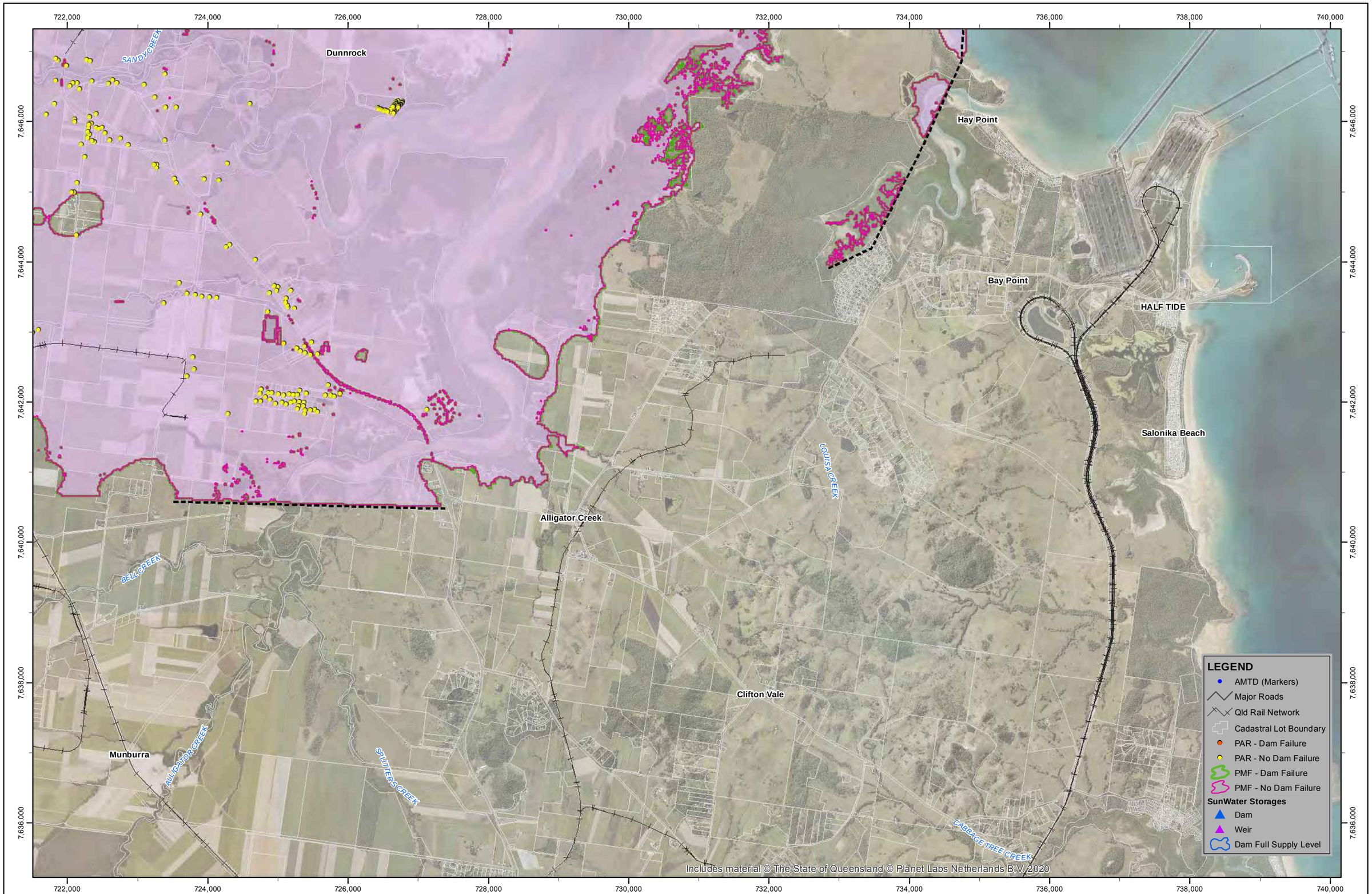
Map Produced By:
Water Resources and Dam Safety
Tel: (07) 3120 0000



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DATE		REMARKS	CKD	PSD	

MAP INFORMATION
Projected Coordinate System: Mapping Grid of Australia (MGA20) Zone 55.

REFERENCE DRAWINGS
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SCALES (A3 SIZE)
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APPROVED
M.G. HUGHES
11/10/2023
RPEQ: 18351

