cleanco queensland

Emergency Action Plan
Swanbank Cooling Water Dam

November 2023

Approved by the delegate of the Chief Executive, Department of Regional Development, Manufacturing and Water until 1 September 2027.

Emergency Action Plan – Swanbank Cooling Water Dam

Issue: 5.0– November 2023 Expiry Date:

Prepared by CleanCo

Controlled Copy No.

Gated: No	Manned: Yes

Type: Homogenous earthfill embankment with toe drain, and concrete uncontrolled ogee crest with concrete spillway discharge channel

Location: Lat. -27.655833º -27 º 39’ 21” S
Long 152.811111 º 152 º 48’ 40” E

CLEANCO QUEENSLAND LIMITED. ACN 628 008 159

Emergency activation quick reference – Dam Hazards

The Emergency Action Plan (EAP) for Swanbank Cooling Water Dam covers dam hazards evaluated within CleanCo's Dam Safety Management System. Use the following table to select the relevant section referenced with the dam hazard. Note: The Incident Coordinator (IC) is responsible for activating the EAP unless directed by Dam Safety Technical Decision Maker (DSTDM). If IC unavailable, Owner's Regional Representative (ORR) or Dam Duty Officer (DDO) is responsible.

Dam hazard	Alert levels					
		Lean Forward	Stand Up 1	Stand Up 2	Stand Up 3	Stand Down
Dam hazard – Flood Operations See Section 5						Lake level dropping to FSL
Dam hazard – Piping / Increased leakage through embankment, or embankment instability See Section 6	Unexpected increased leakage through the embankment, foundations or abutments or new areas	• Unexpected increased leakage through the embankment, foundations or abutments with cloudy water, OR • Unexpected cloudy water in A Weir or spillway	Piping condition has been established	• Failure in progress or likely due to piping • Sufficient water in storage to create a dam hazard	N/a	Risk assessment has established risk has reduced
Dam hazard – Distress in embankment due to embankment instability issues (non-piping) See Section 7	Initial signs of embankment distress such as cracks or scarps near the crest and/or bulges at the toe, OR Scour of spillway	Deformation or scour continuing and erosion/deformation becoming significant to the point where stability may be impacted	Loads on embankment increasing or cracking deformation/increasing to state where safety of the dam is significantly impaired	• Failure in progress • Sufficient water in storage to create a dam hazard	N/a	Risk assessment has established risk has reduced
Dam hazard – Earthquake See Section 8	Earthquake reported or felt in the area, AND Intensity less than 5 MM		Earthquake reported or felt in the area, AND A possible failure path has been identified	Failure in progress or likely due to earthquake, AND Sufficient water in storage to create dam hazard	N/a	Risk assessment has established risk has reduced.

Dam hazard	Alert levels					
		Lean Forward	Stand Up 1	Stand Up 2	Stand Up 3	Stand Down
Terrorism **See Section 9**					storage to create dam hazard	Risk assessment has established risk has reduced.

Contents

List of Figures

List of Tables

Document Control

Authorisation of document

Name	Position/role	Signature	Date
	Site Manager Swanbank Power Station ORR		8/12/2023
	Dam Safety Engineer DSTDM		8/12/2023
	General Manager Asset Operations OHOR		8/12/2023

Document revision history

REVISION STATUS:

REVISION	REVISION DESCRIPTION	REVISION DATE
1	Initial Issue	17/01/2018
2	CleanCo Update	21/10/2019
3	Minor updates	09/10/2020
3.1	Minor updates	09/2022
4.0	Updated in accordance with Emergency Action Plan for Referable Dam Guideline (DRDMW, June 2021)	14/02/2023
4.1	Updated as part of annual review AWS icons added	29/09/2023
5.0	Substantive amendment - Hazards and triggers updated to reflect 2023 CRA.	29/10/2023

Controlled document distribution list

Copy Number	Position	Location
1	Site Manager	Swanbank Power Station
2	Maintenance Superintendent	Swanbank Power Station
3	Swanbank Cooling Water Dam Copy	Swanbank E Station Control Room
4	Civil Engineer (DSTDM)	CleanCo, Brisbane office
5	Corporate Communications	CleanCo, Brisbane office
6	Physical Trading Desk	CleanCo, Brisbane office
7	District Disaster Coordinator – Ipswich District Disaster Management Group (DDMG)	Executive Officer Ipswich DDMG Yamanto Police Station PO Box 382 Ipswich QLD 4305
9	Officer In Charge	Yamanto Police Station
11	Local Disaster Coordinator City of Ipswich Local Disaster Management Group	Ipswich City Council 1 Nicholas Street, Ipswich

1. References, abbreviations and definitions

1.1. References/associated documents

Ref.	Document Title	Reference/location
A		https://www.legislation.qld.gov.au/view/whole/pdf/inforce/current/act-2008-034
B	Queensland Disaster Management Act 2003	https://www.legislation.qld.gov.au/view/pdf/inforce/current/act-2003-091
C	Queensland Disaster Management Guidelines	http://www.disaster.qld.gov.au
D	Guidelines on Selection of Acceptable Flood Capacity for Dams (ANCOLD, 2000)	https://www.ancold.org.au/
E	Queensland Dam Safety Management Guidelines (DRDMW 2020)	https://www.resources.qld.gov.au/__data/assets/pdf_file/0007/78838/dam-safety-management.pdf
F	Australian Rainfall and Runoff (ARR) 2016	http://book.arr.org.au.s3-website-ap-southeast-2.amazonaws.com/
G	Emergency action plan for referable dam guideline (DRDMW 2021)	https://www.resources.qld.gov.au/__data/assets/pdf_file/0018/84015/eap-guideline.pdf
H	Queensland State Disaster Management Plan 2016 (Queensland's Disaster Management Arrangements)	https://www.disaster.qld.gov.au/cdmp/Documents/Queensland-State-Disaster-Management-Plan.pdf
I	City of Ipswich Local Disaster Management Plan	https://www.ipswich.qld.gov.au/disasterplans
J	Queensland Government arrangements for coordinating public information in a crisis	https://www.disaster.qld.gov.au/dmg/st/Documents/H1159-Public-Information-Crisis-Communication-Document.pdf
K	Professional Engineers Act 2002 (RPEQ)	https://www.legislation.qld.gov.au/view/pdf/inforce/2013-09-23/act-2002-054
L	Guidelines for the Development of Communication Education, Awareness and Engagement Programs (Australian Institute for Disaster Resilience 2002)	https://knowledge.aidr.org.au/media/1970/manual-45-guidelines-for-the-development-of-communication-education-awareness-and-engagement-programs.pdf
M	Queensland Emergency Alert Manual – M.1.174	https://www.disaster.qld.gov.au/dmg/st/Documents/M1174-Queensland-Emergency-Alert-Manual.pdf
N	CleanCo (Internal) Crisis Management Plan	CleanCo Crisis Management Plan
O	CleanCo (Internal) Business Continuity Plans	Under development
P	CleanCo (Internal) Swanbank Cooling Water Dam Safety Condition Schedule	SafetyCond
Q	CleanCo (Internal) Swanbank Cooling Water Dam Failure Impact Assessment Nov 2020	FIA
R	Swanbank Cooling Water Dam O&M Manual	

Ref.	Document Title	Reference/location
S		ANCOLD ISBN: 0-731027620
T	Guidelines on Consequence Categories for Dams (ANCOLD 2012)	ANCOLD ISBN: 978-0-9808192-5-0
U	Guideline for Failure Impact Assessment of Water Dams (DNRME 2018)	https://www.dews.qld.gov.au/__data/assets/pdf_file/0005/78836/guidelines-failure-impact-assessment.pdf
V	Emergency Response Guide – Swanbank Power Station	https://cleancoqueensland.sharepoint.com/sites/docs-sb/_layouts/15/DocIdRedir.aspx?ID=CCQSBK-1247369340-2360
W	Water Act	https://www.legislation.qld.gov.au/view/pdf/2017-07-03/act-2000-034

1.2. Abbreviations and acronyms

Acronym	Definition
AEP	Annual exceedance probability
AHD	Australian height datum
AMTD	Adopted Mean Thread Distance
ANCOLD	Australian National Committee on Large Dams
AWS	Australian Warning System
BGA	Blue green algae
BOM	Bureau of Meteorology
CCQ	CleanCo Queensland
CEO	Chief Executive Officer (CleanCo)
CRA	Comprehensive risk assessment
CSTN	Counter Security & Terrorism Network
D/S or d/s	Downstream
DCF	Dam crest flood
DCL	Dam crest level
DDC	District Disaster Coordinator
DDMG	District Disaster Management Group (Ipswich DDMG for the purposes of this EAP)
DDMP	District disaster management plan
DDO	Dam Duty Officer (CleanCo)
DRDMW	Department of Regional Development, Manufacturing and Water
DSE	Dam Safety Engineer (CleanCo)
DSR	Dam safety regulator
DSSP	Dam Safety Services Provider
DSTDM	Dam safety technical decision maker
EA	Emergency Alert
EAP	Emergency Action Plan
EER	Emergency event report
EL	Elevation level
FCL	Fixed crest level
FSL	Full supply level
GMAO	General Manager Asset Operations (CleanCo)
IC	Incident controller
ICC	Ipswich City Council
IFCC	Incremental flood consequence category
IGEM	Inspector-General Emergency Management
LB	Left bank
LDMG	Local disaster management group. For the purposes of this EAP, the LDMG refers to the City of Ipswich LDMG.
LDMP	Local disaster management plan
MSSPS	Maintenance & Site Superintendent Swanbank Power Station
MM	Modified Mercalli
OB	Observation bore
OCO	On call officer Swanbank Power Station
OHOR	Owners Head Office Representative
ORR	Owners regional representative
PAM	Portfolio Asset Manager (CleanCo)

Acronym	Definition
PAR	Population at risk
PFRM	Predictive flood routing model
PLL	Probable loss of life
PMF	Probable maximum flood
PMP	Probable maximum precipitation
PMPDF	Probable maximum precipitation design flood
PTD	Physical trading desk
QDMC	Queensland Disaster Management Committee
QFES	Queensland Fire & Emergency Services
QPS	Queensland Police Service
RB	Right bank
RL	Reduced level
RPEQ	Registered Professional Engineer of Queensland
SCTN	Security & Counter Terrorism Network
SDCC	State Disaster Coordination Centre
SDCG	State Disaster Coordination Group
SDF	Sunny day failure
SES	State Emergency Service
SMSPS	Site Manager Swanbank Power Station
SMS	Short message service
SO	Standby officer
SOP	Standing operating procedure
SWL	Storage water level
U/S or u/s	Upstream
WHS	Workplace health and safety
WQ	Water quality

1.3. Business terms and definitions

Term	Definition
Terms set out in section 352A of the Water Supply (Safety and Reliability) Act 2008 (Qld) (Ref A)	
Dam Hazard	
Dam hazard event	
Disaster Management Plan (DDMP or LDMP)	
District Group (DDMG)	
Emergency event	
Local Group (LDMG)	
Notice Response	A dam owner's written response to a notice following an assessment of an EAP by a local government or district group.

Term	Definition
Referable Dam	A dam, or a proposed dam after its construction, will be a referable dam if: • a failure impact assessment of the dam, or the proposed dam, is carried out under the Act, AND • the assessment states the dam has, or the proposed dam after its construction will have, a category 1 or category 2 failure impact rating, AND • the chief executive has, under section 349 of the Act, accepted the assessment. Also, a dam is a referable dam if: • under section 342B of the Act, the owner of a dam is given a referable dam notice and, before the effective day for the notice, does not give the chief executive a failure impact assessment for the dam, AND • the chief executive has not, under section 349 of the Act, accepted a failure impact assessment of the dam Swanbank Cooling Water Dam is a referable dam
Relevant Entity	Means each of the following under the EAP for the dam: • the persons who may be affected, or whose property may be affected, if a dam hazard event or emergency event were to happen for the dam, e.g. the owners of parcels of farm land adjacent to the dam or residents of a township • local group and district group for the EAP • local government whose local government area may be affected if a dam hazard event or emergency event were to happen • the chief executive • another entity the owner of the dam considers appropriate, e.g. the Queensland Police Service.
Terms consistent with Queensland Disaster Management Guidelines (reference C)	
Activation levels	The four levels of EAP activation are: • Alert: A heightened level of vigilance due to the possibility of an event occurring. No further action may be required; however, the situation should be monitored by someone capable of assessing the potential of the threat. Moving to an Alert level indicates the dam owner is getting ready to activate the Lean Forward level of the EAP if the situation deteriorates. • Lean Forward: An operational state characterised by a heightened level of situational awareness of an impending disaster event and a state of operational readiness. Disaster coordination centres are on standby and prepared but not activated. • Stand Up: The operational state where resources are mobilised, personnel are activated, and operational activities commenced. Disaster coordination centres are activated. The dam owner needs to provide an Emergency Event Report (EER) in accordance with the provision of the 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.
Other Terms	

Term	Definition
Dam Crest (reference D)	
Dam crest flood (reference D)	The flood event that results in a peak water level equivalent to the dam crest.
Dam Failure	Dam failure is the physical collapse of all or part of a dam or the sudden, rapid, and unintended release of impounded water.
Downstream releases	
Earthquake	
Flood Release	
Piping	
Plane strike or other impact	
Probable maximum flood (PMF) (reference E)	
Probable maximum precipitation design flood (PMPDF) (reference F)	The flood resulting from the probable maximum precipitation coupled with typical catchment conditions.
Stability, dam embankments	
Stability, spillway	
'Sunny day' failure (SDF)	A failure that occurs at the FSL and there is no concurrent rain associated flooding.
Terrorist activity	A deliberate attempt to damage, fail or contaminate a dam.

Terms used with notifications;

Term	Definition
Advise	To give advice or recommend particular actions or to give information.
Notify	To inform (someone) or to give or impart knowledge of a fact or circumstance.
Warn	To give a warning or to give notice, advice, or intimation to (a person, group, etc.) of danger.

1.4. Activation Levels

This EAP is activated using an escalation model based on the following levels:

The four levels of EAP activation are:

Alert	A heightened level of vigilance due to the possibility of an event occurring. No further action may be required; however, the situation should be monitored by someone capable of assessing the potential of the threat. Moving to an Alert level indicates the dam owner is getting ready to activate the Lean Forward level of the EAP if the situation deteriorates.
Lean Forward	An operational state characterised by a heightened level of situational awareness of an impending disaster event and a state of operational readiness.
Stand Up	The operational state where resources are mobilised, personnel are activated, and operational activities commenced.
Stand Down	Transition from responding to an event back to normal core business and/or continuance of recovery operations. There is no longer a requirement to respond to the event and the threat is no longer present.

The triggering of one of these levels of activation may not necessarily mean a similar activation of Disaster Management Groups.

1.5. Bureau of Meteorology Flood Level Classifications

Minor Flooding	This causes inconvenience such as closing of minor roads and the submergence of low-level bridges and makes the removal of pumps located adjacent to the river necessary.
Moderate Flooding	This causes the inundation of low-lying areas requiring the removal of stock and/or the evacuation of some houses. Main traffic bridges may be closed by flood waters.
Major Flooding	This causes inundation of large areas, isolating towns and cities. Major disruptions occur to road and rail links. Evacuation of many houses and business premises may be required. In rural areas widespread flooding of farmland is likely

2. Introduction

2.1. Context

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

This EAP has been prepared in accordance with Chapter 4 of the Act and references G, H & I. The content requirements for EAPs are contained in section 352H of the Act.

Summary of legal requirements – Section 352H

Section 352H(1) of the Act requires that the EAP must identify each dam hazard for the dam; and for each of these dam hazard types (e.g., flood operations, or chemical spill/toxic conditions):

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

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

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

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

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

The local governments whose areas may be affected by a dam hazard for Swanbank Cooling Water Dam, has been determined as **Ipswich City Council** (ICC). CleanCo has provided ICC with a copy of the draft EAP for assessment.

Section 352HC of the Act states that a district group may review the EAP for consistency with its disaster management plan. The district group for Swanbank Cooling Water Dam are **Ipswich** DDMG. CleanCo has provided the DDMG with a copy of the draft EAP for review**.**

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

2.2. Purpose

The purpose of this EAP is:

- to 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 Swanbank Cooling Water 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 Swanbank Cooling Water Dam at the one time. In such a circumstance, it may be necessary to act on the procedures within separate sections simultaneously.

The focus of this EAP is the management of dam hazards at Swanbank Cooling Water Dam by the owner of the dam (CleanCo) and the communication and notification of dam hazards to the LDMGs, DDMGs and broader community. However, the EAP sits within the broader emergency response framework. This EAP has been developed to be consistent with the relevant (Ipswich) Local Disaster Management Plans.

2.3. Scope

The Swanbank Cooling Water Dam EAP covers:

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

- roles and responsibilities in responding to a dam hazard event or emergency event
- notification, warning, and communication protocols
- inspection, monitoring, and reporting protocols during emergencies
- other relevant information that may assist with identifying the area affected by a dam hazard event or emergency event, and the management of such

2.4. Hazards

CleanCo completed a comprehensive risk assessment for the Swanbank Cooling Water Dam in August 2023. The findings of that assessment have been used to confirm the hazards covered by this EAP and define critical trigger levels. Twelve potential failure modes were assessed in some details. These can be grouped into five broad failure modes summarised in Table 1 below:

Table 1: Broad Failure Modes

Broad Failure mode	Initiating event	Annual Probability of Failure (Lower Bound)	Contribution to total risk
Piping through upper embankment	Crack induced piping	$5.0*10^{-4}$	18%
Piping through lower embankment	Crack induced piping	$9.2*10^{-7}$	0%
Piping through foundation	Piping/back erosion along sand layer	$6.1*10^{-4}$	21%
Piping along or into low level outlet	Piping	$8.5*10^{-4}$	30%
Spillway Failure	Flood induced	$9.0*10^{-4}$	31%
Total		$2.9*10^{-3}$	100%

A number of critical levels for Swanbank CWD have been identified (

Table 2) for the potential failure modes from the flood frequency curve (Figure 1) and failure analysis for the spillway (Figure 2).

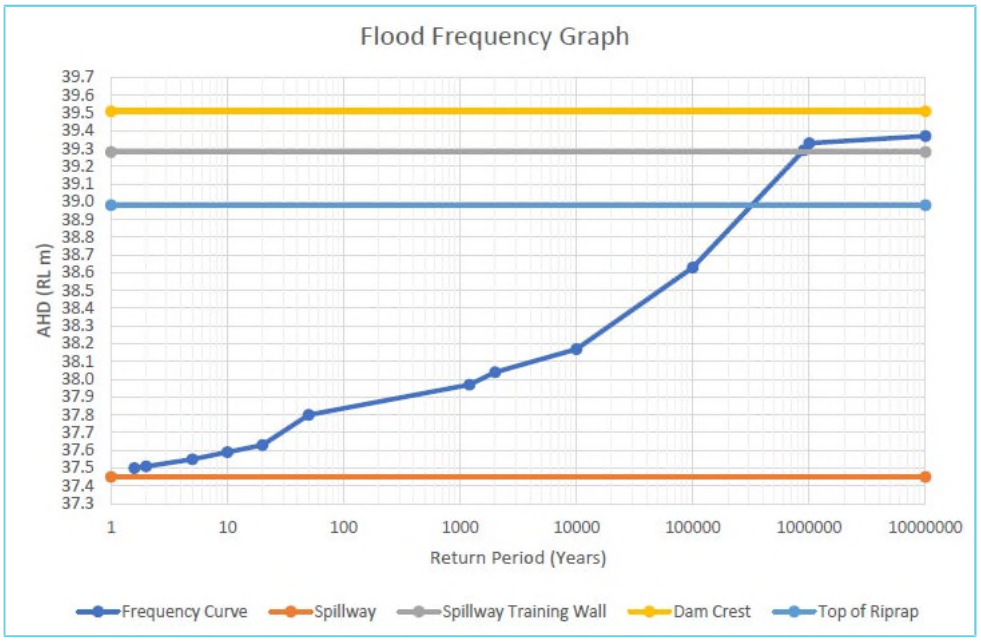


Figure 1: Flood Frequency Curve

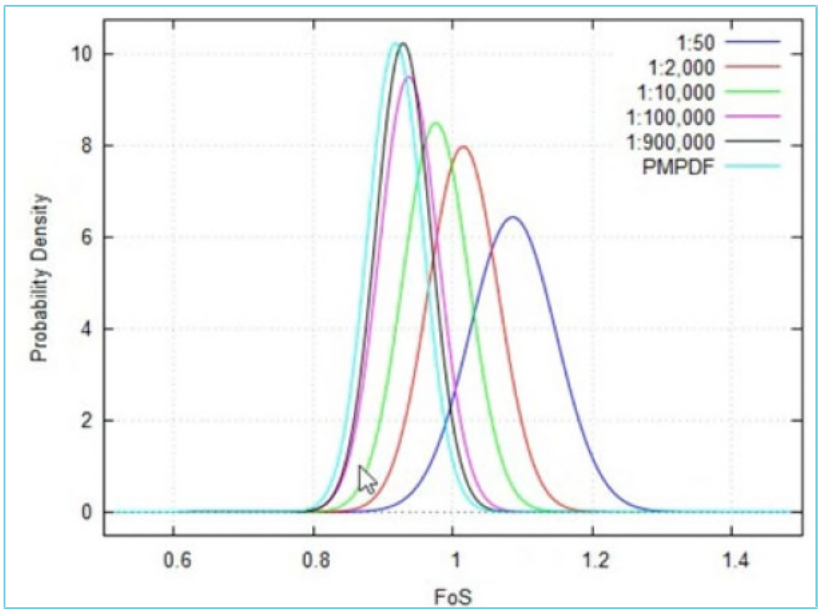


Figure 2: Spillway Slab Factor of Safety Probability Function

Table 2: Critical Levels for Swanbank CWD

Level (mAHD)	AEP	Issue	Indicative Trigger (flood)
37.45m	1 in 2	FSL	Normal Operation
37.6m	1 in 20	Inflexion point in spillway curve, beyond which rapid increase in storage level occurs for a given increase in AEP Increasing risk that piping could initiate	Alert Trigger
37.8m	1 in 50	Factor of Safety for critical spillway slab approaching 1	Lean forward trigger
38.1m	1 in 2000	Factor of Safety for critical spillway slab likely less than 1	Stand Up 1
39.0m	1 in 30,000	Top of rip-rap on upstream face of embankment	Stand up 2
39.3m	1 in 90,000	Overtopping of spillway training walls	
39.4m		PMPDF	
39.51m		Crest Level	

Five dam hazards have been identified for Swanbank Cooling Water Dam and incorporated into dam hazard and emergency event scenario plans. The relevant hazards are:

Table 3: Dam Hazards

Dam Hazard	Dam hazard and emergency event scenario	Plans to be found in the following sections of this plan
Flooding	Flood operations	Section 5
Embankment instability due to piping	Increased leakage through embankment, foundations or embankment instability / failure	Section 6
Embankment instability non piping initiated	Distress in embankment due to embankment instability issues (non-piping initiated)	Section 7
Earthquake	Response to Earthquake event in area	Section 8
Terrorism	Response to threat or actual incident of terrorism	Section 9

2.5. CleanCo EAP training

CleanCo has a safe system of work for its employees that includes the assessment of risks. Staff are trained in assessment of risks before undertaking any tasks. If the undertaking of any task under this EAP is assessed as an unacceptable risk that cannot be reasonably mitigated then staff are trained to not perform that task until the risk can be reduced to an acceptable level.