sunwater

TEEMBURRA DAM
DAM BREAK ANALYSIS 2022
PROBABLE MAXIMUM FLOOD
SADDLE DAM TWO
INUNDATION PLAN

CONTRACT NUMBER

DRAWING NUMBER	REV.
260302	A

SHEET 12 OF 12

DATE OCTOBER 2023

Appendix B4: Access routes during fair and adverse weather conditions

Emergency access route information

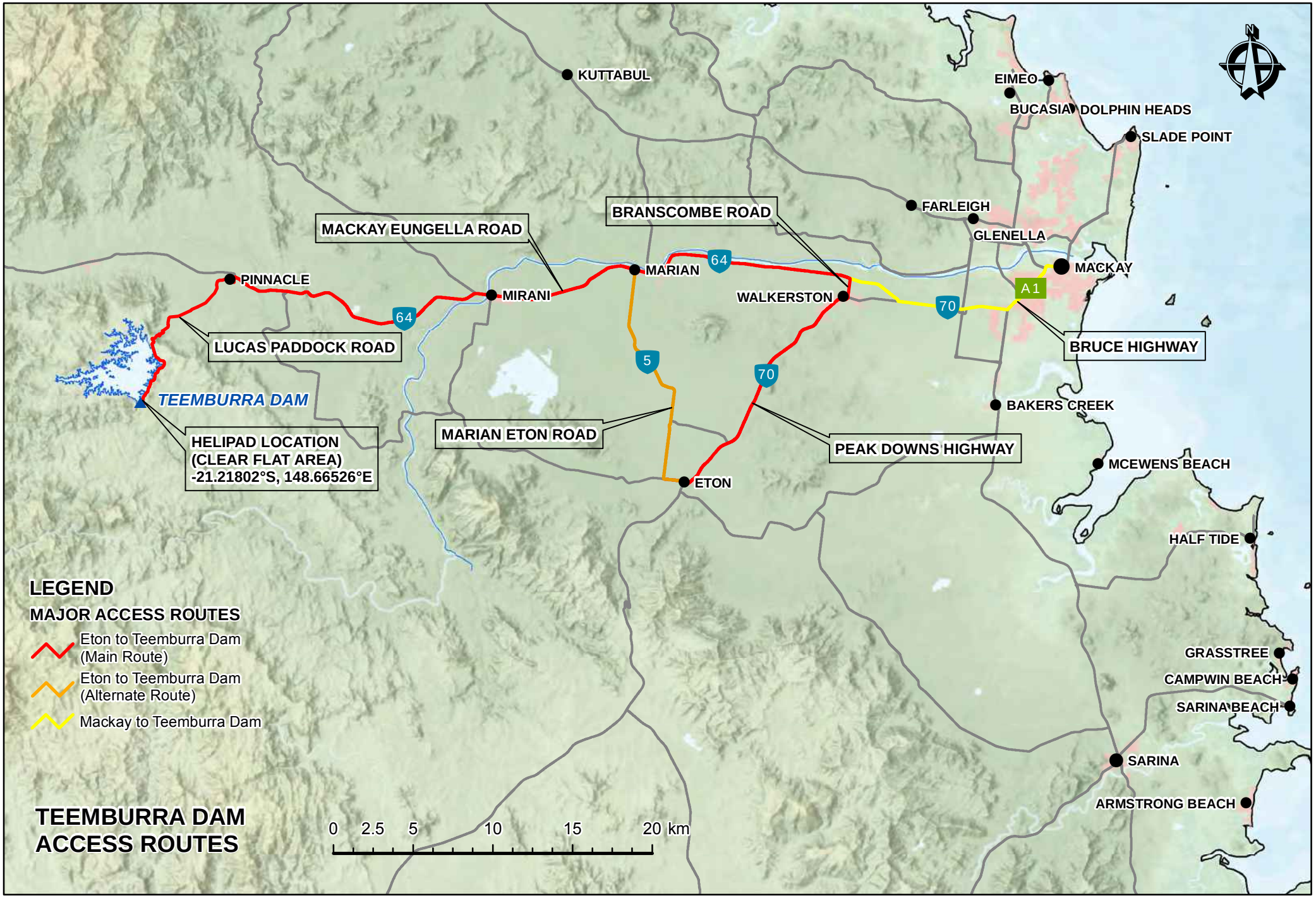
Access to Teemburra dam is by car from the Sunwater office at Kinchant dam.

From 687 Kinchant dam road, Kinchant dam, turn left onto Kinchant dam rd. Turn right onto Leichardt rd and continue for 9.4 km (note that this begins as a dirt road for 5.5km, and is suitable to travel when wet). Continue onto Mary street at Mirani. Turn left onto Augusta St. Turn left onto Mackay Eungella rd (route 64) and continue for 16.9 km. Turn left onto Pinnacle Septimus Rd. Turn right onto Pinnacle St, and continue along Lucas Paddock Rd for 6.7 km. Continue to Teemburra dam. Bitumen roads are signed with the speed limit.

During a flood event, the usual route to Teemburra dam by car is not accessible. The Sunwater office at Kinchant dam becomes inaccessible due to flood waters at two crossings: Currans crossing (located at Leichardt rd, near the golf course) and Antony's crossing (located at Kinchant dam rd, near North Eton Primary School). This means that the only access by car to the Teemburra dam is via the Mirani Diversion Chanel from Mirani Eton Rd, which may be hazardous when wet.

- **Distance:** Approx. 36 km from the Sunwater office at Kinchant dam (687 Kinchant dam road)
- **Travel Time:** Approx. 32 minutes when dry, or via alternate route when wet.
- **Road Type:** Bitumen, double-lane and dirt track. 4 x 4 access in very wet conditions (creek crossings).
- **Helipad Coordinates:** Latitude: -21.21802°, Longitude: 148.66526°. This is not a constructed helipad, and its location has been chosen because it is a large, flat, clear area with no power lines.

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



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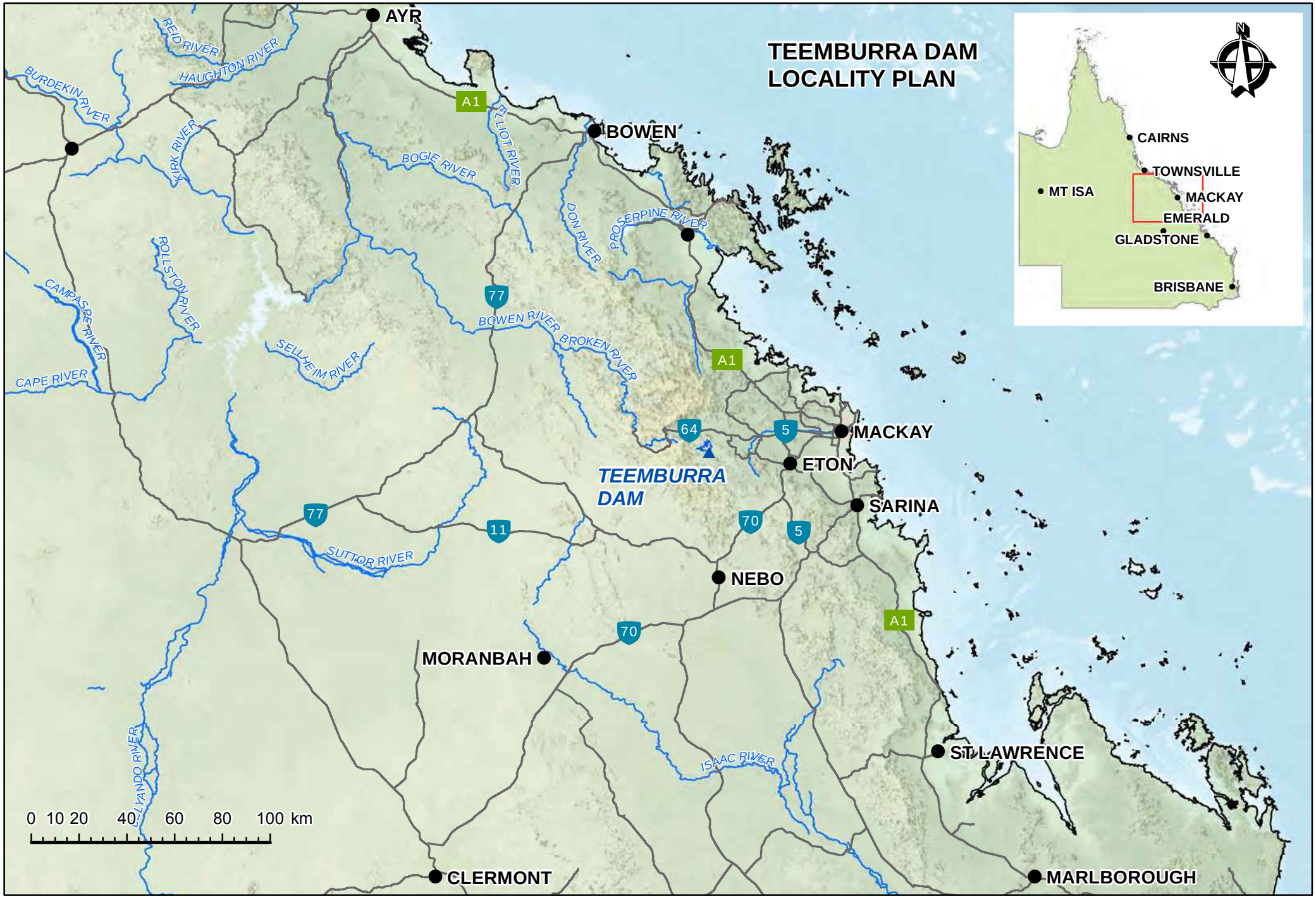