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 at Swanbank Power Station in the months leading up to the wet season.

The EAP training that is carried out on-site includes walkthroughs of new changes, scenario (role play) and Q&A to check the knowledge and competency of all those who attended. This on-site training is presented to relevant CleanCo staff (DDOs and ICs) and disaster management stakeholders.

Around September each year, DDO, IC and DSTDM and other relevant emergency response staff participate in training exercises at the Swanbank Power Station, involving the latest version of the EAP. Periodically these training exercises will be a joint desktop EAP exercise with the Disaster Management Groups in Ipswich. The last CleanCo training exercise was done on 19th September 2023 at Swanbank, it involved an earthquake scenario followed by a piping failure event.

A joint training with the Deputy Local Disaster Coordinator was conducted in 2021. Lessons learnt from these training exercises have been incorporated into this version of the EAP. New CleanCo employees in their various roles would also have a walkthrough of the EAP.

We recently engaged the State Disaster Coordination Centre to deliver face-to-face training to our staff for Warnings and Alerts, we have expecting this to happen in early 2024.

RPEQs who fulfil the DSTDM role are provided with any updates to the EAP that are reviewed by the individual. These individuals are also provided with all inspection reports and engineering studies to review to ensure currency of knowledge of the individual dams.

Records of discussions and agreements with key emergency management stakeholders are provided in APPENDIX I.

2.6. Dam emergency organisations within CleanCo

The CleanCo emergency management framework generally utilises the organisations hierarchy and dam safety experts as illustrated in Figure 3 below.

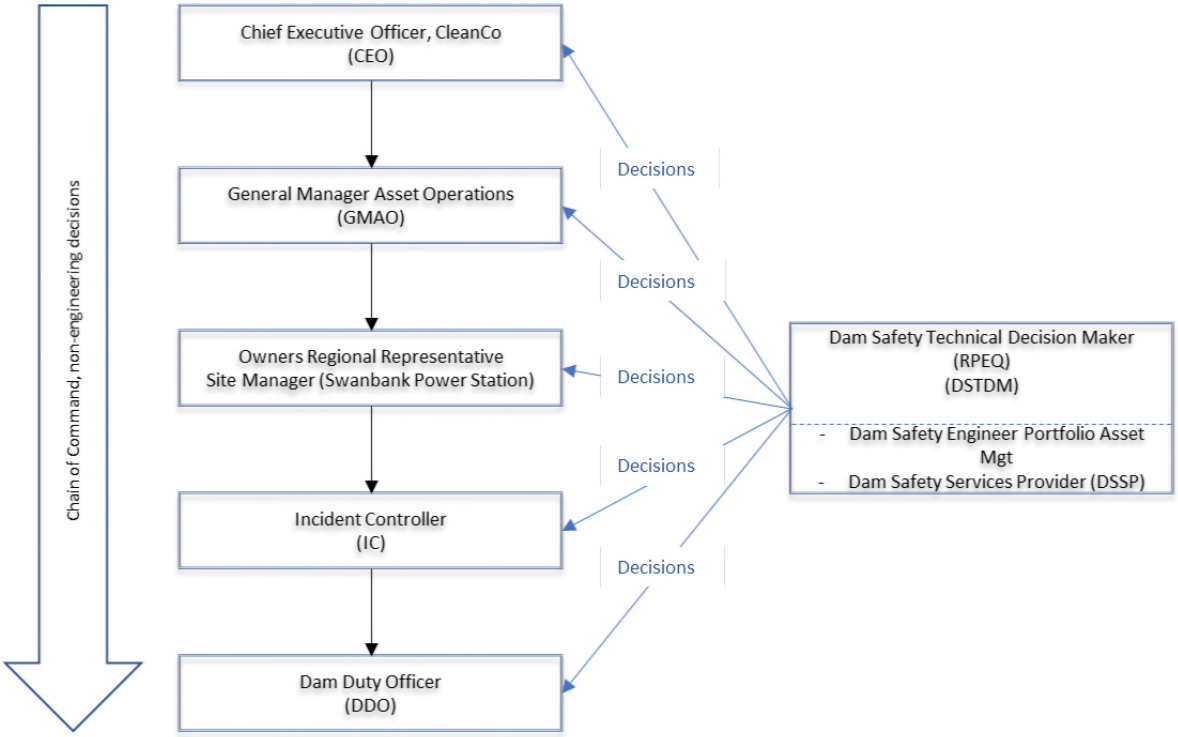


Figure 3: CleanCo emergency response organisation

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 activating the EAP when the dam reaches an EAP activation level, unless instructed to activate by the DSTDM who has determined that it is reasonable likely that the dam could reach an EAP activation level. Should the IC be unavailable, the DDO is responsible for the activation. If the IC loses all communications during a dam hazard, then as a fail-safe position, the DDO will assume the duties and responsibilities of the IC. However, loss of communications could result in some communication processes defined in this EAP not being carried out.
- Technical staff will provide technical advice to the IC and DDO on an as needs basis. The DSTDM will also make flood and dam engineering decisions during a dam hazard. These roles are filled by Registered Professional Engineers of Queensland (RPEQs), or by experienced engineers under the direct supervision of an RPEQ and are suitably qualified professionals as defined in reference K. Such advice will be provided within an established framework of SOPs, models, standards and manuals. The DSTDM role will be filled by either the internal Dam Safety Engineer Portfolio Asset Management or an externally sourced dam safety service provider.
- CleanCo has an obligation to minimise risks related to fatigue on employees, contractors, visitors and the public whilst at the workplace or carrying out activities on behalf of CleanCo. This is underpinned by the organisation's Health, Safety and Environment (HSE) Policy and HSE Fundamentals (CCQ-HSE-PRO-03). Where the effects of fatigue and/or the nature of the work being performed induces fatigue causing impairment to a person's health and safety, CleanCo will ensure that appropriate and reasonable management action consistent with this procedure, is taken. We setup work rosters to establish the working hours of employees and we have a Fatigue Assessment Form and Fatigue Safe 'App' and SafeStart tools for completing fatigue risk assessment.

2.7. Inundation maps

In order to comply with the recommendations of the Queensland Government Floods Commission of Inquiry, a review was conducted to determine the impact of downstream release hazard flows from the CWD on downstream properties. Inundation maps for a number of scenarios are shown in APPENDIX B. The maps show a number of features including downstream flood extent, incremental population at risk for failure scenarios, depth of inundation and velocity*depth to indicate the level of hazard.

The map scenarios and figure references shown in APPENDIX B are listed in Table 4.

Table 4: Flooding scenarios and figure references

Scenario	Figure reference
Sunny Day Failure	Figure 10: Sunny day failure - Failure impact zone and PAR mapping Figure 11: Sunny day failure - Flood depth mapping Figure 12: Sunny day failure - Depth velocity mapping

Scenario	Figure reference
10% AEP Coincident flooding	Figure 13: Coincident flood failure - 10% AEP regional flood failure impact zone and PAR mapping Figure 14: Coincident flood failure - 10% AEP regional flood depth mapping Figure 15: Coincident flood failure - 10% AEP regional flood depth velocity mapping
1% AEP Coincident flooding	Figure 16: Coincident flood failure - 1% AEP regional flood failure impact zone and PAR mapping Figure 17: 1% AEP regional flood depth mapping Figure 18: Coincident flood failure - 1% AEP regional flood depth mapping Figure 19: Coincident flood failure - 1% AEP regional flood depth velocity mapping
PMP No Failure	Figure 20: PMP regional flood depth mapping
PMP Failure	Figure 21: Coincident flood failure - PMP regional flood failure impact zone and PAR mapping Figure 22: Coincident flood failure - PMP regional flood depth mapping Figure 23: Coincident flood failure - PMP regional flood depth velocity mapping

2.8. Downstream notification lists and distribution

The potential hazard area downstream of Swanbank Cooling Water Dam includes a number of suburbs with medium density residential development. Whilst CleanCo will employ multiple communications channels to issue notifications and warnings, the primary channel will be the Emergency Alert system.

The Queensland Emergency Alert Manual (M.1.174) outlines requirements for alerting persons at risk (PAR) to the associated dam hazard events and emergency events relating to identified hazards, such as hazards pertaining to dam failure. Table 5 details the message severity to be transmitted based on the associated activation level and will align with the Australian Warning System (AWS). These activation levels are consistent with the requirements of DNRME 2017 and WLAA 2017.

Distribution of these warnings will be dictated by the polygon area provided by CCQ located in APPENDIX A. The polygon area was determined to be the area covered by the PMF dam failure flood outline expanded to the nearest road crest.

Table 5: Hazard and emergency alert message outline (Adapted from QEAG 2015)

Message Severity	Activation Level	Priority	General Meaning	Guidance on Use
Advice 	Alert	3	There is no immediate danger. General information to keep you up-to-date with developments.	Unlikely that EA will be used to disseminate Advice messages
Watch and Act 	Lean Forward or Stand Up	2	It is likely that you may be impacted by the emergency. You may be in danger and should start taking action to protect your life and your family.	EA may be used to disseminate Watch messages
Warning 	Stand Up	1	You will be impacted by the emergency. You are in danger and must take action immediately. Voice messages will be preceded by a four second sound of the Standard Emergency Warning Signal, followed by the words “Emergency, Emergency”.	Most likely that EA will be used to issue Emergency Warnings

2.9. Communication protocol due to regional flooding

Based on the flood mapping presented, the City of Ipswich LDMG have confirmed that properties likely to be inundated during flood releases from the CWD would already be at risk from regional flooding of either Bundamba Creek or the Bremer River (or both) during large rain events in the area. Clean Co is still required to provide regular communications with Ipswich City Council during regional flooding to provide situational awareness.

The City of Ipswich LDMG may use the Emergency Alert System to warn of potential flooding impacts. If Ipswich LDMG are unavailable, CleanCo have the capacity to send Emergency Alerts. Detailed communication protocols for each emergency scenario, including flooding, are provided in relevant sections.

2.10. Redundancy of warning systems

In the event that all established communication protocols become redundant, CCQ will likely request assistance of the LDMG, with radio broadcasting and door knocking to notify people at risk during flooding events. The order of priority will be given to downstream landowners highlighted in APPENDIX D. Clean Co will ensure suitable protocols and staff are identified to undertake door knocking operations.

Potential Affected Properties that are identified firstly, as:

- Population at risk directly impacted as per the Failure Impact Assessment, followed by
- Properties adjacent to identified population at risk.

The priority of notifications is as follows:

- State Disaster Coordination Centre Watch Desk;
- Emergency Alert System notification;
- Radio broadcasting;
- Door knocking, where feasible

2.11. Lessons learnt

CleanCo will carry out Lessons Learnt (debrief) workshops as part of its post-event management once a stand down status is reached. The outcomes of any debrief will be included in the emergency event report. These Lessons Learnt can result in changes to the EAP. These will be captured and, if applicable to this document, will be implemented at the earliest opportunity and are made available in the next EAP update to the DSR as part of CleanCo's continual improvement of its EAPs. The Lessons Learnt actions, if relevant, will be provided to stakeholders, such as the LDMG, DDMG, other dam owners and DRDMW as appropriate.

In addition, CleanCo requests any post event learnings be communicated regarding operational effectiveness and areas for improvement with internal and external stakeholders as appropriate.

2.12. Comprehensive Risk Assessments

A new safety review and comprehensive risk assessment was completed in August in 2023. The CRA is a technical report that is utilised to ascertain risks for the dam as the basis for emergency triggers. The CRA will be made available to disaster management personnel whom require further assurance around the findings. To obtain a copy of a relevant CRA a request should be made in writing to CleanCo General Manager Asset Operations. It should detail the reason for the request and indicate who will be interpreting the data, i.e. engineering capability, for any unqualified personnel.

3. Roles and responsibilities

Role	Description	Positions
Owner	• Liaise with the Board, Dam Safety Regulator and Minister as required • Activate Crisis Management Plan and Crisis Management Team if required • Liaise with the Media team. • Ensure adequate resources available to manage any event	• CEO • GMAO • SMSPS
Owner Head Office Representative	• Authorise the issuing of EAP, SOPs and O&M Manual and Amendments • Management responsibility for the DSMS • Prepare budgets for the DSMS activities • Ensure appropriate governance for the DSMS • Accountable for the performance of the DSMS	• GMAO • PAM

Owner Regional Representative	• Liaise with site staff (production and maintenance), traders and executive management
	• Ensure rosters are in place for all on site roles during an emergency event that adequately mitigate fatigue risk
	• Ensure competent, trained and accredited personnel operate the storages
	• Undertake the role of IC as required:
	  ○ Liaise with the Local Disaster Coordinator or proxy
	  ○ Activate the EAP, when necessary
	• Maintain contact with IC, DDO and DSTDM for duration of emergency event
	• Ensure all work orders, work instructions and lesson learned outcomes are fully implemented.
	• Ensure appropriate facilities and supplies are available at the dam.
	• Record communications, notifications and observations as required
		• SMSPS or delegate

Role	Description	Positions
	• Procurement of external resources for local activities • Compile draft Emergency event reports for all events as identified in this EAP where the EAP is activated and submit to Owner Head Office Representative	
Dam Safety Technical Decision Maker (DSTDM)	• Analyse the situation and provide expert technical advice in relation to Dam Safety • Discuss Dam Hazard with peers and other technical experts and make sound decisions to mitigate the risk • Determine response to incidents and emerging issues • Issue warning on dam failure and advise on protective measures • Ensure the EAP is implemented appropriately and carry out the DSTDM role as required • Liaise with DSR as required • Provide technical advice and oversight to the owner representatives to ensure the DSMS is fully implemented • Ensure that all dam safety risks are understood by the organisation and adequate controls are in place • Ensure visual inspections and instrumentation monitoring frequencies are appropriate to the situation • Record communications, notifications and observations as required	• DSE • DSSP
Incident Controller (IC)[1]	• Activate the EAP, when necessary and assume command of the emergency on site and lead external communications • Liaise with disaster coordinators when LDMGs are not stood up, otherwise liaise with LDMGs and DDMGs as required	• SMSPS • or delegate

[1] *This is a different role to the iC that may be appointed under the overall Emergency Response Plan (ERP) for the power station site*

Role	Description	Positions
	• Notify LDMGs, or councils of intent to use the Emergency Alert (EA) • Arrange Situation Reports and determine frequency, as required • Record communications, notifications and observations as required • Ensure adequate resources and rosters are in place for an emergency event • Actions as described in the EAP	
Dam Duty Officer (DDO)	• 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 • Lead site activities such as surveillance, maintenance and operations • Assess any situations and escalate as appropriate • Ensure DSTDM is kept informed of the condition of the dam and any unusual conditions	• MSSPS • Security Officer
CleanCo Media Team	• Oversight of all communication to external stakeholders will be the responsibility of CleanCo's Corporate Sustainability and Stakeholder Engagement team. • 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 SDCC on flood events as requested • Record communications, notifications and observations as required	• Manager Corporate Sustainability and Stakeholder Engagement or delegate

Role	Description	Positions
	• Update the CleanCo Queensland Web Site	
Council	• Councils have legislated local government functions, as per Section 80 of reference B. These include: • Ensure it has a disaster response capability • Approve its local disaster management plan • Ensure information about an event or a disaster in its area is promptly given to the DDMG for the disaster district in which area it is situated • Perform other functions given to the local government under reference B	• ICC
Queensland Police Service (QPS)	• Manage the initial situation based on local operational procedures; including but not limited to: • Conduct emergency operations • Support CleanCo and LDMG during a declared emergency at the dam • Liaise with relevant organisations • Support evacuation of persons if required/requested through LDMG • Control of essential traffic • Security of specific areas	• Ipswich PS
Disaster Management Groups/Personnel	**LDMG** • Promote community education and messaging prepared by Clean Co in relation to the dam hazard and the EAP • Participate in exercises related to the dam and its EAP • Support and coordinate disaster management activities for their respective LGAs • Identify and coordinate the use of resources and support services that may be requested for an EAP event, noting that for safety events unique to the dam, CleanCo will approach councils to initiate • During a dam hazard event with regional flooding (refer to Section 5) or upon negotiation at the time, providing they are Stood Up, the LDMG in the	• LDMG • QFES • DDMG

Role	Description	Positions
	affected local government area will take the lead role in notifying the broader community • Initiate and coordinate evacuation based on existing protocols and risk • Identify and provide advice to the relevant DDMG about support services required by the LDMG to manage an EAP event • Provide reports and make recommendations to the relevant DDMG about matters relating to EAP events **DDMG** • Assist and provide support to the LDMG to manage an EAP event • May review the EAP for consistency with the DDMP **QFES** • Work with dam owner to ensure Emergency Alert polygons are prepared, stored and tested at the State Watch Desk	
Dam Safety Regulator (DSR)	• Liaison with relevant Minister on necessary actions • Approve this document as required under legislation • Liaise with chief executive as required in administering (regulating) the Act	• Chief Executive of DRDMW or delegate

Note:

CCQ response processes to emergencies are also detailed in the Swanbank Power Station Emergency Response Plan (CCQ Document Number – SBK-HSE-PRO-313). This document outlines the roles, responsibility and guidelines for responding to emergencies at Swanbank in order to protect people, plant and the environment.

4. Dam details

4.1. General dam information

Location: Swanbank Cooling Water Dam is located approximately 7 km southwest from the centre of Ipswich on Lot 2 on RP101603 (refer Figure 4). It is located on Oaky Creek, a tributary of Bundamba Creek, approximately 0.8 km upstream of the confluence with Bundamba Creek.

Purpose: The dam acts as water storage for Swanbank Power Station.

Construction: The dam was designed by Macdonald Wagner and Priddle and constructed within the Swanbank Power Station site in 1966. It is a homogeneous earth fill embankment constructed above an impervious foundation layer with toe drain and filter. The spillway consists of an uncontrolled concrete ogee crest with concrete lined discharge channel.

Specification: The table below lists general specifications of Swanbank Cooling Water Dam.