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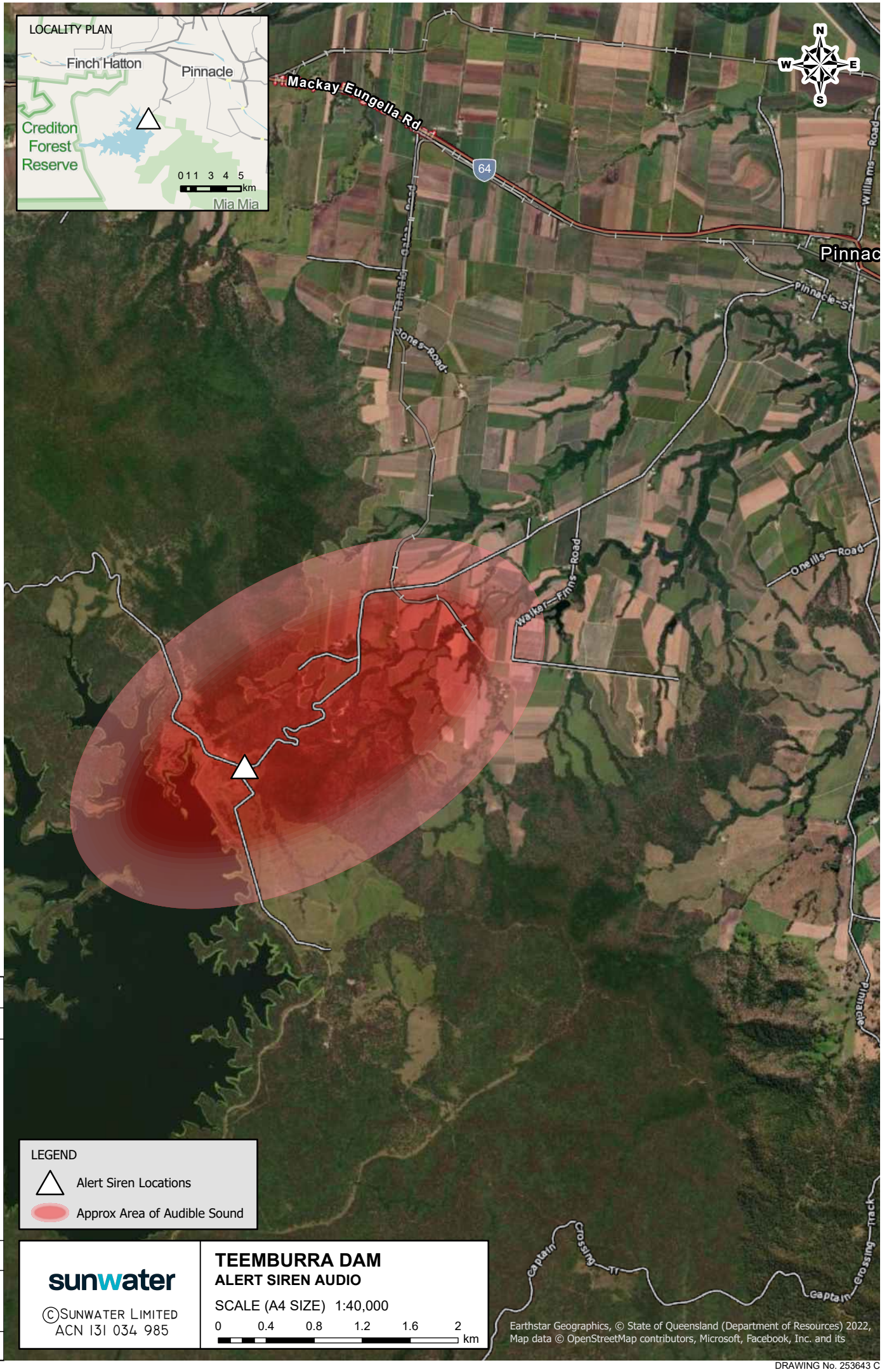

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					PSD

MAP PRODUCED BY:
SUNWATER LTD
TEL. (07)3120 0000

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Map Produced By:
SunWater Ltd
Tel: (07) 3120 0000

148°32'0"E 148°34'0"E 148°36'0"E 148°38'0"E 148°40'0"E 148°42'0"E

21°10'0"S 21°12'0"S 21°14'0"S

N W E S

MACKAY - EUNGELLA ROAD

FINCH HATTON

LUCAS PADDOCK ROAD

PINNACLE CREEK

CREDITON TBR

TEEMBURRA SADDLE DAM 2

TEEMBURRA SADDLE DAM 3

TEEMBURRA CK TM

TEEMBURRA SADDLE DAM 1

TEEMBURRA DAM AL

TEEMBURRA DAM HW TM

TEEMBURRA DAM

TEEMBURRA DAM TW TM

TEEMBURRA CREEK

CEDAR CREEK

TEEMBURRA CREEK

RIDGELANDS AL

LEGEND

- Rainfall Station
- Rainfall & River Station
- River Station
- Sunwater Gauging Station
- Sunwater Dam
- Sunwater Saddle Dam
- Town
- Major Watercourse
- Creek
- State Road (DTMR)
- Secondary Road

sunwater

TEEMBURRA DAM
TEEMBURRA CREEK CATCHMENT
CATCHMENT MAP

MAP INFORMATION
Coordinate System: Geocentric Datum of Australia (GDA94).

SCALES (A3 SIZE)
0 0.5 1 1.5 2 2.5 km 1:50,000

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

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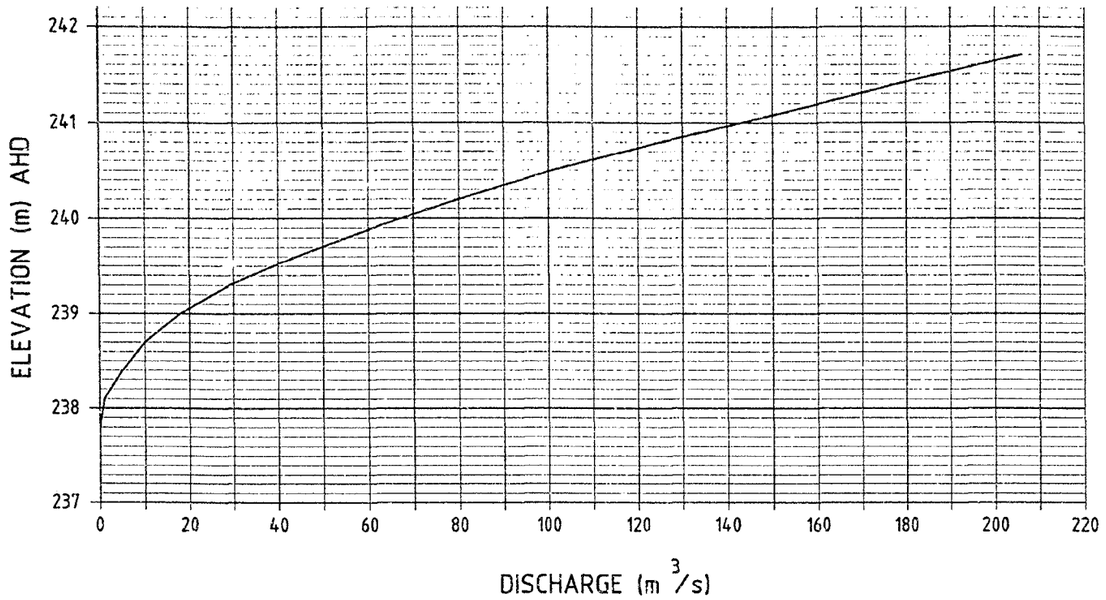
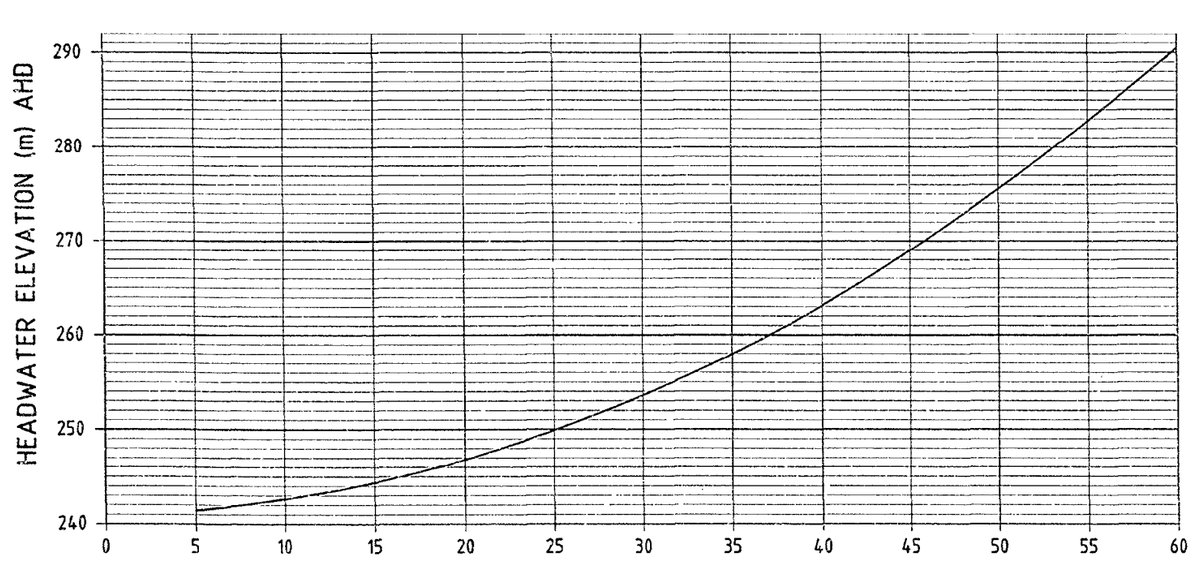
APPENDIX C: Equipment and technical information

Appendix C1 has been redacted



RATING CURVE FOR TEEMBURRA CREEK (AMTD 20.5km)

(GAUGING STATION 125014A)