Table 6: Swanbank Cooling Water Dam Specification

Feature	Specification
Statutory Details	
Dam Identification Number	1643
Local Authority	Ipswich City Council
State Disaster District	Ipswich
Population at Risk (PAR) Assessment	Sunny day failure = 20 (2020 FIA) Maximum Coincident Flood Failure = 118 (2020 FIA)
Failure Impact Assessment Category	Category 2
Incremental Flood Consequence Category	High A
Sunny Day Failure Consequence Category	High A
Storage Details	
Storage Capacity (at FSL)[2]	811ML
Storage Surface Area (at FSL)	27ha
Full Supply Level (FSL)	37.45m AHD
Catchment Area	448ha
Embankment	
Maximum embankment height	8m
Dam Crest Level (DCL)	39.51m
Embankment length	396m
Spillway	
Spillway type	Uncontrolled concrete ogee crest
Spillway crest level	37.45m AHD
Spillway crest width	45.72m
Spillway chute length	150m
Outlet Works	

[2] *Source: Swanbank Power Station Cooling Water Dam, Failure Impact Assessment, November 2020*

Feature	Specification
Outlet Type	Reinforced concrete twin shaft (wet and dry) outlet tower. Single 450mm (nominal) DN cement lined steel pipe which is routed around the left abutment and terminates as a submerged outlet in the A-Weir Pond.
Outlet Control	Upstream penstock gate and downstream gate valve, both located on the base of the intake tower
Design Discharge	126.39 m^3/s at top of spillway training walls (AEP 1:900,000)
General	
Dam Type	Homogeneous earth fill embankment with an impervious foundation layer with toe drain and filter
Current Owner	CleanCo Queensland
Current Operator	CleanCo Queensland
Original Owner	
Designer	Macdonald Wagner and Priddle
Year Constructed	1966
Purpose	Supply of cooling water for Swanbank gas turbine power station
Construction type	Central mass concrete spillway with flanking earth-rockfill embankments and two separate saddle dam embankments
Location	7 km southwest of Ipswich
Lot and plan	Lot 2 RP101603
Stream	Oaky Creek, 0.8 km upstream of the confluence with Bundamba Creek
Position	Latitude 27º 39’ 21” **S** Longitude 152º 48’ 40” **E**
Access	

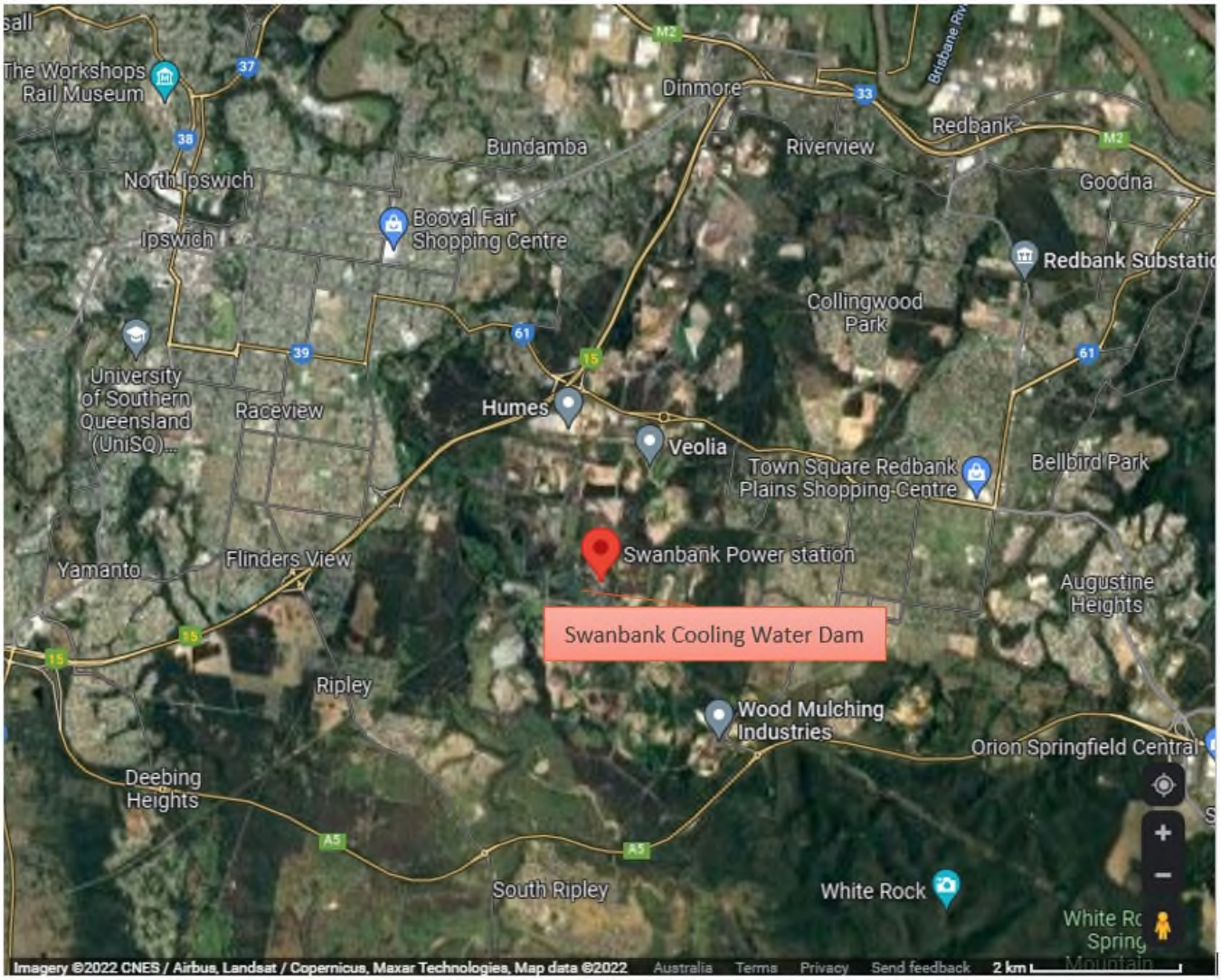


Figure 4: Swanbank Cooling Water Dam Location

4.1.1. General Arrangement

The general arrangement (aerial view) of the Swanbank Cooling Water Dam is shown in Figure 5.

Relevant engineering drawings are in APPENDIX G.

Figure 5: Swanbank Cooling Water Dam - General Arrangement

4.1.2. Site communication systems

The communication systems in place at Swanbank CWD are detailed below.

Normal and standby communication:	Mobile phone and two-way radio. CleanCo vehicles are equipped with two-way radios.
Emergency communication:	Fixed satellite phone in the control room [redacted]

4.2. Population at risk

The Population at Risk (PAR) estimates, shown in Table 7, correspond with the latest inundation maps (refer APPENDIX B), as seen in the latest Failure Impact Assessment report (dated November 2020).

Table 7: Swanbank Cooling Water Dam Population at Risk (PAR) estimates

Failure Impact Assessment report	2020 FIA
Sunny day failure (SDF)	20
Maximum PAR with PMF flood event	118
Failure Impact Assessment Category	Category 2
Incremental Flood Hazard Category	High A
Sunny Day Failure Hazard Category	High A

4.3. Flood Adequacy

The peak PMP inflow of 181.25 m^3/s (Peak outflow 129.9m^3/s) corresponds to a maximum PMP flood level in the dam of RL 39.37mAHD, which is 0.14 metres below the embankment crest level of RL 39.51 m AHD[3]. The dam spillway has adequate flood capacity to prevent overtopping of the crest, however the spillway training walls will begin to overtop at a water surface level of 39.29m.

4.4. Dam inspections and monitoring

To maintain the Swanbank Cooling Water Dam in a safe condition and to enable early detection of any dam hazards, the following inspections and monitoring are applicable.

4.4.1. Routine inspection and condition assessments

Routine and periodic inspections are carried out on the Swanbank CWD and include:

Routine Visual Inspection: Completed 2 times per week by inspection staff under the direction of the Dam Operator. Directed at early detection of issues/defects that may lead to an emergency condition e.g. uncontrolled seepage, instability etc.

Annual Inspection: Carried out by the CCQ Dam Safety Engineer or Dam Safety Consultants on an annual basis. A thorough on-site inspection is undertaken together with a detailed evaluation of data.

Comprehensive Inspection: Completed every 5 years by an experienced and qualified Dam Safety Consultant.

[3] *2023 CRA*

4.4.2. Instrumentation and monitoring

Storage level, daily rainfall and seepage are monitored at Swanbank CWD through the following instrumentation and methods.

Storage level: The water level of the dam is monitored continuously via a hydrostatic level sensor in the inlet channel to the cooling water makeup pump station located near the left abutment, adjacent to the outlet tower. The water level data is recorded on the power station SCADA system and monitored in the E station control room. A level gauge board is also attached to the side of the inlet channel for manual reading, if required. The gauge board is to be read during each routine inspection and periodic inspection.

Daily rainfall: Manually recorded at the guard house at the entrance to the B Station compound. A v-notch weir located in the toe drain collection pit is no longer used due to a blocked drain.

Seepage: A pump system was installed in 2011 in the toe drain collection sump that included a flow meter for the purposes of measuring the seepage rate. The flow meter is read and recorded twice weekly for monitoring of dam seepage.

Five vibrating wire piezometers have been installed on the dam.

4.4.3. Event Inspections and Surveillance

Where a defect has been identified from routine inspection that has the potential for dam failure or in the case of a flood or other damaging event, the procedures shall be followed as per the following tables for identification, notification and management of any potential event that may lead to a sunny-day failure of the dam.

- Table 15: Piping / Increased Leakage - DDO Emergency Action and
- Table 20: Embankment stability issues (non-piping) - DDO Emergency Action

5. Dam hazard – Flood Operations

5.1. Overview

The emergency action described in this section (dam hazard – flood operations) relates to the following scenarios:

- A dam hazard where inflows fill Swanbank CWD to the full supply level (FSL), the spillway will then discharge water downstream to Oaky Creek, to regional flooding of the downstream catchment;
- Spillway discharge from the dam where there have been no indications that a dam failure may be initiating or in progress.

5.2. Affected Areas and Dam Failure Inundation Times

The area likely to be affected by this dam hazard will depend on the amount of flooding due to river and creek flows downstream of the dam. If there are limited flows entering the creek system downstream of the dam (in other words, outflows from the dam are the major contributor to river flows) then the area affected by this dam hazard will be largely limited to within the bed and banks of Bundamba Creek. However as other catchment contributions increase, so will the impacted area.

Flood inundation maps are included in APPENDIX B and detail the impacted areas for 10% AEP, 1% AEP coincident flooding and PMF. The flooding from areas other than the Swanbank Cooling Water Dam tend to dominate in terms of overall impact.

The CWD Failure Impact Assessment (FIA) showed that for a Sunny Day Failure the failure impact zone is largely contained within the Bundamba Creek floodplain. However, for the PMF initiated failure event, inundation of residential areas adjacent to the Bundamba Creek floodplain occurred. A copy of the CWD flood inundation maps for a Sunny Day failure and a PMF initiated failure event are shown in APPENDIX B. It should be noted that, due to uncertainties involved in modelling the dam failure, the inundation area shown on the map is approximate and should only be used as a guide.

The CWD FIA[4] indicated that the flood wave from a PMF dam failure would travel via Bundamba Creek, with a peak discharge exceeding 750 m^3/s. The travel time of a dam failure flood wave from the CW Dam to the Cunningham Highway would be of the order of 45 minutes. Travel times for the PMF event to key locations is summarised in Table 8.

[4] *May 2015 FIA*

Table 8: PMF Dam Failure Inundation Times at junction with Bundamba Creek

Cunningham Highway	46 minutes	1 hour 38 minutes
Blackstone Road	1hour 34 minutes	2 hours 26 minutes
Brisbane Road	1hour 54 minutes	3 hours 02 minutes
Gledson St/Creek St	2hours 10 minutes	3 hours 20 minutes

5.3. Emergency Actions

In the 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.

5.3.1. Activation Triggers

	Water level in the dam 37.6m (0.15m over spillway) (5% AEP).
Lean Forward	Water level in dam 37.8m reaches (0.35m over spillway) (2% AEP).
Stand Up 1	Water level in dam 38.1m (AEP 1:2,000), OR, signs of distress or damage to spillway.
Stand Up 2	Flooding where the storage level is approaching 39.0 m AHD (top of rip rap) (AEP 1:30,000)
Stand Down	Lake levels dropping to FSL.

Table 9: Emergency Action Flood trigger summary

Whilst this EAP is not activated until Swanbank Cooling Water Dam reaches the Alert trigger; CleanCo and the LDMG will work cooperatively and will endeavour to share intelligence of any rainfall event as and when each organisation becomes aware of a situation that could result in the activation of the EAP. Such intelligence relates to information that affects the downstream area of the Swanbank CWD that is not readily available through public sources (such as the Ipswich Disaster Management Dashboard or BOM), for example, the Bundamba Creek flood forecast surface.

Explanation for selecting Activation Triggers

An emergency action plan must identify each circumstance that indicates a material increase in the likelihood of the dam hazard event or emergency event happening. With respect to flooding hazard, a hazard event occurs when release of water may cause harm to persons or property. The EAP should therefore be triggered by the time the lowest rate of release (spillway overflow) that is likely to cause minor flooding downstream of the dam.

It was confirmed that the relative impacts caused by releases from the dam were small compared to those caused by regional flooding that is likely to be occurring at the same time (e.g. Bundamba Creek). The flood mapping was used during consultation with the City of Ipswich LDMG where it was agreed that since there is no means of controlling the outflow from the dam, and the flows from the dam are relatively small compared to those likely to be generated within the Bundamba Creek catchment, that communication of downstream release hazard flows from the CW Dam is of limited use. Therefore, based on the flood mapping presented, ongoing updates from CCQ with respect to flood release levels would be limited to when regional flooding levels are beginning to impact on downstream residents and businesses. It is also noted that there is an inflexion point in spillway curve (Figure 1), beyond which rapid increase in storage level occurs for a given increase in AEP increasing risk that piping could initiate. Consequently, the Alert trigger has been set to correspond to the 5% AEP event at the dam.[5].

Refer to Section 2.4 for further explanation of trigger levels and relationship to critical levels identified in the 2023 CRA.

These triggers are reflected in the Flood Operations emergency actions (refer Table 10 to Table 13).

CleanCo uses the Consultation Manager stakeholder database platform to maintain SMS distribution lists for downstream residents. CleanCo contacts identified downstream landholders through a formal letter, providing the opportunity for them to opt-in to the SMS alert system.

CleanCo is in the early stages of developing an educational communication and engagement program to increase awareness and strengthen resilience amongst downstream residents/landholders regarding the potential risks and how to respond to any alerts issued in relation to the dam. Activities may include in-person meetings/forums, online updates, printed brochures, fridge magnets and targeted social media campaigns.

5.3.2. Assessment of circumstances that indicates an increase in the likelihood of flood operations

The DSTDM will assess the weather and flood warnings daily. They will escalate to the IC any warnings that have the potential to generate an inflow event.

The on-call IC will escalate to the DSTDM any local intelligence on catchment conditions that could increase the probability of inflows to the dam.

The DSTDM will determine whether it is reasonably likely that the dam could reach an EAP activation level within the subsequent 24 hours. If so assessed, the DSTDM may instruct the IC to trigger the appropriate status for flood operations.

5.3.3. Emergency action roles

Table 10 to Table 13 specify emergency actions and communication plan for the following roles:

[5] *Inundation maps in the 2020 FIA that 10% AEP*

- Dam Duty Officer (DDO)
- Incident Controller (IC)
- Dam Safety Technical Decision Maker (DSTDM)

Table 10: Flood Operations – Dam Duty Officer (DDO) Actions

Activation Level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	Water level in the dam 37.6m (0.15m over spillway) (5% AEP).	Water level in dam 37.8m reaches (0.35m over spillway) (2% AEP).	Water level in dam 38.1m (AEP 1:2,000), OR, signs of distress or damage to spillway.	Flooding where the storage level is approaching 39.0 m AHD (top of rip rap) (AEP 1:30,000)	Lake levels dropping to FSL.

Actions	• Record all communications
	• Monitor water level and report at least every 6 hours
	• Lock gates and attempt to move on any members of public in vicinity of dam
	• Measure, photograph/video and document flows and send to DSTDM and IC
	• Undertake visual inspection and monitoring of any instrumentation and potential spillway damage and check water levels and rates of water level rises
		• As per previous activation level AND
		• Continue inspections and monitoring, increase frequency to twice daily. Noting any signs of damage to spillway or piping
		• Ensure the IC and DSTDM are provided with hourly updated information on:
		  ○ The flowrate over the spillway and
		  ○ The current rate of rise.
		• Monitor and record rainfall every hour and review of BOM advice on forecast rainfall.
			• As per previous activation level AND
			• Continue inspections and monitoring, increase frequency to 6 hourly
			• Maintain surveillance of area immediately downstream of dam
			• Ensure any people (personnel or members of the public) have been moved to a safe location if required
			• Ensure plant has been moved to a safe location
				• As per previous activation level AND
				• Ensure embankment is monitored for signs of damage, slumping or seepage emerging above toe drain.
				• Report any overtopping of spillway training walls or erosion on outside of training walls
					• Forward all communication, inspection sheets, photos and other data to ORR for EER
					• Update dam log book
					• Return to routine activities

Activation Level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
	• Inspections and recording to be undertaken at least daily (including checking VWPs and seepage)(or as instructed by DSTDM) until a decreasing trend is observed or as directed by IC • Monitor and record of rainfall every 3 hours and review of BOM advice on forecast rainfall. • Update dam log book	• Facilitate dam inspections or other necessary actions as instructed by DSTDM and IC • On instruction of the DSTDM and IC, initiate the Emergency Response (Stand Up)			
Internal notifications	• DSTDM • IC • Site personnel	• As per previous level	• As per previous level	•	• Inform all previous notified contacts of stand down
External notifications	• Members of public in vicinity of dam	• As required	• As required	•	• As above

Table 11: Flood Operations –Dam Operator (IC) Emergency Actions

Activation Level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	Water level in the dam 37.6m (0.15m over spillway) (5% AEP).	Water level in dam 37.8m reaches (0.35m over spillway) (2% AEP).			Lake levels dropping to FSL.
Actions	• Raise incident in accordance with Event Management Standard • Record all communication in event log and maintain the log throughout the emergency condition • Update DDO and DSTDM regarding the situation • Review staffing levels and implement roster • Enact communication plan	• As per previous activation level AND • Advise the DSTDM (as well as LDMG. Information to be provided includes: ○ The flowrate over the spillway and ○ The current rate of rise. • Ensure all abnormal observations or damage has been reported to the DSTDM • Suggest to LDMG to consider need for road closures • Review dam status condition with DSTDM	• As per previous activation level AND • Ensure all abnormal observations or damage has been reported to DSTDM • Review dam status and condition with DSTDM and amend emergency actions as required • IC to maintain an event log throughout the emergency condition.	• As per previous activation level	• Contact and notify external stakeholders as per communication plan • Stand down dam staff after inspections complete • Provide details of any damage to DSTDM • Forward all communication and inspection sheets for EER to OOR • The Dam Operator (IC), in consultation with the Dam Safety Engineer (DSTDM), is responsible for initiating the “stand-down” phase of the

Activation Level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
		and undertake actions as required • Initiate the Emergency Response (Stand Up) if/when instructed by the DSTDM			EAP following the emergency event.
Internal notifications	• DDO • DSTDM • SO • PTD • GMAO	• As per previous level • Corporate Media	• As per previous level • CEO	• As per previous level	Inform all previous notified contacts of stand down
External notifications	As required in external communication plan	As required in external communication plan	As required in external communication plan	As required in external communication plan	As required in external communication plan

Table 12: Flood Operations IC external communication plan

Activation level	Trigger for communication	Group to contact	Method	Message
Alert	Water level in the dam 37.6m (0.15m over spillway) (5% AEP).	1. LDMG 2. DDMG	Phone Provide updates as required/requested 	Describe current situation with dam: What is the event? What is the status? Advise of current storage level, releases and expected changes
Lean Forward	Water level in dam 37.8m reaches (0.35m over spillway) (2% AEP).	1. LDMG 2. Ipswich Police 3. DDMG 4. Bunnings Bundamba	Phone Provide updates as required/requested 	Describe current situation with dam: What is the event? What is the status? Advise of current storage level, releases and expected changes Discuss downstream flooding conditions and road closures Discuss AWS message
		5. D/S residents 	Emergency Alert (EA) – Watch and Act through LDMG if practical If LDMG unavailable, CleanCo to issue emergency alert.	<Coordinate with LDMG. LDMG may exercise some discretion in adapting the communications messaging based on risk, current warnings and other contextual inputs.> Watch and Act CleanCo: Flood, Swanbank Dam now spilling excess water due to rain in catchment. Moderate to major flooding Flood in Bundamba Creek Monitor Ipswich Disaster & Emergency Board https://disaster.ipswich.qld.gov.au/ and BOM
			CleanCo SMS Subscriber service	Watch and Act CleanCo: Flood, Swanbank Dam now spilling excess water due to rain in catchment. Moderate to major flooding Flood in Bundamba Creek Monitor Ipswich Disaster & Emergency Board https://disaster.ipswich.qld.gov.au/ and BOM
			Local ABC radio ABC 612 Brisbane: [redacted] River 94.9FM Phone: [redacted]	Studio: [redacted]	<Coordinate with LDMG. LDMG may exercise some discretion in adapting the communications messaging based on risk, current warnings and other contextual inputs.> Prepare and send AWS E1 Riverine Flood > Watch and Act > Prepare to Leave