RATING CURVE FOR O/D 1915 DIVERSION CONDUIT

NOT IN CONTRACT
FOR INFORMATION ONLY

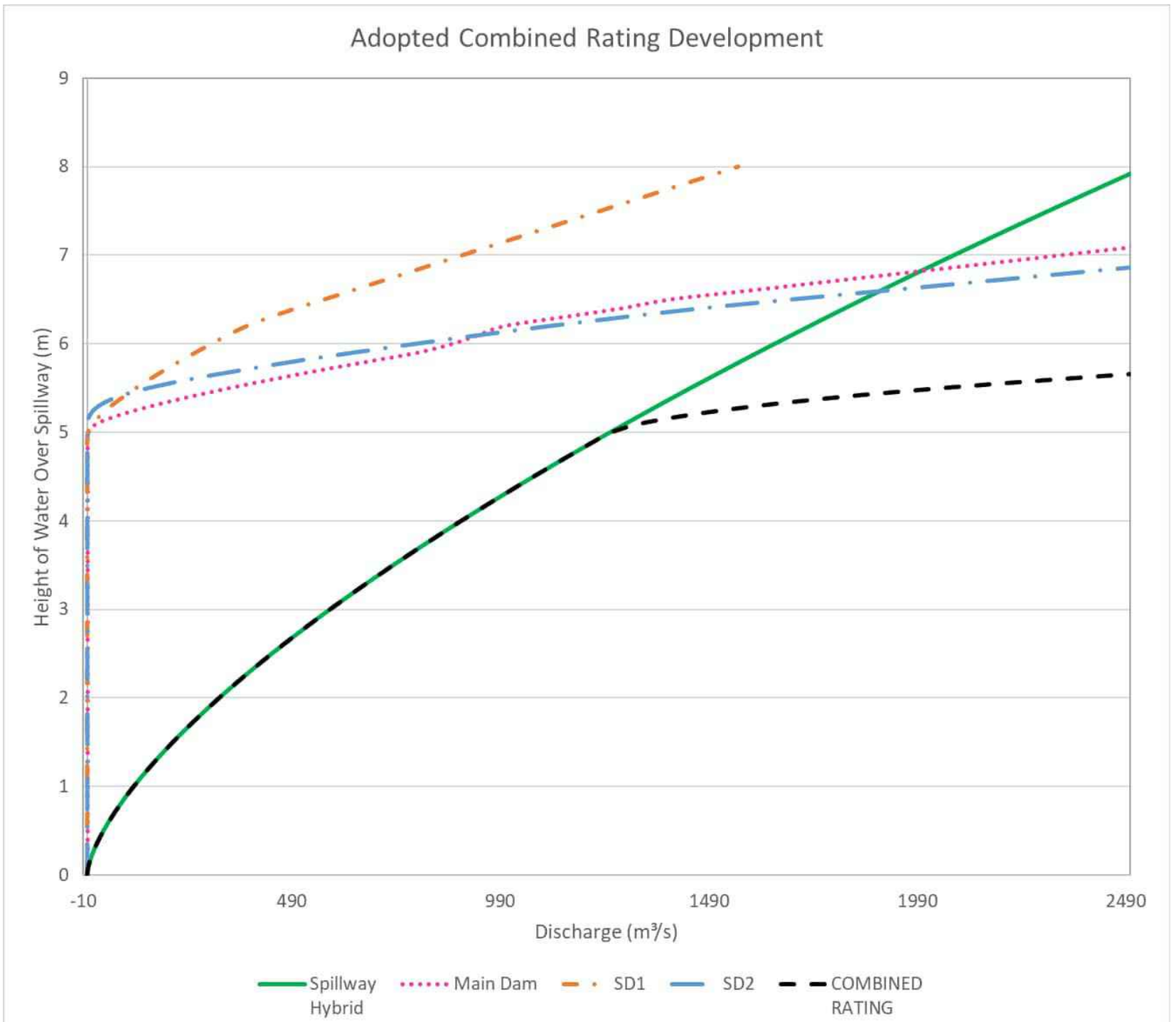
NOTES.

1. THE GAUGING STATION 125014A IS LOCATED APPROXIMATELY 400m DOWNSTREAM OF THE MAIN DAM AXIS.
2. THE RATING CURVE FOR THE DIVERSION CONDUIT DOSE NOT ALLOW FOR ANY TEMPORARY UPSTREAM EXTENSION DURING CONTRUCTION.

O:\TEEMBURR\W106080.DWG
22 Nov 1994 2.10 PM

REVISION DATE	REMARKS	CKD	PSD	REFERENCE DRAWINGS	SCALES	DRAFTING / RECOMMENDED	QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES WATER RESOURCES	TEEMBURRA DAM - MAIN DAM RATING CURVES	CONTRACT NUMBER 309/0012 DRAWING NUMBER A3-106080 DATE NOV 1994
						DR DGT CKD AN SUPV DESIGN PREP JR CKD SUPV APPROVED MANAGER CIVIL DESIGN				

DWG 106080.TIF



Headwater Elevation (mAHD)	Spillway	Saddle Dam 1	Saddle Dam 2	Main Embankment	Combined
Crest	290	294.9	295	295	
Width	60	220	740	350	
Source	CFD	TUFLOW	TUFLOW	TUFLOW	
290	-	-	-	-	-
290.5	40	-	-	-	40
291	112	-	-	-	112
291.5	206	-	-	-	206
292	317	-	-	-	317
292.5	444	-	-	-	444
293	583	-	-	-	583
293.5	735	-	-	-	735
294	898	-	-	-	898
294.5	1,071	-	-	-	1,071
294.7	1,143	-	-	-	1,143
295	1,254	3	-	0	1,258
295.3	1,369	58	29	157	1,613
295.5	1,447	118	148	342	2,056
296	1,649	299	790	876	3,614
296.5	1,859	569	1,690	1,399	5,517
297	2,078	899	2,814	2,336	8,128

SCALES (A4 SIZE)
NOT TO SCALE

NOTE:
- SOURCE REFERENCE - TEEMBURRA DAM DESIGN HYDROLOGY REPORT 2022 (HB DOC #2687669).

DRAWING PRODUCED BY:
SUNWATER LTD
TEL: (07) 3120 0000

S:\BW_WaterResources\projects\SW_Pioneer River WSS\Teemburra Dam _ Spillway Rating Curve\Drawings\AutoCAD\260300-A.dwg
10 Oct 2023 1:43 PM

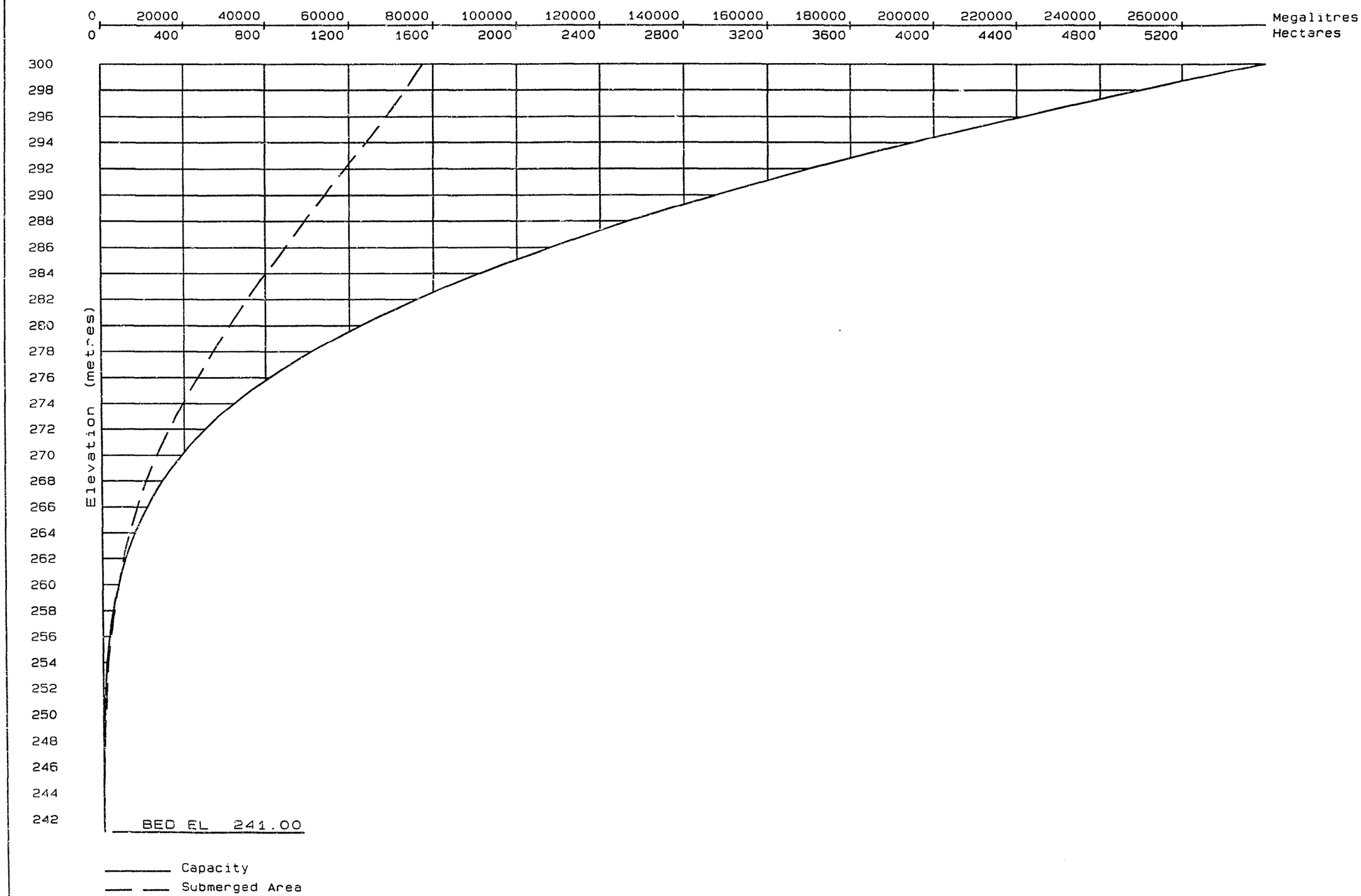
REVISION	DATE	REMARKS	CKD	
A	13/10/23	ISSUED FOR USE		LH

DRAWN RB | DESIGNED
CHECKED | CHECKED LH
APPROVED
L. HUGHES
RPEQ 29259

sunwater

TEEMBURRA DAM
SPILLWAY, SADDLE DAMS 1 & 2
DISCHARGE RATING CURVES

CONTRACT NUMBER
DRAWING NUMBER 260300
REV. A
SHEET 1 OF 1
DATE OCT 2023



Level Datum: AHD PM54929 EL 83.227 m AHD [At Pinnacle]
Computed using photogrammetric DTM produced in 1994 from 1993 photography
Survey Records : F25650,FD25584 & 93,FD25540
FSL EL 290.00 m AHD [1082 ha ; 147,556 ML]
River outlet EL 241.5 m , Normal operating level EL 265.0 m
Storage Curve based on Total Volume
Catchment area : 67 sq km
Latitude : 21 13 14 Longitude : 148 39 47

NATURAL RESOURCES

TEEMBURRA CREEK - BASIN 125
TEEMBURRA DAM - AMTD 20.5 Km
TOTAL STORAGE

STORAGE CURVE

A3-203284

29/07/96

203284 (TIF)