Activation level	Trigger for communication	Group to contact	Method	Message
			CleanCo Web page & Facebook www.cleancoqueensland.com.au	link to 10% AEP flood maps
Stand Up 1	Water level in dam 38.1m (AEP 1:2,000), OR, signs of distress or damage to spillway	1. LDMG 2. Ipswich Police 3. DDMG 4. Bunnings Bundamba	Phone Provide updates as required/requested 	Describe current situation with dam: What is the event? What is the status? Advise of current storage level, releases and expected changes Warning at flood of record and additional monitoring implemented Discuss downstream flooding conditions and road closures. LDMG to liaise with Brisbane Metropolitan Traffic Management Centre (BTMC) and Ipswich City Council. LDMG to prepare coordinated evacuations noting indicative lead time until impact.
		5. D/S residents	Emergency Alert (EA) – Watch and Act through LDMG if practical 	<Coordinate with LDMG. LDMG may exercise some discretion in adapting the communications messaging based on risk, current warnings and other contextual inputs.> Phone: Watch and Act. This is a Flood Warning from Swanbank Dam. Areas along Bundamba Creek are at record high levels. You should warn neighbours, secure your belongings, and move to higher ground. This is an EMERGENCY, do not DELAY. For more information listen to local radio or visit https://cleancoqueensland.com.au/ https://disaster.ipswich.qld.gov.au/ (delete one). If your life is in danger, call Triple zero. Watch and Act. Flood Warning. Properties near Bundamba Creek. Move to higher ground NOW. Warn neighbours. Listen to radio or visit https://cleancoqueensland.com.au/ https://disaster.ipswich.qld.gov.au/ (delete one). If your life is in danger, call Triple zero.
			CleanCo SMS Subscriber service Local ABC radio ABC 612 Brisbane:	<Coordinate with LDMG. LDMG may exercise some discretion in adapting the communications messaging based on risk, current

Activation level	Trigger for communication	Group to contact	Method	Message
			River 94.9FM Phone: [redacted] | Studio: [redacted]	warnings and other contextual inputs. This includes modifications to the AWS prepared messages in APPENDIX E where required. >
			CleanCo Web page & Facebook www.cleancoqueensland.com.au	Prepare and send AWS E2 Riverine Flood > Watch and Act > Move to higher ground link to PMF flood maps
Stand Up 2	Flooding where the storage level is approaching 39.0 m AHD (top of rip rap) (AEP 1:30,000)	1. LDMG 2. Ipswich Police 3. DDMG 4. Bunnings Bundamba	Phone Provide updates as required/requested	Same as Stand up 1 unless damage noted or potential failure identified Describe current situation with dam: What is the event? What is the status? Advise of current storage level, releases and expected changes Warning at flood of record and additional monitoring implemented Discuss downstream flooding conditions and road closures. LDMG to liaise with Brisbane Metropolitan Traffic Management Centre (BTMC) and Ipswich City Council. LDMG to prepare coordinated evacuations noting indicative lead time until impact as follows.
		5. D/S residents	Emergency Alert (EA) – Emergency Warning through LDMG if practical 	Same as Stand up 1 unless damage noted or potential failure identified. If potential failure then messages as follows <Coordinate with LDMG. LDMG may exercise some discretion in adapting the communications messaging based on risk, current warnings and other contextual inputs.> Phone: Emergency. Emergency. This is a Flood Emergency Warning from Swanbank Dam. Areas along Bundamba Creek are in immediate danger. You should warn neighbours, secure your belongings, and move to higher ground NOW. This is an EMERGENCY, do not DELAY. For more information listen to local radio or visit https://cleancoqueensland.com.au/ https://disaster.ipswich.qld.gov.au/ (delete one). If your life is in danger, call Triple zero. Emergency. Flood Warning. Properties near Bundamba Creek. Evacuate to higher ground NOW. Warn neighbours. Listen to radio or visit

Activation level	Trigger for communication	Group to contact	Method	Message
				https://cleancoqueensland.com.au/ https://disaster.ipswich.qld.gov.au/ (delete one). If your life is in danger, call Triple zero.
			CleanCo SMS Subscriber service	<Coordinate with LDMG. LDMG may exercise some discretion in adapting the communications messaging based on risk, current warnings and other contextual inputs. This includes modifications to the AWS prepared messages in APPENDIX E where required. >
			Local ABC radio ABC 612 Brisbane: [redacted] River 94.9FM Phone: [redacted]	Studio: [redacted]	Prepare and send AWS E3 Riverine Flood > Emergency Warning > Leave Immediately link to PMF flood maps
			CleanCo Web page & Facebook www.cleancoqueensland.com.au	
Stand down	Lake level dropping to FSL	1. LDMG	Phone	Describe current situation with Dam What is the event? What is the status? Advise current storage level Advise EAP has been deactivated
		2. Bunnings Bundamba 3. D/s residents	CleanCo to issue SMS alert. Refer APPENDIX D for contact list Phone/SMS Provide updates as required/requested	Advice CleanCo: Flood, Swanbank Cooling Water Dam spilling reduced to minor levels. Dam emergency ceased. Refer Cleancoqld.com.au for more details
			CleanCo SMS Subscriber service	<Coordinate with LDMG. LDMG may exercise some discretion in adapting the communications messaging based on risk, current warnings and other contextual inputs. This includes modifications to the AWS prepared messages in APPENDIX E where required.>
			Local ABC radio ABC 612 Brisbane: [redacted] River 94.9FM Phone: [redacted]	Studio: [redacted]	Prepare and send AWS E1 After the flood > Advice > Threat is reduced *If event does not escalate to point where all stakeholders have been notified then communication at stand down should be limited to those that received communications during the event*
			CleanCo Web page & Facebook www.cleancoqueensland.com.au	

Table 13: Flood Operations – Dam Safety Technical Decision Maker (DSTDM) Emergency Actions

Activation Level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	Water level in the dam 37.6m (0.15m over spillway) (5% AEP).	Water level in dam 37.8m reaches (0.35m over spillway) (2% AEP).	Water level in dam 38.1m (AEP 1:2,000), OR, signs of distress or damage to spillway.	Flooding where the storage level is approaching 39.0 m AHD (top of rip rap) (AEP 1:30,000)	Lake levels dropping to FSL.
Actions	• Record all communication • Provide technical advice to DDO and IC on a needs basis • Review surveillance reports and determine if any additional responses are required • Ensure back up resources for DSTDM are on stand by • Liaise with DSR and ensure situational awareness	• As per previous activation level, AND • Evaluate dam condition from surveillance and performance reports • Assess any escalation of dam safety risk • Ensure all failure impact information is available to LDMG, DDMG as requested • Initiate the Emergency Response (Stand Up) if/when required	• As per previous activation level, AND • Determine the requirements for remedial action, if any, as necessary, in consultation with the Dam Operator (IC) and the Dam Safety Consultant if necessary.	• As per previous activation level, AND • Continually ensure monitoring for damage that could indicate potential failure. Consider ○ Damage to spillway and back erosion ○ Erosion or slumping of u/s face of embankment ○ Signs of piping	• Forward all communication and log sheets for EER to OOR • If damage reported provide insurance notification • Return to routine activities • Specify remedial action in consultation with the Dam Operator (IC) and the Dam Safety Consultant, if necessary. • Ensure remedial works are undertaken to significantly mitigate risk.

Activation Level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Internal notifications	• DDO • IC	• As per previous level	• As per previous level	• As per previous level	• Inform all previous notified contacts of stand down
External notifications	• DSR	• As per previous level	• As per previous level	• As per previous level	• Inform all previous notified contacts of stand down

6. Dam hazard – Piping / Increased leakage through embankment or foundations, or embankment instability

6.1. Overview

The emergency action described in this section relates to a potential dam hazard due to piping or excessive leaking through dam embankment. This potential dam hazard may occur with or without associated regional concurrent flooding. As a general principle, CleanCo will lead the external communications and issue the Emergency Alerts when in Stand Up activation level, if:

- piping or excessive leakage through dam embankment occurs without regional flooding (i.e. Sunny Day Failure, SDF, scenario), and/or
- the dam hazard occurs with regional flooding and the Stand Up level is triggered suddenly, without adequate warning to coordinate with the LDMG.

If the dam hazard occurs with regional flooding and there has been adequate warning of the potential dam hazard prior to Stand Up, CleanCo shall coordinate with LDMG and agree on which party is best placed to lead the external communications depending on the magnitude and extent of regional flooding, risk, current warnings and other contextual inputs. Refer to external communications plan in Table 17.

An early indication 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. The 2023 CRA identified a number of feasible piping mechanisms for this dam that should be monitored:

- Piping through the upper embankment (exiting downstream face of embankment above the toe drain)
- Piping through the foundations (exiting in A Weir Pond of downstream of dam toe)
- Piping into or along the low-level outlet

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

The flood outlines in APPENDIX B are there to provide indicative outlines of the maximum potentially affected area of a dam failure. The use of these flood outlines is prescribed below:

- Use the SDF outline when a dam failure is in progress or likely due to embankment instability, and no concurrent or downstream flooding is occurring or expected to occur, or
- Use the relevant downstream concurrent flooding scenario maps when a dam failure is in progress or likely due to embankment instability and concurrent or downstream flooding is occurring or expected to occur. Refer to Section 5, Dam hazard – Flood Operations.

6.2. Affected Areas and Dam Failure Inundation Times

The CWD Failure Impact Assessment (FIA) showed that for a Sunny Day Failure the failure impact zone is largely contained within the Bundamba Creek watercourse. Travel times for SDF flood event to key locations are summarised in Table 14.

Table 14: SDF Inundation Times at junction with Bundamba Creek

Location	Time to first rise in water level (from failure initiation)	Time to inundation peak (from failure initiation)
Cunningham Highway[1]	2 hours	3 hours 48 minutes
Blackstone Road[2]	4 hours 28 minutes	6 hours 12 minutes
Brisbane Road[2]	6 hours 12 minutes	7 hours 56 minutes
Gledson Street[2]	7 hours 28 minutes	8 hours 44 minutes

[1]State Road – Contact BMTMC to facilitate road closure (refer Table 32 for contact details)
[2]Local Road – Contact ICC to facilitate road closure (refer Table 32 for contact details)

6.3. Emergency Actions

6.3.1. Assessment of circumstances that indicate an increase in the likelihood of piping

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

Cloudy seepage water is a circumstance that could indicate an increase likelihood of piping. This circumstance is the trigger for the lean forward status for piping, including Unexpected cloudy water in A Weir or spillway dissipator.

6.3.2. Emergency action roles

Table 15 to Table 18 specify emergency actions and communication plan for the following roles:

- Dam Duty Officer (DDO)
- Incident Controller (IC)
- Dam Safety Technical Decision Maker (DSTDM)

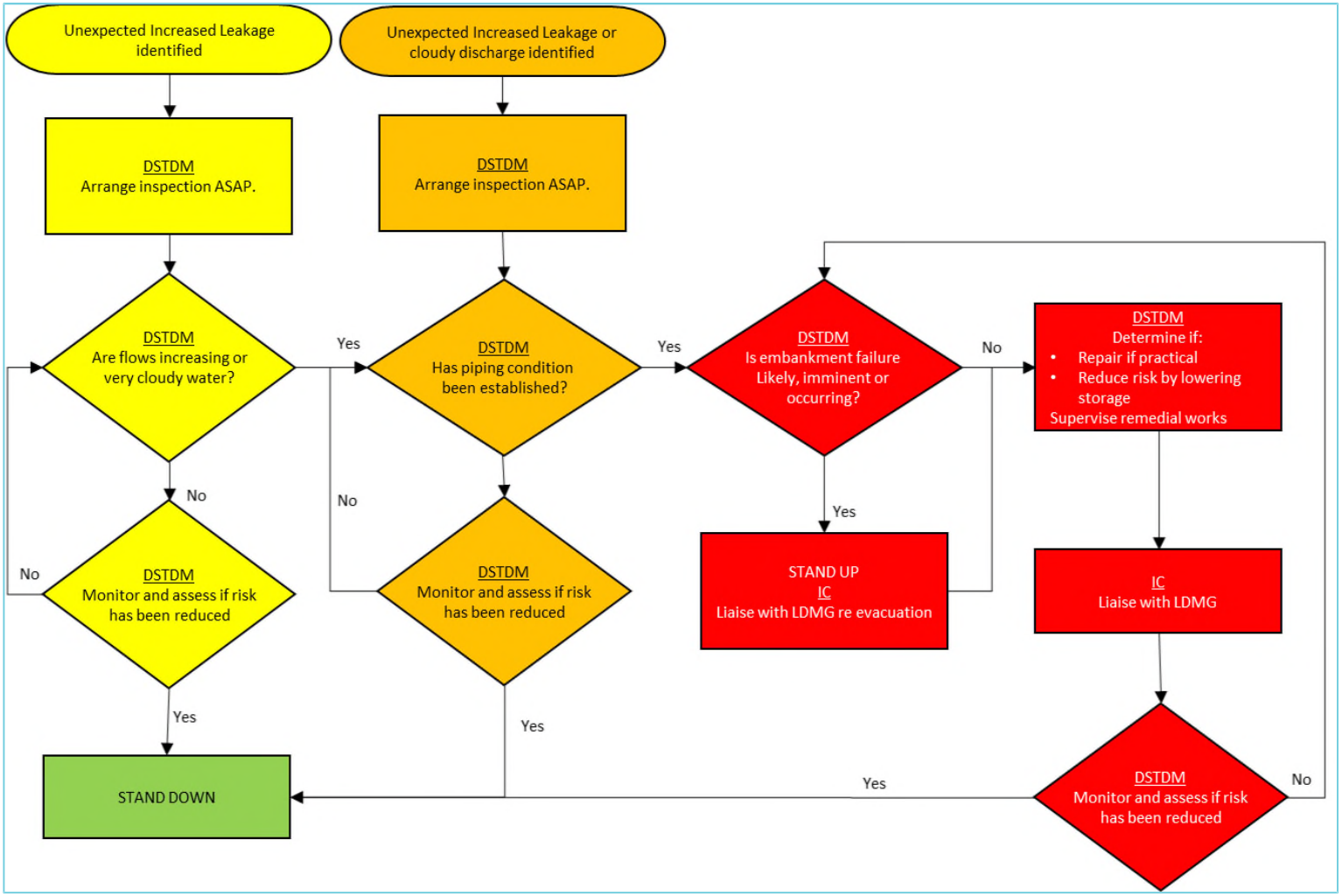


Figure 6: Piping / Increased leakage through embankment flowchart

Table 15: Piping / Increased Leakage - DDO Emergency Action

Activation Level		Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	Unexpected increased leakage through the embankment, foundations or abutments or new areas	• Unexpected increased leakage through the embankment, foundations or abutments with cloudy water, OR • Unexpected cloudy water in A Weir or spillway dissipator	Piping condition has been established	• Failure in progress or likely due to piping • Sufficient water in storage to create a dam hazard	Risk assessment has established risk has reduced.
Actions	• Record all communications • Measure, photograph/video and document flows and send to DSTDM and IC • Inspect affected area and look for source of seepage. • Inspect dam for other signs of distress such as slumping, cracking or movement. Send inspection sheet to DSTDM • Monitor flows every 6 hours (or as instructed by DSTDM) until a decreasing trend is observed or as directed by IC • Update dam log book	• As per previous activation level, AND • Liaise with DSTDM to confirm trigger has been met	• As per previous activation level AND • Support/supervise remedial works as required • Lower the storage if directed • Liaise with IC and DSTDM re evacuations	• 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 • Liaise with IC and DSTDM re evacuations	• Forward all communication, inspection sheets, photos and other data to ORR for EER • Update dam log book • Return to routine activities

Activation Level		Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Internal notifications	1. IC 2. DSTDM	As per previous level	As per previous level	As per previous level	As per previous level
External notifications			Members of public in vicinity of dam		

Table 16: Piping / Increased Leakage - IC Emergency Action

Activation Level		Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	Unexpected increased leakage through the embankment, foundations or abutments or new areas.	• Unexpected increased leakage through the embankment, foundations or abutments with cloudy water, OR • Unexpected cloudy water in A Weir or spillway dissipator	Piping condition has been established	• Failure in progress or likely due to piping • Sufficient water in storage to create a dam hazard	Risk assessment has established risk has reduced.
Actions	• Record all communication • Liaise with DDO and DSTDM regarding situation • Enact communication Plan • Review staffing levels and implement rosters • Notify SO for DDO • Raise incident in accordance with Event Management Standard • Notify GMAO	• As per previous activation level, AND • Liaise with DSTDM to confirm trigger has been met • Liaise with LDMGs regarding situation • 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 for the follow through on actions to close out all matters and works outstanding after the initial emergency is over.	• As per previous activation level, AND • Liaise with DDO and relevant LDMG regarding potential for evacuations and road/bridge closures • Emergency Alert (EA) – through LDMG if practical, otherwise, CleanCo to issue emergency alert • Mobilise resources to undertake remedial works if directed by DSTDM • Consider lowering storage level • Recommend to CleanCo CEO to enact crisis management plan	• As per previous activation level, AND • Liaise with DDO, DSTDM, Police and LDMG re potential for evacuations • Direct remedial works to cease if directed by the DSTDM and plant and personnel to be moved to a safe location • Liaise with the DSTDM to confirm that dam failure is in progress • Clean Co to enact door knocking procedures (if	• Complete all Internal and External notifications • Forward all communications including relevant emails for EER to ORR • Close out Incident Report Record • Liaise with DSTDM for any immediate repairs and structural damage of the dam • Return to routine activities

Activation Level		Lean Forward	Stand Up 1	Stand Up 2	Stand Down
				feasible) for SDF failures where PAR is 20	
Internal notifications	1. DSTDM 2. DDO 3. SO 4. GMAO	As per previous level Corporate media	As per previous level CEO	As per previous level	As per previous level
External notifications	As required in external communication plan	As required in external communication plan	As required in external communication plan	As required in external communication plan	As required in external communication plan

Table 17: Piping / Increased leakage IC external communication plan

Activation level	Trigger for communication	Group to contact	Method	Message
Alert	Unexpected increased leakage through the embankment, foundations or abutments or new areas.	LDMG	Phone Provide updates as required/requested	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 advices
Lean Forward	• Unexpected increased leakage through the embankment, foundations or abutments with cloudy water, OR • Unexpected cloudy water in A Weir or spillway dissipator	1. LDMG 2. Ipswich Police 3. DDMG	Phone Provide updates as required/requested 	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 advices
Stand Up 1	Piping condition has been established	1. LDMG 2. Ipswich Police 3. DDMG 4. Bunnings Bundamba	Phone Provide updates as required/requested 	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. LDMG to liaise with Brisbane Metropolitan Traffic Management Centre (BTMC) and Ipswich City Council. Prepare for possible evacuations
		5. D/s residents	Emergency Alert (EA) – Watch and Act. CleanCo to issue EA unless coordinated and agreed with LDMG. 	Watch and Act, CleanCo: Swanbank Cooling Water Dam in distressed condition. Prepare to move. Listen for further advice Monitor Ipswich Disaster & Emergency Board https://disaster.ipswich.qld.gov.au/

Activation level	Trigger for communication	Group to contact	Method	Message
			CleanCo SMS Subscriber service Local ABC radio ABC 612 Brisbane: [redacted] River 94.9FM Phone: [redacted] | Studio: [redacted]	< CleanCo to issue in SDF situation. CleanCo also to issue if there is regional flooding, unless otherwise coordinated and agreed with LDMG. If LDMG issue the AWS, LDMG may use discretion in adapting the AWS prepared messaging provided in APPENDIX E, as required.>  Prepare and send AWS E1 Riverine Flood > Watch and Act > Prepare to Leave link to SDF flood maps. If d/s flooding occurring then consider one of the coincident flooding maps
Stand Up 2	• Failure in progress or likely due to piping • Sufficient water in storage to create a dam hazard	1. LDMG 2. Ipswich Police 3. DDMG 4. Bunnings Bundamba	Phone Provide updates as required/requested 	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 LDMG to prepare coordinated evacuations noting indicative lead time until impact as follows
		5. D/s residents	Emergency Alert (EA) – Warning. CleanCo to issue in SDF situation. CleanCo also to issue if there is regional flooding, unless coordinated and agreed with LDMG. 	Phone: Emergency. Emergency. This is a Flood Emergency Warning from Swanbank Dam. Areas along Bundamba Creek are in immediate danger. You should warn neighbours, secure your belongings, and move to higher ground NOW. This is an EMERGENCY, do not DELAY. For more information listen to local radio or visit https://cleancoqueensland.com.au/ https://disaster.ipswich.qld.gov.au/ (delete one). If your life is in danger, call Triple zero. Emergency. Flood Warning. Properties near Bundamba Creek. Evacuate to higher ground NOW. Warn neighbours. Listen to radio or https://cleancoqueensland.com.au/ https://disaster.ipswich.qld.gov.au/ (delete one). If your life is in danger, call Triple zero.

Activation level	Trigger for communication	Group to contact	Method	Message
			CleanCo SMS Subscriber service Local ABC radio ABC 612 Brisbane: [redacted] River 94.9FM Phone: [redacted] | Studio: [redacted] CleanCo Web page & Facebook www.cleancoqueensland.com.au	< CleanCo to issue in SDF situation. CleanCo also to issue if there is regional flooding, unless otherwise coordinated and agreed with LDMG. If LDMG issues the AWS, LDMG may use discretion in adapting the AWS prepared messaging provided in APPENDIX E, as required.>  Prepare and send AWS E3 Riverine Flood > Emergency Warning > Leave Immediately link to SDF flood maps. If d/s flooding occurring then consider one of the coincident flooding maps
Stand down	Risk assessment has established risk has reduced.	1. LDMG	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
		2. Bunnings Bundamba 3. D/s residents	SMS notification. CleanCo to issue SMS alert.	Refer APPENDIX D for contact list Phone/SMS Provide updates as required/requested Advice CleanCo: Dam emergency ceased, Swanbank Cooling Water Dam Refer Cleancoqld.com.au for more details.
			CleanCo SMS Subscriber service Local ABC radio ABC 612 Brisbane: [redacted] River 94.9FM Phone: [redacted] | Studio: [redacted] CleanCo Web page & Facebook www.cleancoqueensland.com.au	<CleanCo to issue in SDF situation. CleanCo also to issue if there is regional flooding, unless otherwise coordinated and agreed with LDMG. If LDMG issue the AWS, LDMG may use discretion in adapting the AWS prepared messaging provided in APPENDIX E, as required.> Prepare and send AWS E4 After the flood > Alert > Threat is reduced *If event does not escalate to point where all stakeholders have been notified then communication at stand down should be limited to those that received communications during the event*

Table 18: Piping / Leakage DSTDM Emergency Actions

Activation Level			Stand Up 1	Stand Up 2	
Activation trigger		• Unexpected increased leakage through the embankment, foundations or abutments with cloudy water, OR • Unexpected cloudy water in A Weir or spillway dissipator	Piping condition has been established	• Failure in progress or likely due to piping • Sufficient water in storage to create a dam hazard	Risk assessment has established risk has reduced.
Actions	• Record all communication • Arrange an inspection of the dam and assess its condition as soon as possible, when safe to do so. • Determine if piping condition has been established • Monitor situation and assess risks • Provide technical advice to DDO and IC on a needs basis • Ensure back up resources for DSTDM are on stand by	• As per previous activation level, • Brief LDMG id requested	• Assess risk and determine if failure likely or in progress • Liaise with the IC & DDO • 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). Supervision activity may require appointing a separate resource to assist.	• As per previous activation level, AND • Liaise with the IC and advise on need to recommend evacuations	• Forward all logs and communications including relevant emails for EER to ORR • Conduct special inspection (if required) • If damage reported provide insurance notification • Assess need for remedial works

Activation Level		Lean Forward	Stand Up 1	Stand Up 2	Stand Down
	• Liaise with DSR and ensure situational awareness				• Return to routine activities
Internal notifications	1. DDO 2. IC	As per previous level	As per previous level	As per previous level	As per previous level
External notifications	1. DSR	As per previous level	As per previous level	As per previous level	As per previous level

7. Dam hazard – Distress in embankment due to embankment instability issues (non-piping initiated)

7.1. Overview

The emergency action described in this section relates to a potential dam hazard of embankment instability due to erosion, scouring, cracking, deformation, sliding or other processes/defects leading to embankment instability.

If a process or defect affecting embankment stability is established and progresses, then a dam failure may result. If detected early remedial works may be possible to limit and repair the damage, and therefore preventing dam failure.

This potential dam hazard may occur with or without associated regional concurrent flooding. As a general principle, CleanCo will lead the external communications and issue the Emergency Alerts when in Stand Up activation level, if:

- distress in embankment due to embankment instability issues occurs without regional flooding (i.e. Sunny Day Failure, SDF, scenario), and/or
- the Stand Up level of embankment instability hazard occurs suddenly without adequate warning to coordinate with the LDMG.

If the dam hazard occurs with regional flooding and there has been adequate warning of the potential hazard prior to Stand Up, CleanCo shall coordinate and agree with LDMG on which party is best placed to lead the external communications (particularly to the public) at Stand Up depending on the magnitude and extent of regional flooding, risk, current warnings and other contextual inputs. Refer to the external communications plan in Table 22.

The flood outlines in APPENDIX B are there to provide indicative outlines of the maximum potentially affected area of a dam failure. The use of these flood outlines is prescribed below:

- Use the SDF outline when a dam failure is in progress or likely due to embankment instability, and no concurrent or downstream flooding is occurring or expected to occur, or
- Use the relevant downstream concurrent flooding scenario maps when a dam failure is in progress or likely due to embankment instability and concurrent or downstream flooding is occurring or expected to occur. Refer also to Section 5, Dam hazard – Flood Operations.

7.2. Affected Areas and Dam Failure Inundation Times

The CWD Failure Impact Assessment (FIA) showed that for a Sunny Day Failure the failure impact zone is largely contained within the Bundamba Creek watercourse. Travel times for SDF flood event to key locations are summarised in Table 19.

Table 19: SDF Inundation Times at junction with Bundamba Creek

Location	Time to first rise in water level (from failure initiation)	Time to inundation peak (from failure initiation)
Cunningham Highway[1]	2 hours	3 hours 48 minutes
Blackstone Road[2]	4 hours 28 minutes	6 hours 12 minutes
Brisbane Road[2]	6 hours 12 minutes	7 hours 56 minutes
Gledson Street[2]	7 hours 28 minutes	8 hours 44 minutes

[1]State Road – Contact BMTMC to facilitate road closure (refer Table 32 for contact details)
[2]Local Road – Contact ICC to facilitate road closure (refer Table 32 for contact details)

7.2.1. Assessment of circumstances that indicate an increase in the likelihood of embankment instability

Erosion, scouring, cracking, deformation and other processes/defects may be identified during inspections. Signs of embankment distress, such as cracks of scarps near the crest and bulges at the toe, are the trigger for an alert activation level. Scour continuing and erosion becoming significant to the point where stability is impacted is a trigger for lean forward actions.

7.2.2. Emergency action roles

Table 20 to

Table 23 specify emergency actions and communication plan for the following roles:

- Dam Duty Officer (DDO)
- Incident Controller (IC)
- Dam Safety Technical Decision Maker (DSTDM)

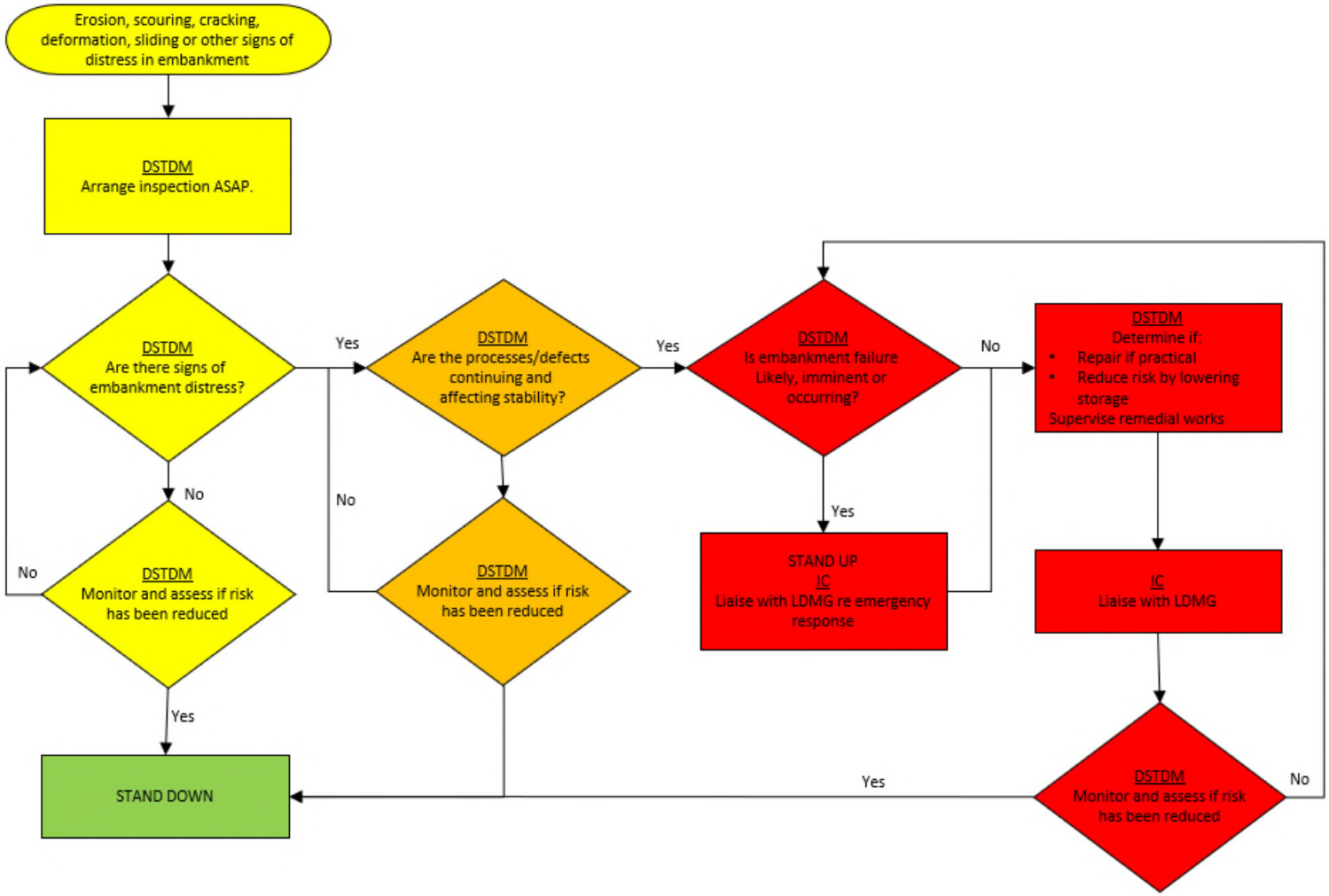


Figure 7: Non-piping embankment stability issues flowchart

Table 20: Embankment stability issues (non-piping) - DDO Emergency Action

Activation Level		Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Initial signs of embankment distress such as cracks or scarps near the crest and/or bulges at the toe, OR • Scour of spillway	Deformation or scour continuing and erosion/deformation becoming significant to the point where stability may be impacted	• Loads on embankment increasing or cracking deformation/increasing to state where safety of the dam is significantly impaired	• Failure in progress • Sufficient water in storage to create a dam hazard	Risk assessment has established risk has reduced.
Actions	• Record all communications • Inspect affected area of embankment. Watch for signs of cracking or deformation progressing. • Notify the DSTDM, Report the nature of the problem, details of influencing factors (e.g. description and location of defects, abnormalities, cracking, sliding, differential movement of walls etc.) • Measure, photograph/video and document, and send to IC and Dam Safety Engineer DSTDM (or Dam Safety Consultant if DSTDM is not available) • Update dam log book	• As per previous activation level, AND • If significant cracking/deformation, erosion, or scour liaise with DSTDM to confirm trigger has been met	• As per previous activation level AND • Support/supervise remedial works as required • Lower the storage if directed • Maintain surveillance of area immediately downstream of dam and attempt to move on any members of the public	• As per previous activation level, AND • Vacate the immediate vicinity of the damage • Ensure remedial works cease and plant and personnel have been moved to a safe location	• Forward all communication, inspection sheets, photos and other data to ORR for EER • Update dam log book • Return to routine activities

Activation Level		Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Internal notifications	1. IC 2. DSTDM	As per previous level	As per previous level	As per previous level	As per previous level
External notifications			Members of public in vicinity of dam		

Table 21: Embankment stability issues (non-piping) - IC Emergency Action

Activation Level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Initial signs of embankment distress such as cracks or scarps near the crest and/or bulges at the toe, OR • Scour of spillway	Deformation or scour continuing and erosion/deformation becoming significant to the point where stability may be impacted	Loads on embankment	• Failure in progress • Sufficient water in storage to create a dam hazard	Risk assessment has established risk has reduced.
Actions	• Record all communication • Liaise with DDO and DSTDM regarding situation • Enact communication Plan • Review staffing levels and implement rosters • Notify SO for DDO • Raise incident in accordance with Event Management Standard	• As per previous activation level, AND • If significant cracking/deformation, erosion, or scour first liaise with DSTDM to confirm trigger has been met • Liaise with LDMGs regarding situation • 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 for the follow through on actions to close out all matters and works outstanding after the initial emergency is over.	• As per previous activation level, AND • Liaise with DDO and relevant LDMG regarding potential road closures • Mobilise resources to undertake remedial works if directed by DSTDM • Consider lowering storage level • Recommend to CleanCo CEO to enact crisis management plan	• As per previous activation level, AND • Direct remedial works to cease if directed by the DSTDM and plant and personnel to be moved to a safe location • Liaise with the DSTDM to confirm that dam failure is in progress	• Complete all Internal and External notifications • Forward all communications including relevant emails for EER to ORR • Close out Incident Report Record • Liaise with DSTDM for any immediate repairs and structural damage of the dam • Return to routine activities

Activation Level		Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Internal notifications	1. DSTDM 2. DDO 3. SO 4. PTD 5. GMAO	As per previous level Corporate media	As per previous level CEO	As per previous level	As per previous level
External notifications	As required in external communication plan	As required in external communication plan	As required in external communication plan	As required in external communication plan	As required in external communication plan

Table 22: Embankment stability issues (non-piping) - IC external communication plan

Activation level	Trigger for communication	Group to contact	Method	Message
Alert	• Initial signs of embankment distress such as cracks or scarps near the crest and/or bulges at the toe, OR • Scour of spillway	LDMG	Phone Provide updates as required/requested 	Describe current situation with dam: What is the event? (Dam Safety Risk—embankment erosion/cracking/deformation condition) What is the status? (Unconfirmed embankment instability — Investigation continues) Advise of current storage level Advise any issues you are aware of Standby for further advices
Lean Forward	Deformation or scour continuing and erosion/deformation becoming significant to the point where stability may be impacted	1. LDMG 2. Ipswich Police 3. DDMG	Phone Provide updates as required/requested 	Describe current situation with dam: What is the event? (Dam Safety Risk—embankment erosion/cracking/deformation condition) What is the status? (Unconfirmed embankment instability — Investigation continues) Advise of current storage level Advise any issues you are aware of Standby for further advices
Stand Up 1	Loads on embankment increasing or cracking deformation/increasing to state where safety of the dam is significantly impaired	1. LDMG 2. Ipswich Police 3. DDMG 4. Bunnings Bundamba	Phone Provide updates as required/requested 	Describe current situation with dam: What is the event? (Dam Safety Risk-– embankment erosion/cracking/deformation condition). What is the status? (Confirmed embankment instability) Advise of current storage level Advise any issues you are aware of. Discuss any potential road/bridge closures. LDMG to liaise with Brisbane Metropolitan Traffic Management Centre (BTMC) and Ipswich City Council. Prepare for possible evacuations
		5. D/s residents 	Emergency Alert (EA) – Watch and Act. CleanCo to issue in SDF situation. CleanCo to also issue if there is regional flooding, unless coordinated and agreed with LDMG.	Watch and Act, CleanCo: Swanbank Cooling Water Dam in distressed condition. Prepare to move. Listen for further advice Monitor Ipswich Disaster & Emergency Board https://disaster.ipswich.qld.gov.au/

Activation level	Trigger for communication	Group to contact	Method	Message
			CleanCo SMS Subscriber service Local ABC radio ABC 612 Brisbane: [redacted] River 94.9FM Phone: [redacted] [redacted] | Studio: [redacted] CleanCo Web page & Facebook www.cleancoqueensland.com.au	< CleanCo to issue in SDF situation. CleanCo also to issue if there is regional flooding, unless otherwise coordinated and agreed with LDMG. If LDMG issue the AWS, LDMG may use discretion in adapting the AWS prepared messaging provided in APPENDIX E, as required.>  Prepare and send AWS E1 Riverine Flood > Watch and Act > Prepare to Leave link to SDF flood maps. If d/s flooding occurring then consider one of the coincident flooding maps
Stand Up 2	• Failure in progress • Sufficient water in storage to create a dam hazard	1. LDMG 2. Ipswich Police 3. DDMG 4. Bunnings Bundamba	Phone Provide updates as required/requested 	Describe current situation with dam: What is the event? (Dam Safety Risk - embankment instability condition) What is the status? (Possible Dam Failure) Advise of current storage level LDMG to prepare coordinated evacuations noting indicative lead time until impact as follows
		5. D/s residents	Emergency Alert (EA) – Warning. CleanCo to issue in SDF situation. CleanCo to also issue if there is regional flooding, unless coordinated and agreed with LDMG. 	Phone: Emergency. Emergency. This is a Flood Emergency Warning from Swanbank Dam. Areas along Bundamba Creek are in immediate danger. You should warn neighbours, secure your belongings, and move to higher ground NOW. This is an EMERGENCY, do not DELAY. For more information listen to local radio or visit https://cleancoqueensland.com.au/ https://disaster.ipswich.qld.gov.au/ (delete one) If your life is in danger, call Triple zero. Emergency. Flood Warning. Properties near Bundamba Creek. Evacuate to higher ground NOW. Warn neighbours. Listen to radio or https://cleancoqueensland.com.au/

Activation level	Trigger for communication	Group to contact	Method	Message
				https://disaster.ipswich.qld.gov.au/ (delete one). If your life is in danger, call Triple zero.
			CleanCo SMS Subscriber service	
			Local ABC radio ABC 612 Brisbane: [redacted] River 94.9FM Phone: [redacted]	LDMG. If LDMG issue the AWS, LDMG may use discretion in adapting the AWS prepared messaging provided in APPENDIX E, as required.>
			CleanCo Web page & Facebook www.cleancoqueensland.com.au	 Prepare and send AWS E3 Riverine Flood > Emergency Warning > Leave Immediately link to SDF flood maps. If d/s flooding occurring then consider one of the coincident flooding maps
Stand down	Risk assessment has established risk has reduced.	1. LDMG 	Phone	Describe current situation with Dam: What is the event? (Dam Safety Risk— Risk - embankment instability condition) What is the status? (Dam hazard Stood Down) Advise risk assessment has determined that failure risk has reduced and EAP has been deactivated
		2. Bundamba Bunnings 3. D/s residents 	SMS notification. CleanCo to issue SMS alert.	Refer APPENDIX D for contact list Phone/SMS Provide updates as required/requested Advice CleanCo: Dam emergency ceased, Swanbank Cooling Water Dam Refer Cleancoqld.com.au for more details
			CleanCo SMS Subscriber service	<CleanCo to issue in SDF situation. CleanCo also to issue if there is regional flooding, unless otherwise coordinated and agreed with LDMG. If LDMG issue the AWS, LDMG may use discretion in adapting the AWS prepared messaging provided in APPENDIX E, as required.>
			Local ABC radio ABC 612 Brisbane: [redacted] River 94.9FM Phone: [redacted]	

Activation level	Trigger for communication	Group to contact	Method	Message
			CleanCo Web page & Facebook www.cleancoqueensland.com.au	Prepare and send AWS E4 After the flood > Advice > Threat is reduced *If event does not escalate to point where all stakeholders have been notified then communication at stand down should be limited to those that received communications during the event*

Table 23: Embankment stability issues (non-piping) - DSTDM Emergency Actions

Activation Level		Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Initial signs of embankment distress such as cracks or scarps near the crest and/or bulges at the toe, OR • Scour of spillway	Deformation or scour continuing and erosion/deformation becoming significant to the point where stability may be impacted	• Loads on embankment increasing or cracking deformation/increasing to state where safety of the dam is significantly impaired	• Failure in progress • Sufficient water in storage to create a dam hazard	Risk assessment has established risk has reduced.
Actions	• Record all communication • Arrange an inspection of the dam and assess its condition as soon as possible, when safe to do so. • Determine if embankment instability is established • Monitor situation and assess risks • Provide technical advice to DDO and IC on a needs basis • Ensure back up resources for DSTDM are on stand by • Liaise with DSR and ensure situational awareness	• As per previous activation level,	• Assess risk and determine if failure likely or in progress • Liaise with the IC & DDO • 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). Supervision activity may require appointing a separate resource to assist.	• As per previous activation level, AND • Liaise with the IC and advise on need to recommend evacuations	• Forward all logs and communications including relevant emails for EER to ORR • Conduct special inspection (if required) • If damage reported provide insurance notification • Assess need for remedial works • Return to routine activities