EL (M)	AREA (HA)	VOLUME (ML)	
		TOTAL	COMM
300.00	1551	279784	
299.50	1530	272096	
299.00	1509	264513	
298.50	1488	257034	
298.00	1466	249662	
297.50	1445	242397	
297.00	1423	235240	
296.50	1400	228194	
296.00	1377	221262	
295.50	1354	214447	
295.00	1330	207750	
294.50	1306	201172	
294.00	1281	194715	
293.50	1257	188381	
293.00	1231	182171	
292.50	1206	176087	
292.00	1180	170133	
291.50	1155	164307	
291.00	1130	158605	
290.50	1107	153022	
290.00	1083	147557	
289.50	1059	142210	
289.00	1035	136981	
288.50	1011	131872	
288.00	988	126881	
287.50	965	122007	
287.00	941	117250	
286.50	918	112610	
286.00	896	108083	
285.50	873	103668	
285.00	850	99367	
284.50	826	95184	
284.00	802	91121	
283.50	778	87177	
283.00	756	83348	
282.50	734	79629	
282.00	712	76021	
281.50	690	72522	
281.00	668	69134	
280.50	646	65855	
280.00	625	62684	
279.50	604	59617	
279.00	585	56650	
278.50	565	53781	
278.00	545	51011	
277.50	525	48340	
277.00	506	45768	
276.50	485	43293	
276.00	467	40914	
275.50	448	38629	

EL (M)	AREA (HA)	VOLUME (ML)	
		TOTAL	COMM
275.00	429	36440	
274.50	411	34343	
274.00	394	32335	
273.50	377	30414	
273.00	359	28580	
272.50	343	26830	
272.00	326	25162	
271.50	310	23574	
271.00	295	22065	
270.50	279	20634	
270.00	264	19283	
269.50	250	18001	
269.00	236	16787	
268.50	223	15643	
268.00	211	14562	
267.50	199	13541	
267.00	188	12576	
266.50	178	11664	
266.00	168	10803	
265.50	159	9989	
265.00	149	9222	
264.50	140	8500	
264.00	131	7825	
263.50	123	7192	
263.00	115	6601	
262.50	107	6049	
262.00	100	5533	
261.50	94	5051	
261.00	87	4601	
260.50	82	4180	
260.00	76	3787	
259.50	71	3422	
259.00	66	3083	
258.50	60	2770	
258.00	55	2483	
257.50	51	2220	
257.00	47	1978	
256.50	42	1759	
256.00	38	1561	
255.50	34	1382	
255.00	31	1223	
254.50	27	1080	
254.00	24	953	
253.50	22	840	
253.00	20	738	
252.50	18	645	
252.00	17	560	
251.50	15	481	
251.00	14	408	
250.50	13	343	

EL (M)	AREA (HA)	VOLUME (ML)	
		TOTAL	COMM
250.00	11	287	
249.50	9	238	
249.00	8	196	
248.50	7	159	
248.00	6	127	
247.50	5	101	
247.00	4	80	
246.50	3	64	
246.00	3	51	
245.50	2	40	
245.00	2	30	
244.50	2	21	
244.00	1	14	
243.50	1	8	
243.00	1	4	
242.50	0	2	
242.00	0	1	
241.50	0	0	
241.00	0	0	

Level Datum: AHD PM54929 EL 83.227 m AHD [At Pinnacle]
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NATURAL RESOURCES

TEEMBURRA CREEK - BASIN 125
TEEMBURRA DAM - AMTD 20.5 Km
TOTAL STORAGE

STORAGE DATA

A3-203285

29/07/96

203285 (TIF)

APPENDIX D: INTERACTION WITH LOCAL GOVERNMENT AND DISTRICT GROUPS

Appendix D has been redacted

Annexe — Teemburra Dam SMS Messages

	Advice Stay informed 	**Watch and Act** Prepare to leave 	**Emergency** Leave immediately To be issued in consultation with council 
SMS	FLOOD WATCH AND ACT from Sunwater. Excess water spilling from Teemburra Dam into Teemburra Creek has increased significantly. Water flows from Teemburra Dam may contribute to dangerous/widespread flooding downstream. Expect increased flows in 6-12 hours / later today/ overnight/ tomorrow. People downstream of Teemburra Dam must PREPARE TO LEAVE in case the flood gets worse. Call Triple Zero (000) if your life is in danger. Call the SES on 132500 for flood help. More information here: bit.ly/RecandSafety	FLOOD EMERGENCY WARNING from Sunwater: People downstream of Teemburra Dam including Pinnacle and Gargett must LEAVE IMMEDIATELY. Teemburra Dam possible failure. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. More information here: Mackay Regional Council disaster.mackay.qld.gov.au/ and Whitsunday Regional Council disaster.whitsundayrc.qld.gov.au/	FLOOD EMERGENCY WARNING from Sunwater: People downstream of Teemburra Dam including Pinnacle and Gargett must LEAVE IMMEDIATELY. Teemburra Dam is failing. Major flooding is happening now. Your life is at risk. Go now to a safe place away from the flood. Get more information and what you should do at Mackay Regional Council disaster.mackay.qld.gov.au/ and Whitsunday Regional Council disaster.whitsundayrc.qld.gov.au/