Activation Level		Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Internal notifications	1. DDO 2. IC	As per previous level	As per previous level	As per previous level	As per previous level
External notifications	1. DSR	As per previous level	As per previous level	As per previous level	As per previous level

8. Dam hazard – Earthquake

8.1. Overview

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

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

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

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

8.2. Emergency action roles

Table 24 to Table 27 specify emergency actions and communication plan for the following roles:

- Dam Duty Officer (DDO)
- Incident Controller (IC)
- Dam Safety Technical Decision Maker (DSTDM)

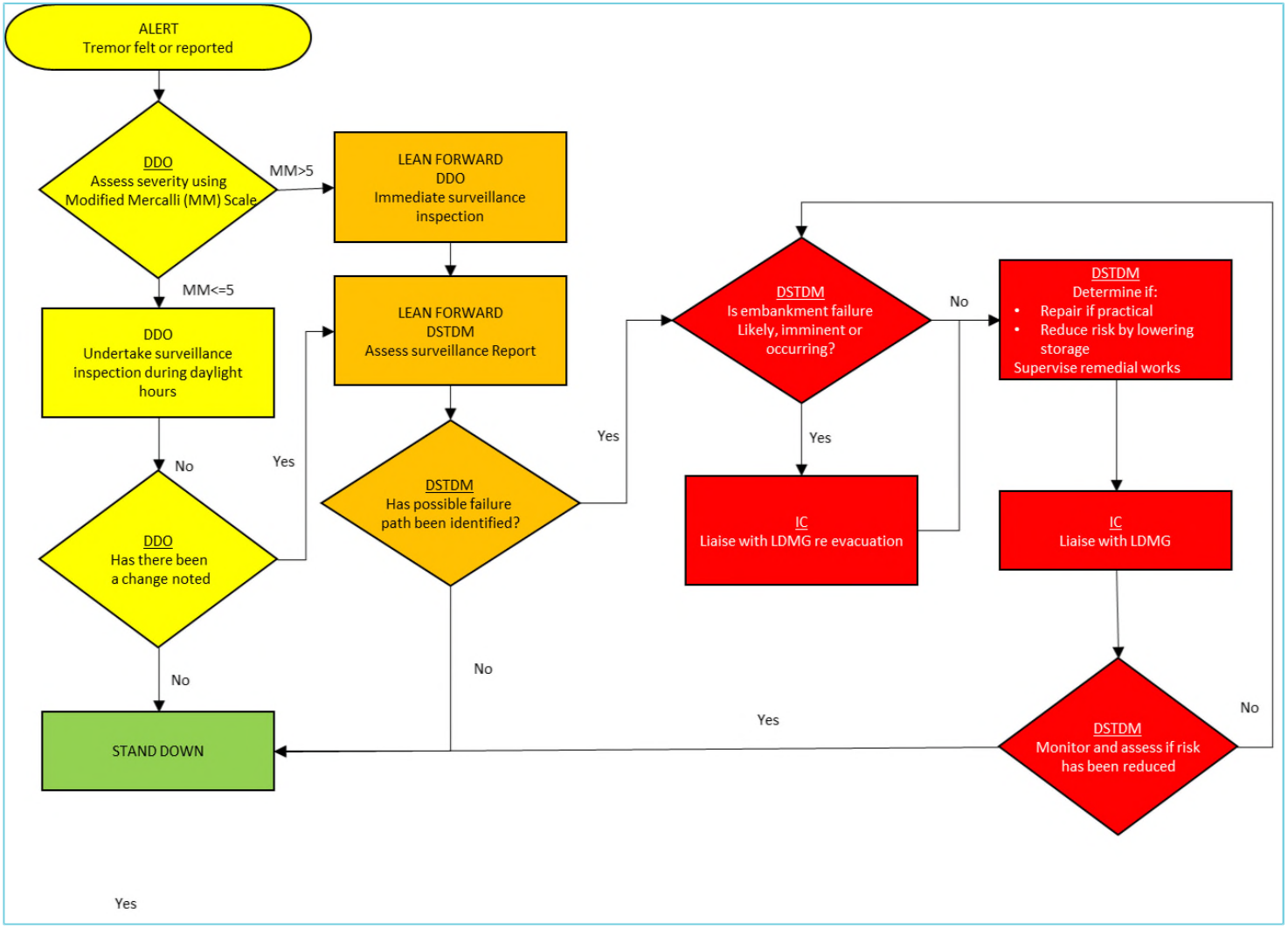


Figure 8: Earthquake flowchart

Table 24: Earthquake - DDO Emergency Action

Activation Level		Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Earthquake reported or felt in the area, AND • Intensity less than 5 MM[6]	• Earthquake reported or felt in the area, AND • Intensity greater than or equal to 5 MM OR • Intensity less than 5MM and change detected during surveillance inspection	• Earthquake reported or felt in the area, AND • A possible failure path has been identified	• Failure in progress or likely due to earthquake, AND • Sufficient water in storage to create a dam hazard	Risk assessment has established risk has reduced.
Actions	• DDO to assess magnitude (MM scale) at dam location in consultation with DSTDM • Record all communications • Inspect dam in daylight hours for other signs of distress such as slumping, cracking or movement and report to the DSTDM and IC - photograph/ video and record • Check for leaks, deformation, and damage • Update dam log book	• As per previous activation level, AND • Immediately inspect for leakage and evidence of initiation of piping, of embankment slips on both upstream and downstream slopes, cracking or movement of concrete monoliths and in the abutments • Repeat the inspection as directed	• As per previous activation level AND • Support/supervise remedial works as required • Lower the storage if directed • Close any affected roads if not already closed by others • Maintain surveillance of area immediately downstream of dam and attempt to move on any members of the public	• As per previous activation level, AND • Vacate the immediate vicinity of the damage / cracking / piping condition • Ensure remedial works cease and plant and personnel have been moved to a safe location	• Forward all communication, inspection sheets, photos and other data to ORR for EER • Update dam log book • Return to routine activities

[6] *Refer description of Modified Mercalli scale in Appendix F*

Activation Level		Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Internal notifications	1. DSTDM 2. IC	As per previous level	As per previous level	As per previous level	As per previous level
External notifications			Members of public in vicinity of dam		

Table 25: Earthquake - IC Emergency Action

Activation Level		Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Earthquake reported or felt in the area, AND • Intensity less than 5 MM[7]	• Earthquake reported or felt in the area, AND • Intensity greater than or equal to 5 MM OR • Intensity less than 5MM and change detected during surveillance inspection	• Earthquake reported or felt in the area, AND • A possible failure path has been identified	• Failure in progress or likely due to earthquake, AND • Sufficient water in storage to create a dam hazard	Risk assessment has established risk has reduced.
Actions	• Record all communication • Liaise with DDO and DSTDM regarding situation • Notify SO for DDO • Enact communication Plan • Raise incident in accordance with Event Management Standard • Notify PTD and GMAO	• As per previous activation level, AND • Review staffing levels and implement rosters • Raise incident in accordance with Event Management Standard (if not already done) • Notify PTD and GMAO • Liaise with LDMG regarding situation • 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 Ipswich LDMG regarding potential road/bridge closures • Emergency Alert (EA) – through LDMG if practical. • Mobilise resources to undertake remedial works if directed by DSTDM • Consider lowering storage level	• As per previous activation level, AND • Direct remedial works to cease if directed by the DSTDM and plant and personnel to be moved to a safe location • Liaise with the DSTDM to confirm that dam failure is in progress	• Complete all Internal and External notifications • Forward all communications including relevant emails for EER to ORR • Close out Incident Report Record • Liaise with DSTDM for any immediate repairs and structural damage of the dam • Return to routine activities

[7] *Refer description of Modified Mercalli scale in Appendix F forms*

Activation Level		Lean Forward	Stand Up 1	Stand Up 2	Stand Down
			• Recommend to CleanCo CEO to enact crisis management plan		
Internal notifications	1. DSTDM 2. DDO 3. SO 4. PTD 5. GMAO	As per previous level Corporate media	As per previous level CEO	As per previous level	As per previous level
External notifications	As required in external communication plan	As required in external communication plan	As required in external communication plan	As required in external communication plan	As required in external communication plan

Table 26: Earthquake IC external communication plan

Activation level	Trigger for communication	Group to contact	Method	Message
Alert	• Earthquake reported or felt in the area, AND • Intensity less than 5 MM[8]	LDMG	Phone Provide updates as required/requested 	Describe current situation with dam: What is the event? (Dam Safety Risk-– earthquake felt or reported) What is the status? (Under Investigation) Advise of current storage level Advise any issues you are aware of Standby for further advices
Lean Forward	• Earthquake reported or felt in the area, AND • Intensity greater than or equal to 5 MM OR • Intensity less than 5MM and change detected during surveillance inspection	1. LDMG 2. Ipswich Police 3. DDMG	Phone Provide updates as required/requested 	Describe current situation with dam: What is the event? (Dam Safety Risk— earthquake felt or reported) What is the status? (Under Investigation) Advise of current storage level Advise any issues you are aware of Standby for further advices
Stand Up 1	• Earthquake reported or felt in the area, AND • A possible failure path has been identified	1. LDMG 2. Ipswich Police 3. DDMG 4. Bunnings Bundamba	Phone Provide updates as required/requested 	Describe current situation with dam: What is the event? (Dam Safety Risk—earthquake damage). What is the status? (Possible earthquake damage to dam) Advise of current storage level Advise any issues you are aware of. Discuss any potential road/bridge closures Activate emergency LDMP

[8] *Refer description of Modified Mercalli scale in Appendix F*

Activation level	Trigger for communication	Group to contact	Method	Message
				Prepare for possible evacuations
		5. D/S residents	Emergency Alert (EA) – Watch and Act through LDMG if practical 	Watch and Act, CleanCo: Swanbank Cooling Water Dam in distressed condition. Possible earthquake damage to dam. Prepare to move. Listen for further advice Monitor https://disaster.ipswich.qld.gov.au
			CleanCo SMS Subscriber service	<Coordinate with LDMG. LDMG may exercise some discretion in adapting the communications messaging based on risk, current warnings and other contextual inputs.> 
			Local ABC radio ABC 612 Brisbane: [redacted]	
			River 94.9FM Phone: [redacted] | Studio: [redacted]	
			CleanCo Web page & Facebook www.cleancoqueensland.com.au	Prepare and send AWS E1 Riverine Flood > Watch and Act > Prepare to Leave link to SDF flood maps. If d/s flooding occurring then consider one of the coincident flooding maps
Stand Up 2	• Failure in progress or likely due to earthquake, AND • Sufficient water in storage to create a dam hazard	1. LDMG 2. DDMG 3. Ipswich Police	Phone Provide updates as required/requested 	Describe current situation with dam: What is the event? (Dam Safety Risk- Earthquake damage) What is the status? (Possible/Likely/In progress Dam Failure) Advise of current storage level Prepare coordinated evacuations • Cunningham Highway – 45 to 90 minutes • Brisbane Rd 2 to 3 hours
		4. D/s residents	Emergency Alert (EA) – Warning through LDMG if practical 	Phone: Emergency. Emergency. This is a Flood Emergency Warning from Swanbank Dam. Areas along Bundamba Creek are in immediate danger. You should warn neighbours, secure your belongings, and move to higher ground NOW. This is an EMERGENCY, do not DELAY. For more information listen to local radio or visit https://cleancoqueensland.com.au/ https://disaster.ipswich.qld.gov.au/ (delete one)

Activation level	Trigger for communication	Group to contact	Method	Message
				Emergency. Flood Warning. Properties near Bundamba Creek. Evacuate to higher ground NOW. Warn neighbours. Listen to radio or https://cleancoqueensland.com.au/ https://disaster.ipswich.qld.gov.au/ (delete one)
			CleanCo SMS Subscriber service	<Coordinate with LDMG. LDMG may exercise some discretion in adapting the communications messaging based on risk, current warnings and other contextual inputs.>
			Local ABC radio ABC 612 Brisbane: [redacted] River 94.9FM Phone: [redacted] | Studio: [redacted]	
			CleanCo Web page & Facebook www.cleancoqueensland.com.au	EMERGENCY WARNING Prepare and send AWS E3 Riverine Flood > Emergency Warning > Leave Immediately link to SDF flood maps. If d/s flooding occurring then consider one of the coincident flooding maps
Stand down	Risk assessment has established risk has reduced.	1. LDMG	Phone	Describe current situation with Dam: What is the event? (Dam Safety Risk –earthquake) What is the status? (Dam hazard Stood Down) Advise risk assessment has determined that failure risk has reduced and EAP has been deactivated
		2. Bunnings Bundamba 3. D/s residents	SMS notification	<Coordinate with LDMG. CleanCo to issue notification.> Advice CleanCo: Dam emergency ceased, Swanbank Cooling Water Dam Refer Cleancoqld.com.au for more details.
			CleanCo SMS Subscriber service	<Coordinate with LDMG. LDMG may exercise some discretion in adapting the communications messaging based on risk, current warnings and other contextual inputs.>
			Local ABC radio ABC 612 Brisbane: [redacted] River 94.9FM Phone: [redacted] | Studio: [redacted]	Prepare and send AWS E4 After the flood > Advice > Threat is reduced *If event does not escalate to point where all stakeholders have been notified then communication at stand down should be limited to those that received communications during the event*
			CleanCo Web page & Facebook www.cleancoqueensland.com.au	

Activation level	Trigger for communication	Group to contact	Method	Message

Table 27: Earthquake - DSTDM Emergency Actions

Activation Level	Alert	Lean Forward	Stand Up 1	Stand Up 2	Stand Down
Activation trigger	• Earthquake reported or felt in the area, AND • Intensity less than 5 MM[9]	• Earthquake reported or felt in the area, AND • Intensity greater than or equal to 5 MM OR • Intensity less than 5MM and change detected during surveillance inspection	• Earthquake reported or felt in the area, AND • A possible failure path has been identified	• Failure in progress or likely due to earthquake, AND • Sufficient water in storage to create a dam hazard	Risk assessment has established risk has reduced.
Actions	• Confirm/estimate magnitude at dam site • Record all communication • Determine if piping, sliding, overturning, slumping or other failure condition has been established	• As per previous activation level, AND • Review surveillance inspection of the dam and assess its condition as soon as possible • Determine if there are possible failure paths from reported damage	• Arrange a DSTDM 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 & DDO • Determine if remedial repairs are practical	• As per previous activation level, AND • Liaise with the IC and advise on need to recommend evacuations	• Forward all logs and communications including relevant emails for EER to ORR • Conduct special inspection (if required) • If damage reported provide insurance notification • Assess need for remedial works

[9] *Refer description of Modified Mercalli scale in Appendix F*

Activation Level		Lean Forward	Stand Up 1	Stand Up 2	Stand Down
	• Monitor situation and assess risks • Provide technical advice to DDO and IC on a needs basis • Liaise with DSR and ensure situational awareness	• Ensure back up resources for DSTDM are on stand by	• 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). May require appointing a separate resource to assist with supervision		• Return to routine activities
Internal notifications	1. DDO 2. IC	As per previous level	As per previous level	As per previous level	As per previous level
External notifications	1. DSR	As per previous level	As per previous level	As per previous level	As per previous level

9. Terrorist threat/activity or high energy impact

9.1. Overview

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

The vulnerability of Swanbank Cooling Water Dam to a terrorist attack is low.

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

- Use the SDF outline when a dam failure is in progress or likely due to a terrorist threat/activity or a high energy impact and no concurrent or downstream flooding is occurring or expected to occur, or
- Use the PMPDF outline when a dam failure is in progress or likely due to a terrorist threat/activity or a high energy impact and concurrent or downstream flooding is occurring or expected to occur.

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

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

9.2. Emergency action roles

Table 28 to Table 31 specify emergency actions and communication plan for the following roles:

- Dam Duty Officer (DDO)
- Incident Controller (IC)
- Dam Safety Technical Decision Maker (DSTDM)

Figure 9: Terrorist threat/activity or high energy impact flowchart

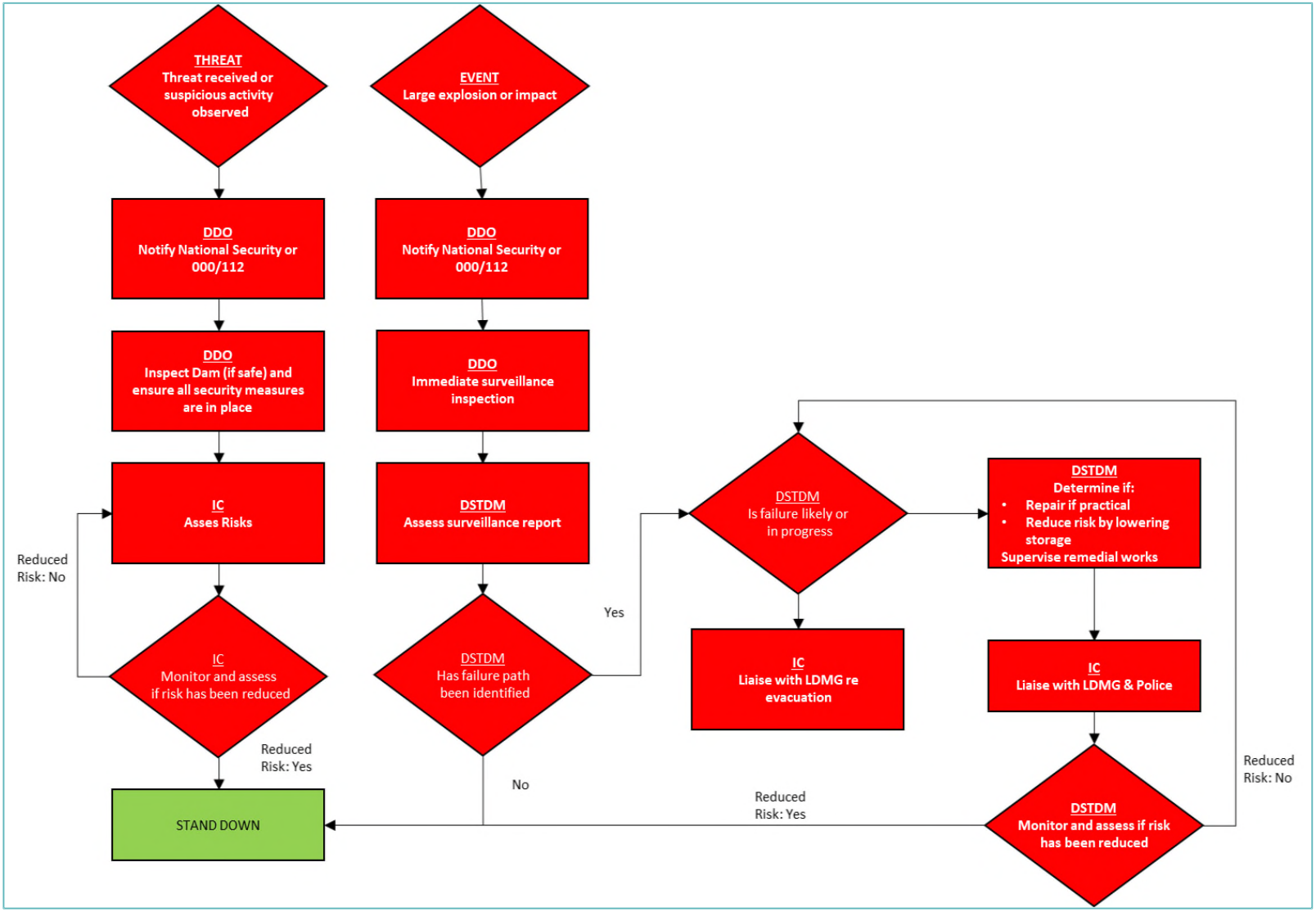


Table 28: Terrorist Threat - DDO Emergency Action

Activation Level		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 established risk has reduced.
Actions	Not applicable	NOTE: If any suspicious behaviour noticed, contact SMSPS for advice. If instructed by SMSPS, or if threat received, complete the following: • Notify National Security • Inspect dam (if safe) and ensure all security measures are in place (locked gates, etc.) • Close any affected roads, if not already closed by others • Update Dam Log Book • If Police appoint incident manager support and follow instructions • Record all communication	• As per previous activation level AND • Vacate the immediate vicinity of the affected area. • Inspect for damage (only if safe to do so or cleared by Police) • Photograph/video the damage from a safe point and record using the approved forms and send to IC & DSTDM	• As per previous activation level, AND • Lower storage level if directed • Maintain surveillance of area immediately downstream of dam or saddle dams and attempt to move on any members of the public • Assist with warning Recreational river users of event and advise any watercraft on the dam of the situation where possible.	• Forward all communication, inspection sheets, photos and other data to ORR for EER • Update dam log book • Return to routine activities

Activation Level		Stand Up 1	Stand Up 2	Stand Up 3	Stand Down
Internal notifications	Not applicable	1. SMSPS 2. DSTDM 3. IC	As per previous level	As per previous level	As per previous level
External notifications		National Security Hotline / 000	National Security Hotline / 000	Members of public in vicinity of dam	

Table 29: Terrorist Threat - IC Emergency Action

Activation Level		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 receive	**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 established risk has reduced.
Actions	• Not applicable	• Liaise with DDO, DSTDM, and LDMG regarding situation • If Police appoint incident manager support and follow instructions • Liaise with DDO and relevant Council(s) regarding possible road/bridge closures • Monitor situation and assess risks • Raise incident in accordance with Event Management Standard • Contact GMAO or GM Performance Risk and Finance – Notify of EAP Activation. • Record all communication	• As per previous activation level • Emergency Alert (EA) - CleanCo to issue emergency alert • Consider lowering storage level	• As per previous activation level, AND • Liaise with the DSTDM to confirm that dam failure is in progress • Liaise with DDO, and DSTDM re: potential for evacuations • Mobilise resources to undertake remedial works if directed by DSTDM	• Forward all communication, inspection sheets, photos and other data to ORR for EER • Close incident report record • Return to routine activities
Internal notifications	Not applicable	1. DDO 2. DSTDM 3. GMAO	As per previous level	As per previous level	As per previous level

Activation Level		Stand Up 1	Stand Up 2	Stand Up 3	Stand Down
External notifications	As required in external communication plan	As required in external communication plan	As required in external communication plan	As required in external communication plan	As required in external communication plan

Table 30: Terrorist Threat IC external communication plan

Activation level	Trigger for communication	Group to contact	Method	Message Text
Alert	Not Applicable			
Lean Forward	Not Applicable			
Stand Up 1	**THREAT** • Possible terrorist activity/suspicious behaviour noticed at the dam, OR • Threat receive	1. CSTN (National Security Hotline) if not already done so by DDO 2. Ipswich Police 3. LDMG	Phone Provide updates as required/requested	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)	1. CSTN (National Security Hotline) if not already done so by DDO 2. Ipswich Police 3. LDMG	Phone Provide updates as required/requested	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
		4. D/S Residents 	Emergency Alert (EA). Watch and ActCleanCo to issue, unless otherwise coordinated and agreed upon with LDMG.	<Redevelop message to suit circumstance> Watch & Act, CleanCo: Swanbank Cooling Water Dam Security incident Prepare to move and await further advice Monitor Ipswich Disaster & Emergency Board https://disaster.ipswich.qld.gov.au
			CleanCo SMS Subscriber service	<CleanCo to issue, unless otherwise coordinated and agreed upon with LDMG>  Prepare and send AWS E1 Riverine Flood > Watch and Act > Prepare to Leave link to SDF flood maps. If d/s flooding occurring then consider one of the coincident flooding maps
			Local ABC radio ABC 612 Brisbane: [redacted] River 94.9FM Phone: [redacted] | Studio: [redacted]	
			CleanCo Web page & Facebook www.cleancoqueensland.com.au	

Activation level	Trigger for communication	Group to contact	Method	Message Text
Stand Up 3	• Failure in progress or likely due to impact or explosion, AND • Sufficient water in storage to create a dam hazard	1. CSTN (National Security Hotline) 2. Ipswich Police 3. LDMG	Phone Provide updates as required/requested	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
		1. D/S Residents	Emergency Alert (EA) – Warning CleanCo to issue, unless otherwise coordinated and agreed upon with LDMG. 	Phone: Emergency. Emergency. This is a Flood Emergency Warning from Swanbank Dam. Areas along Bundamba Creek are in immediate danger. You should warn neighbours, secure your belongings, and move to higher ground NOW. This is an EMERGENCY, do not DELAY. For more information listen to local radio or visit https://cleancoqueensland.com.au/ https://disaster.ipswich.qld.gov.au/ (delete one). If your life is in danger, call Triple zero. Emergency. Flood Warning. Properties near Bundamba Creek. Evacuate to higher ground NOW. Warn neighbours. Listen to radio or https://cleancoqueensland.com.au/ https://disaster.ipswich.qld.gov.au/ (delete one). If your life is in danger, call Triple zero.
			CleanCo SMS Subscriber service Local ABC radio ABC 612 Brisbane: [redacted] River 94.9FM Phone: [redacted] | Studio: [redacted] CleanCo Web page & Facebook www.cleancoqueensland.com.au	<CleanCo to issue, unless otherwise coordinated and agreed upon with LDMG.>  Prepare and send AWS E3 Riverine Flood > Emergency Warning > Leave Immediately link to SDF flood maps, If d/s flooding occurring then consider one of the coincident flooding maps

Activation level	Trigger for communication	Group to contact	Method	Message Text
Stand down	Risk assessment has established risk has reduced.	1. LDMG 2. Ipswich Police		
		3. Bundamba Bunnings 4. D/S residents		Advice CleanCo: Dam emergency ceased, Swanbank Cooling Water Dam Refer Cleancoqld.com.au for more details
			CleanCo SMS Subscriber service	< CleanCo to issue, unless otherwise coordinated and agreed upon with LDMG>
			Local ABC radio ABC 612 Brisbane: [redacted] River 94.9FM Phone: [redacted] | Studio: [redacted]	
			CleanCo Web page & Facebook www.cleancoqueensland.com.au	

Table 31: Terrorist Threat - DSTDM Emergency Actions

Activation Level		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 receive	**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 established risk has reduced.
Actions	Not applicable	• Liaise with IC and DDO • Liaise with CleanCo Executive • Record all communication	• As per previous activation level, AND • Arrange an inspection of the dam and assess its condition as soon as possible, when safe to do so • Assess risk and determine if failure likely or in progress • Liaise with 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)	• As per previous activation level, AND • Liaise with the IC and advise on need to recommend evacuations	• Forward all logs and communications including relevant emails for EER to ORR • Conduct special inspection (if required) • Assess need for remedial works • Return to routine activities

Activation Level		Stand Up 1	Stand Up 2	Stand Up 3	Stand Down
			• Supervise remedial repairs (if applicable)		
Internal notifications	Not applicable	1. IC 2. DDO 3. CleanCo Exec	As per previous level	As per previous level	As per previous level
External notifications		DSR	As per previous level	As per previous level	As per previous level

APPENDIX A: Polygons

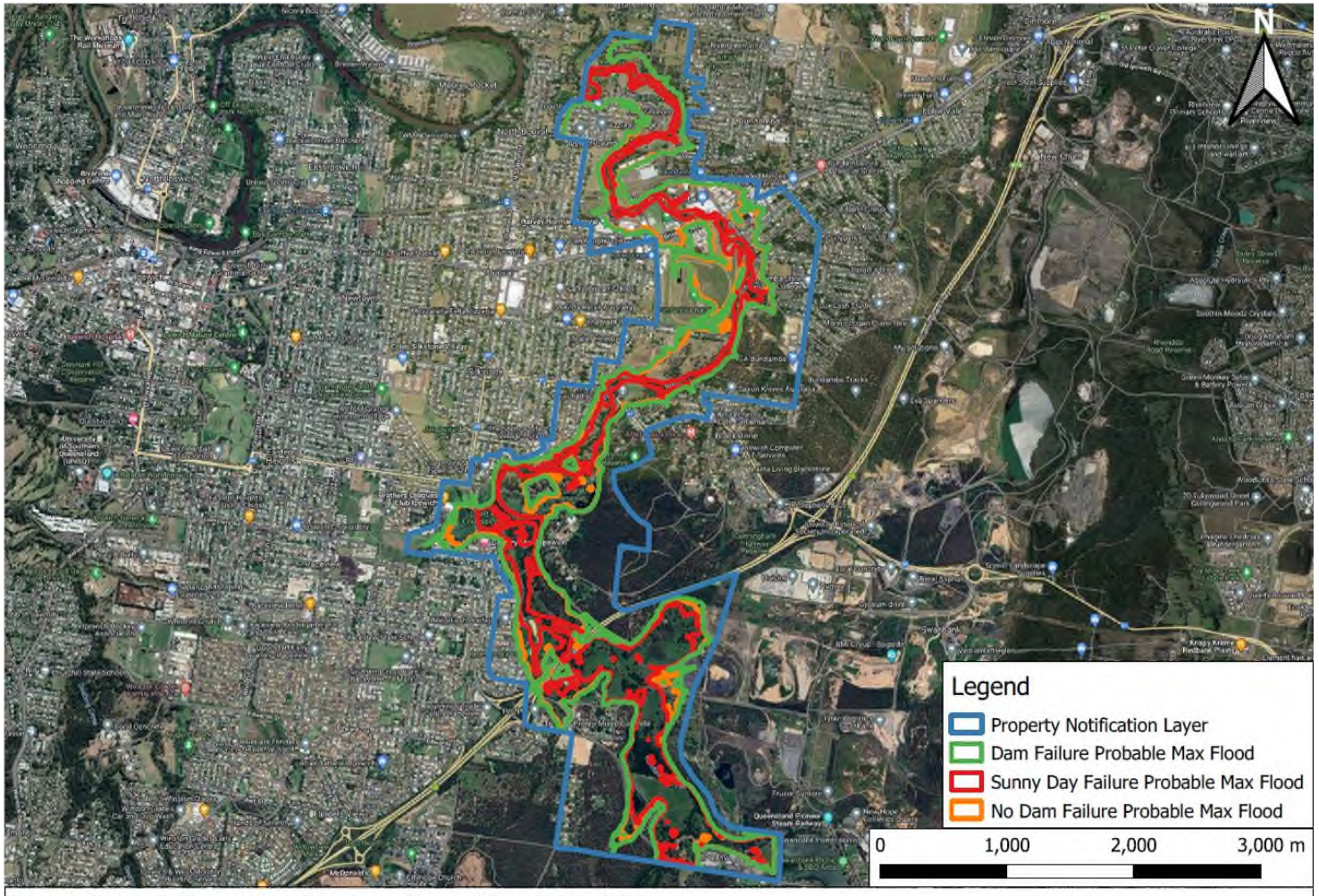


Figure B1.1 Polygon Notification Zone (Sheet 1 of 2)

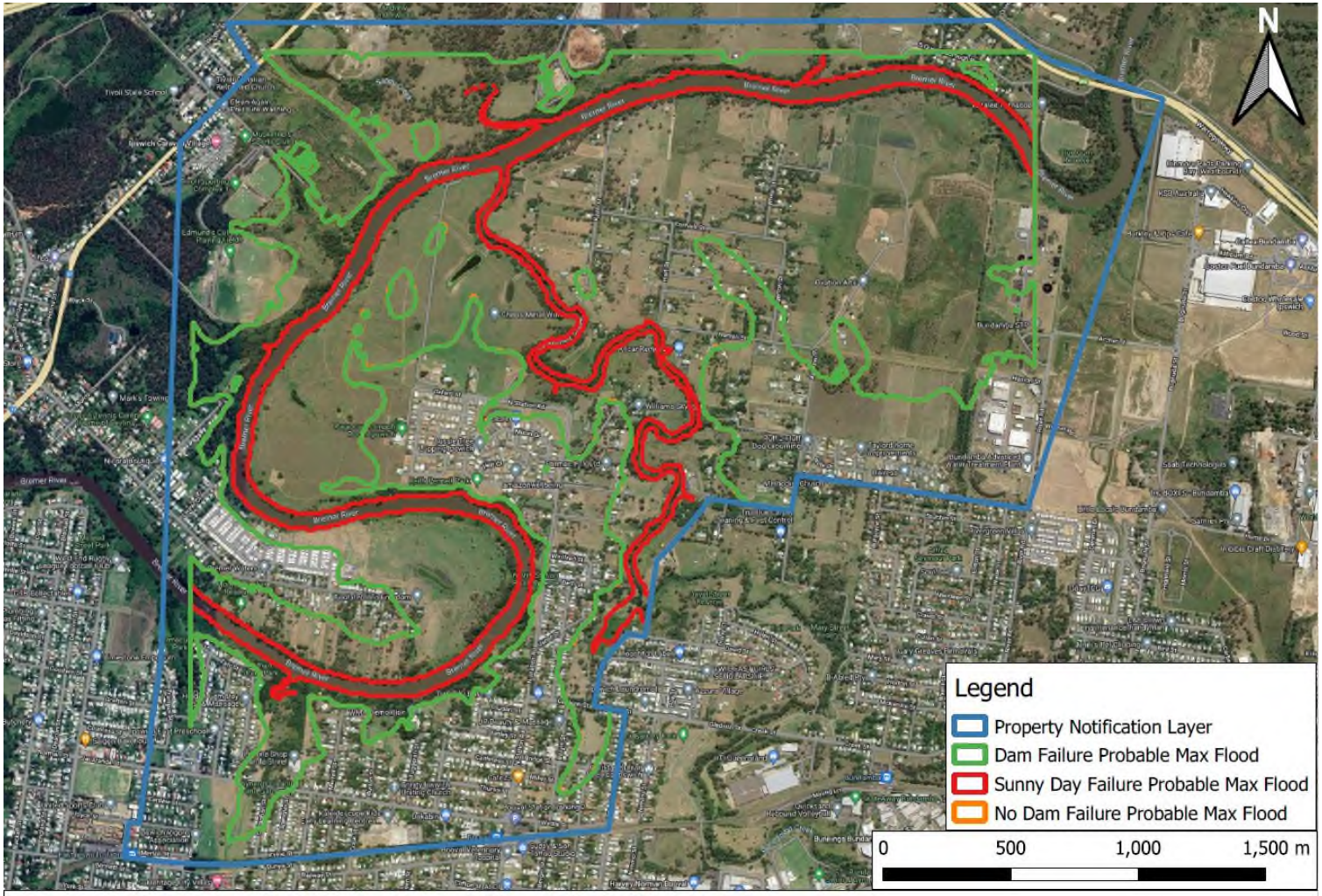


Figure B1.2 Polygon Notification Zone (Sheet 2 of 2)

APPENDIX B: Inundation Maps

The inundation maps shown in APPENDIX B have been taken from the 2020 FIA report (reference Q). It is expected that the quality/resolution of these maps will be improved in the next round of modelling.

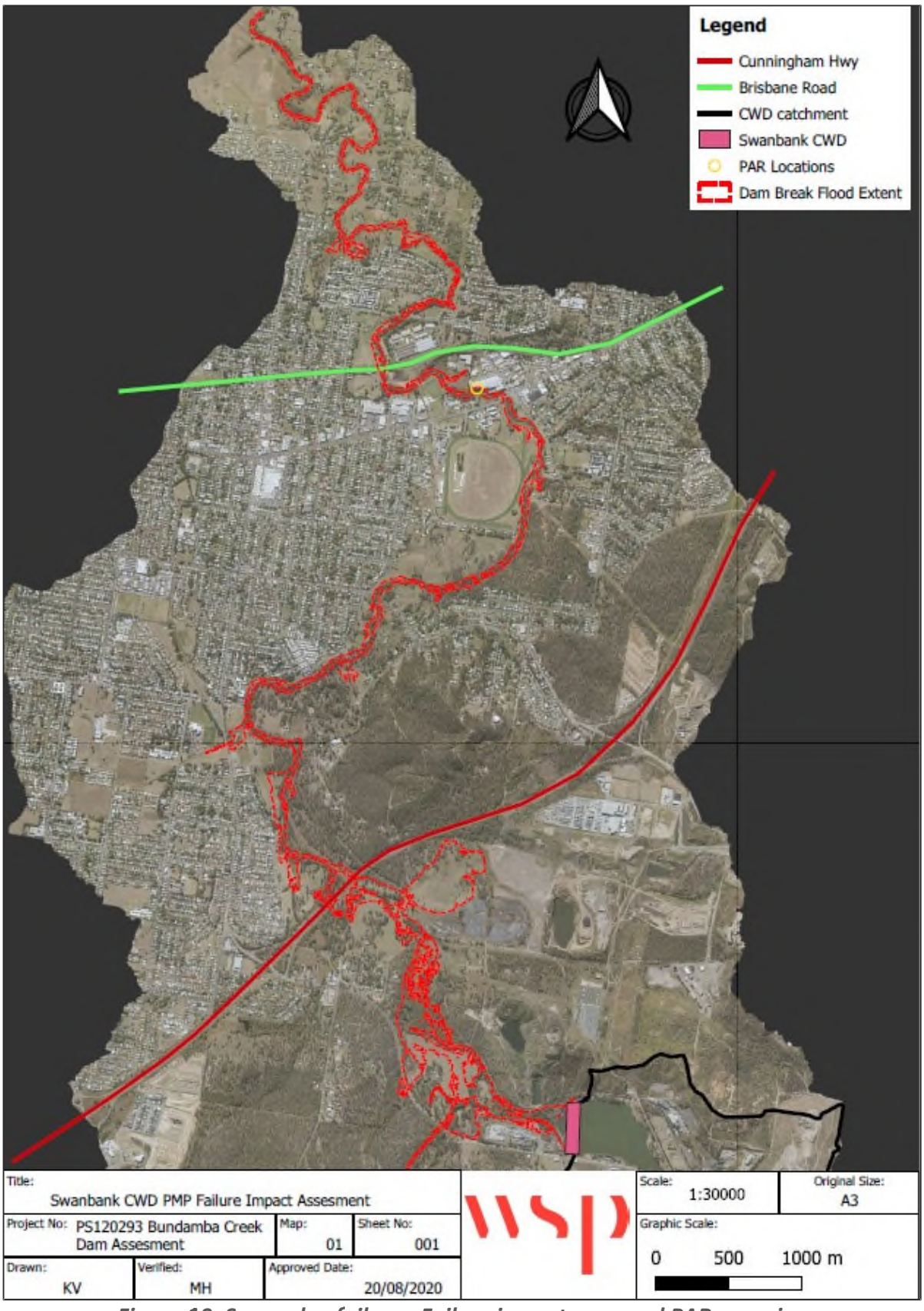


Figure 10: Sunny day failure - Failure impact zone and PAR mapping

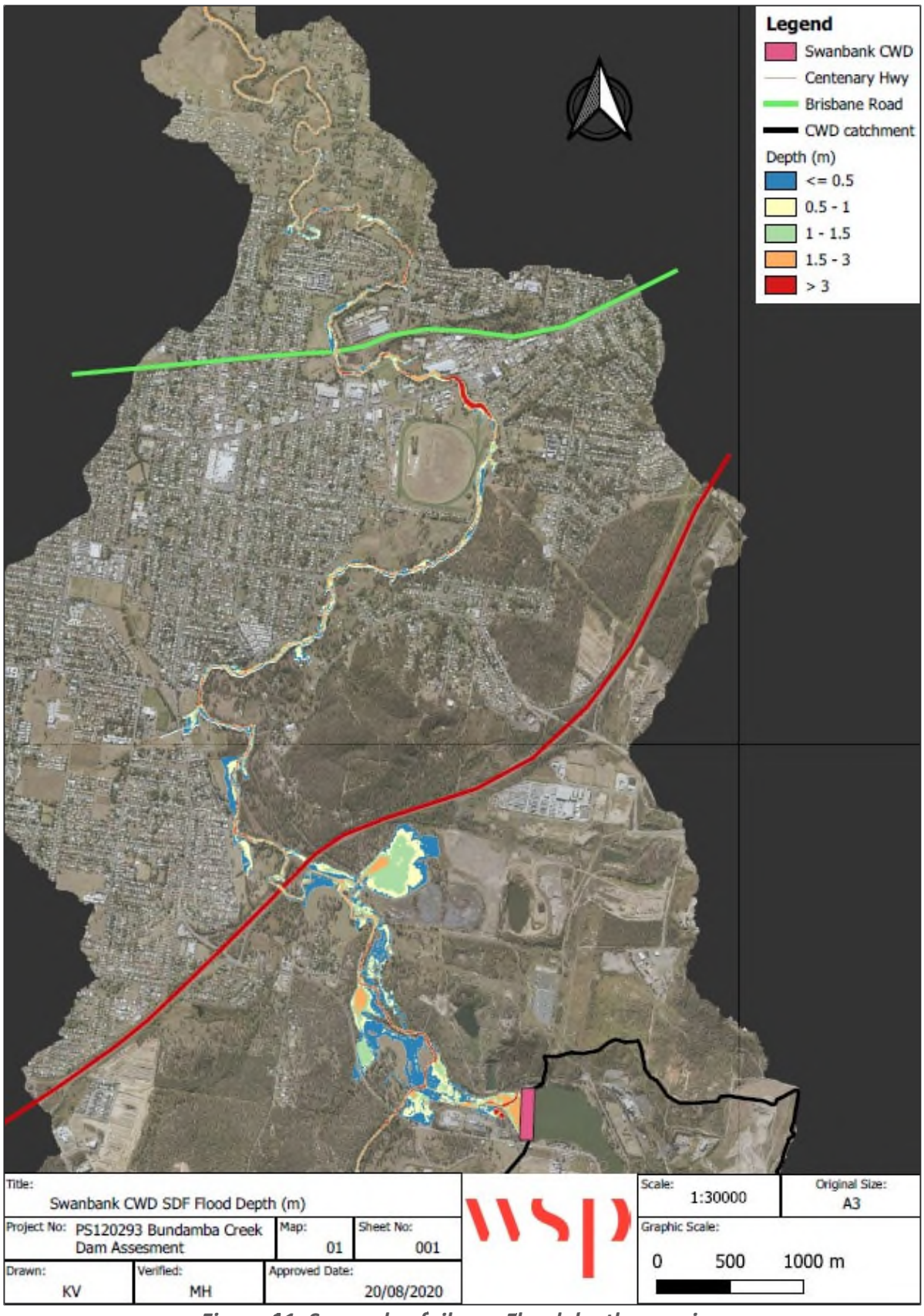


Figure 11: Sunny day failure - Flood depth mapping

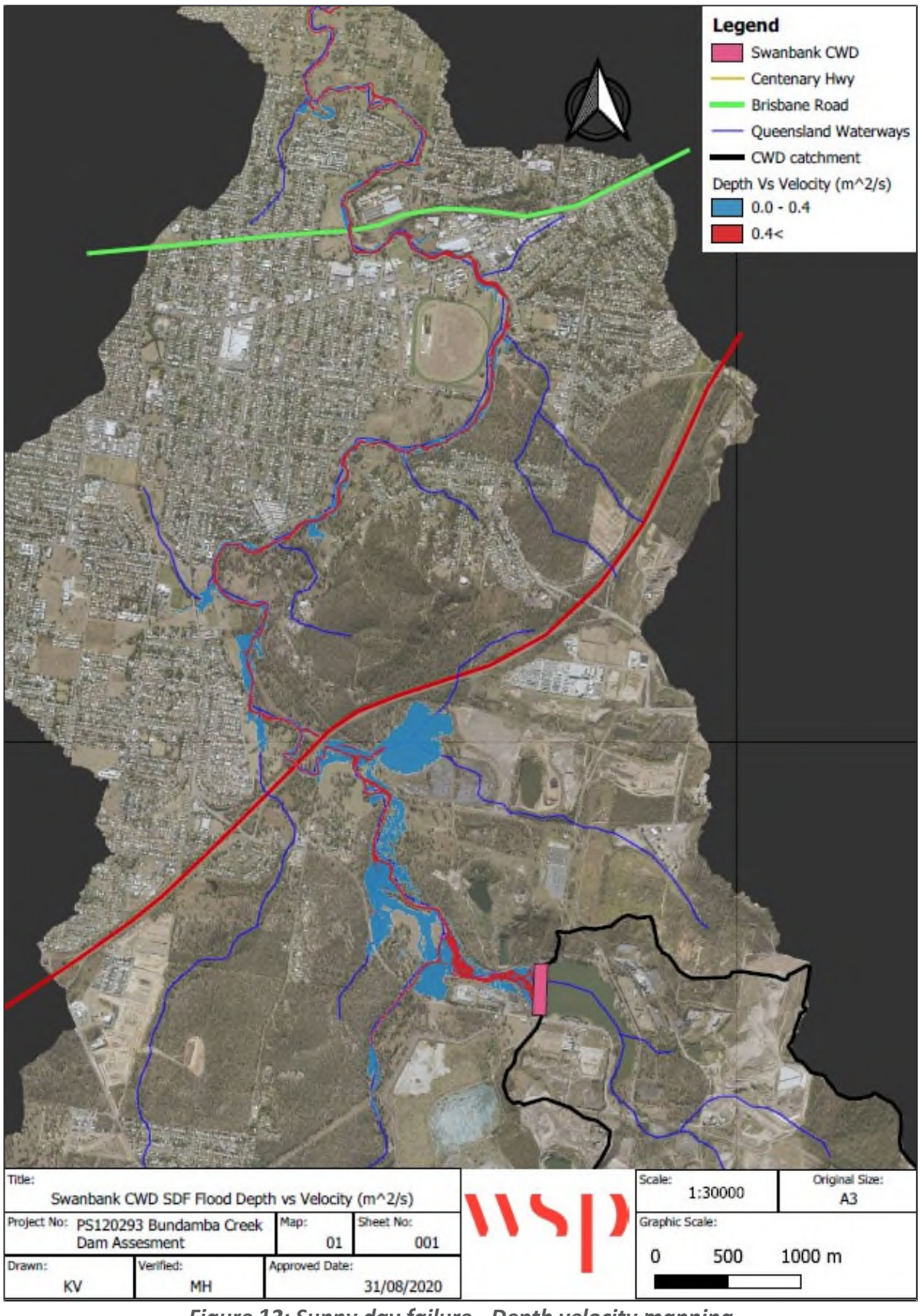


Figure 12: Sunny day failure - Depth velocity mapping

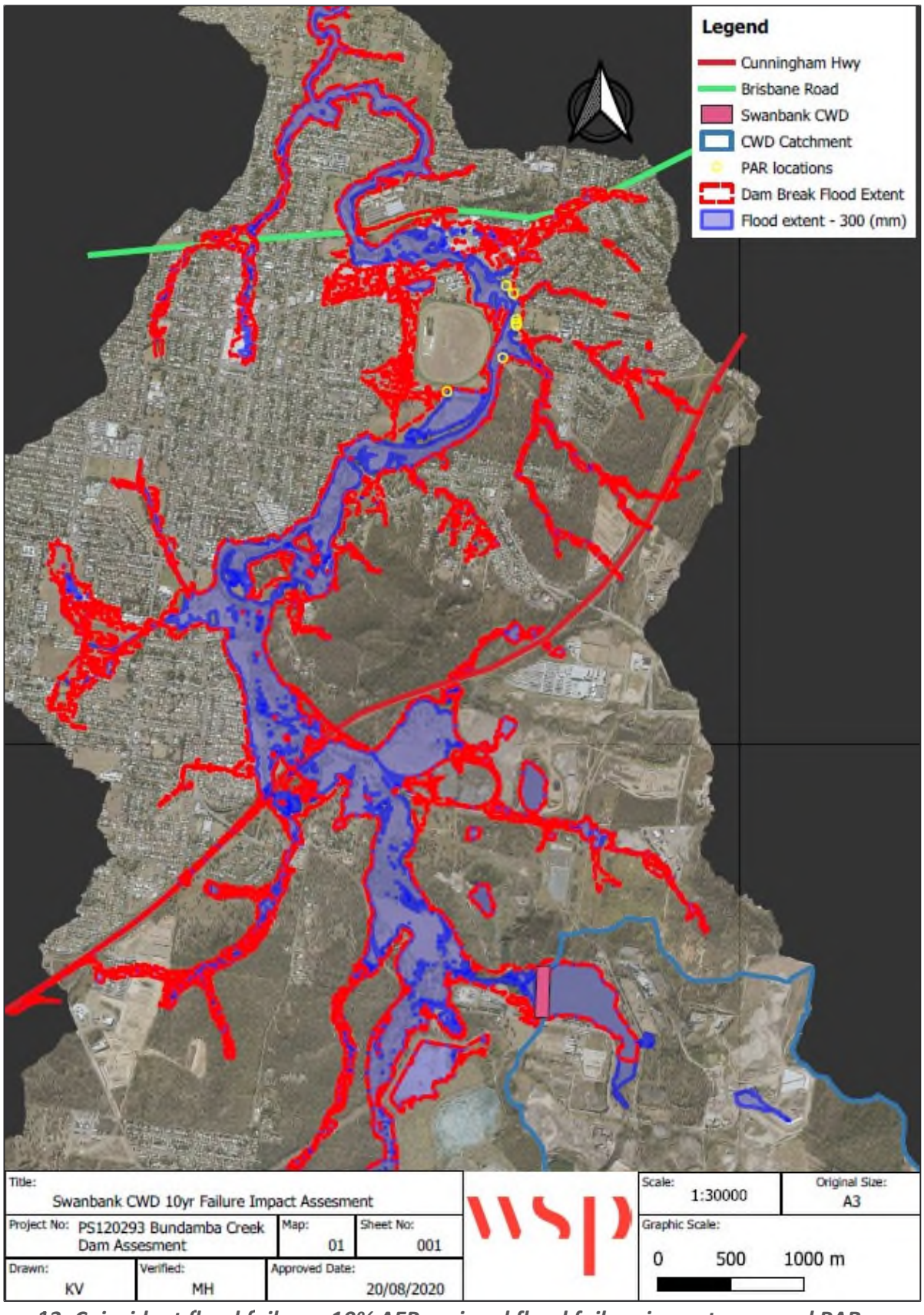


Figure 13: Coincident flood failure - 10% AEP regional flood failure impact zone and PAR mapping

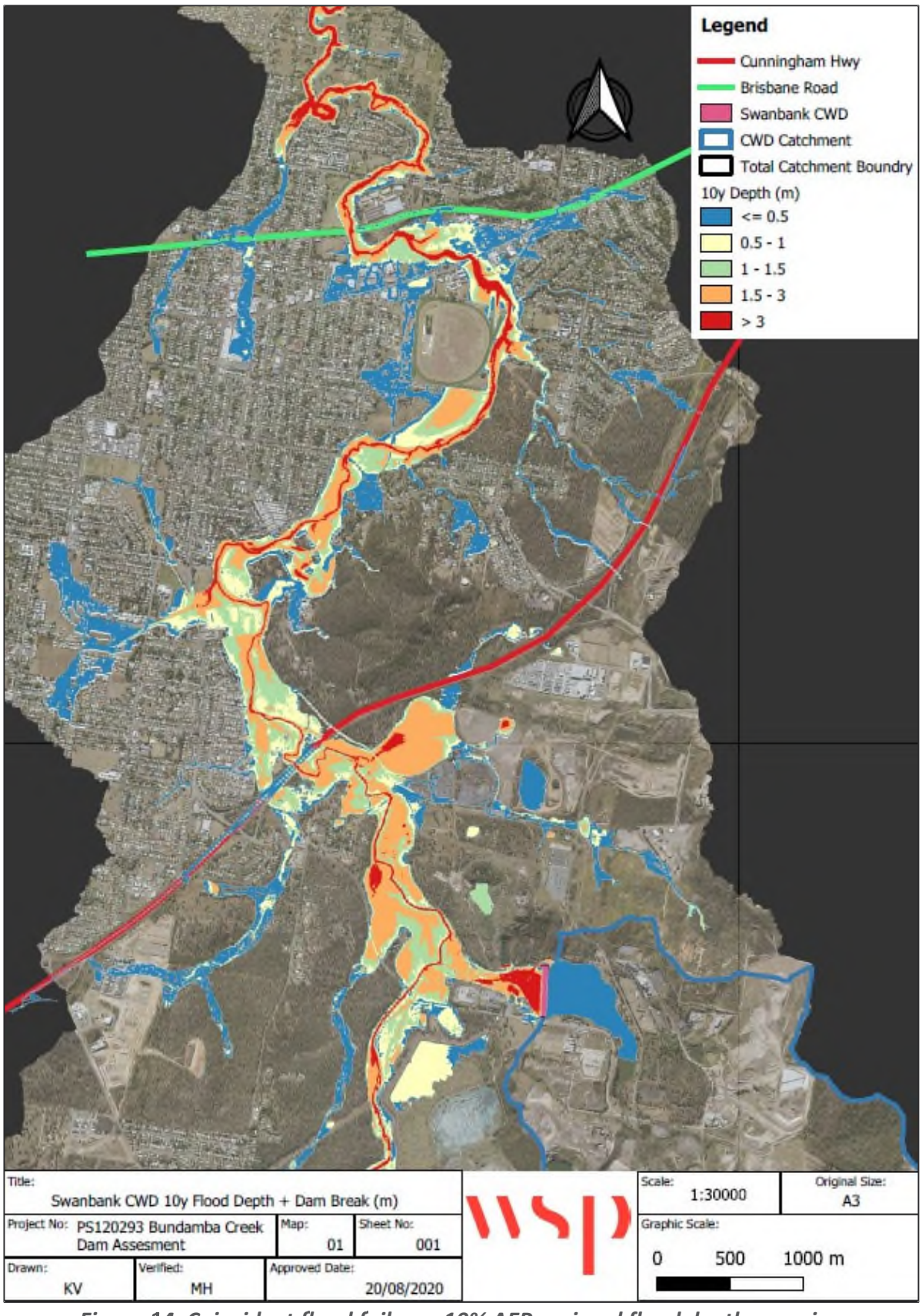


Figure 14: Coincident flood failure - 10% AEP regional flood depth mapping

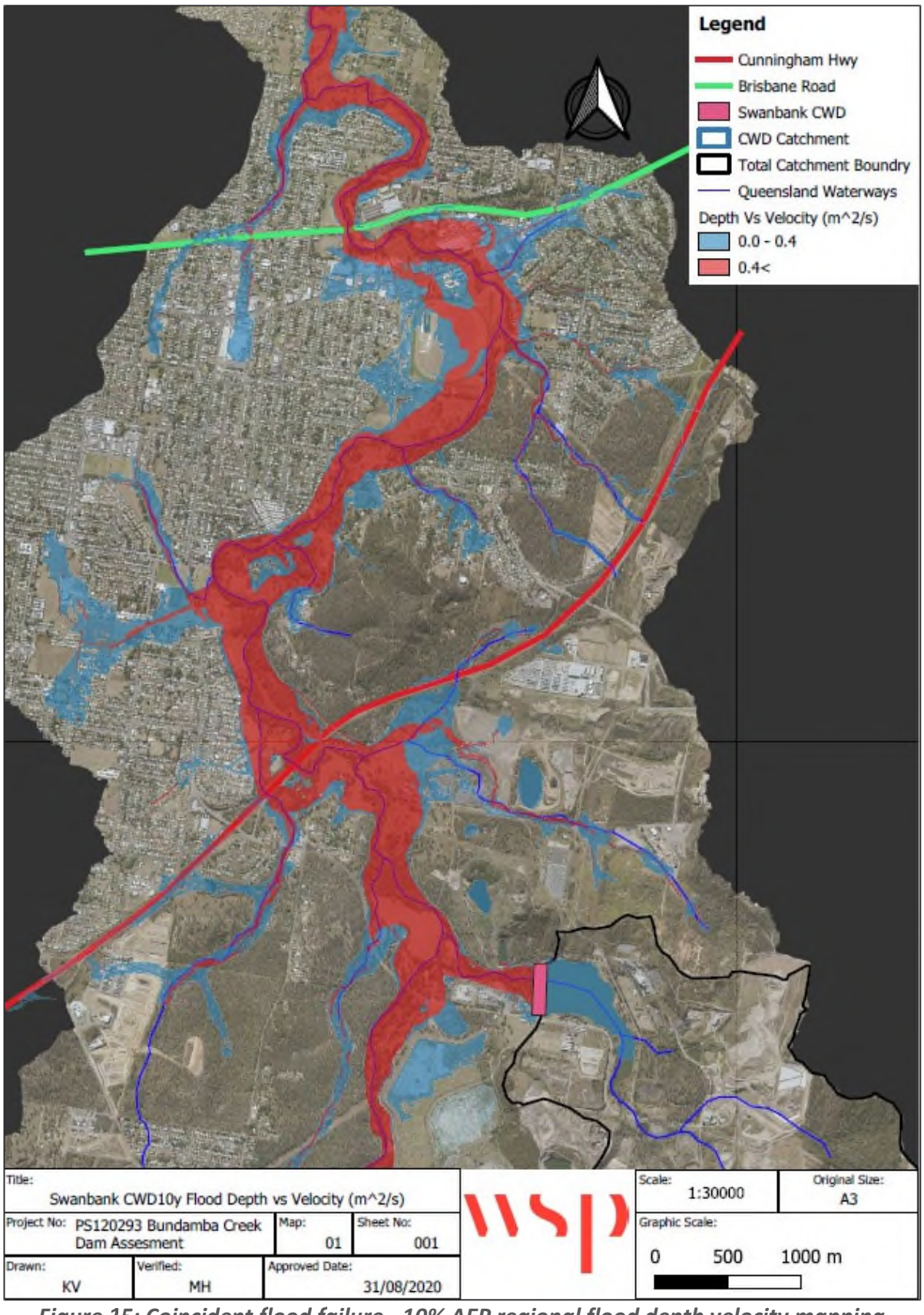


Figure 15: Coincident flood failure - 10% AEP regional flood depth velocity mapping

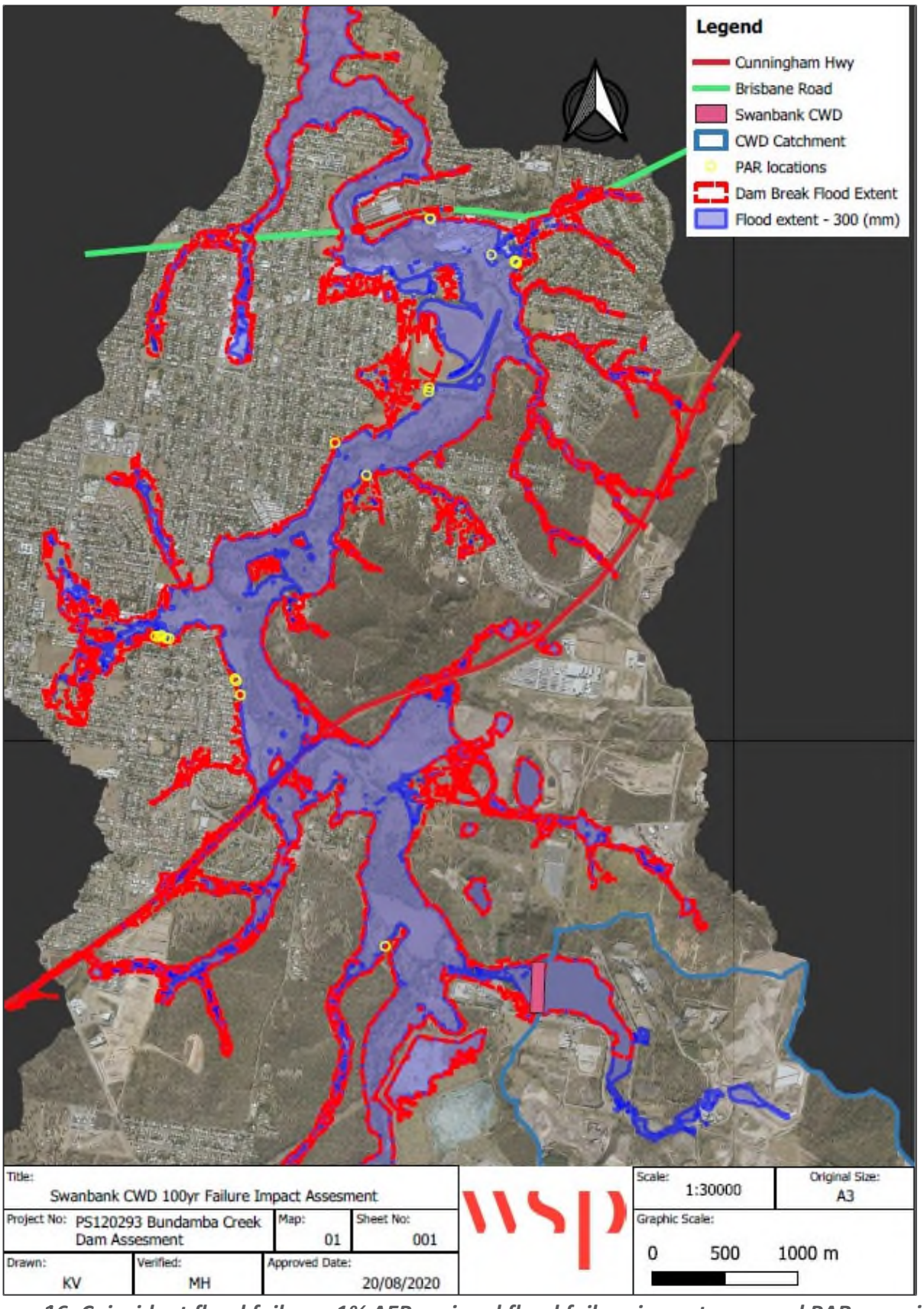


Figure 16: Coincident flood failure - 1% AEP regional flood failure impact zone and PAR mapping

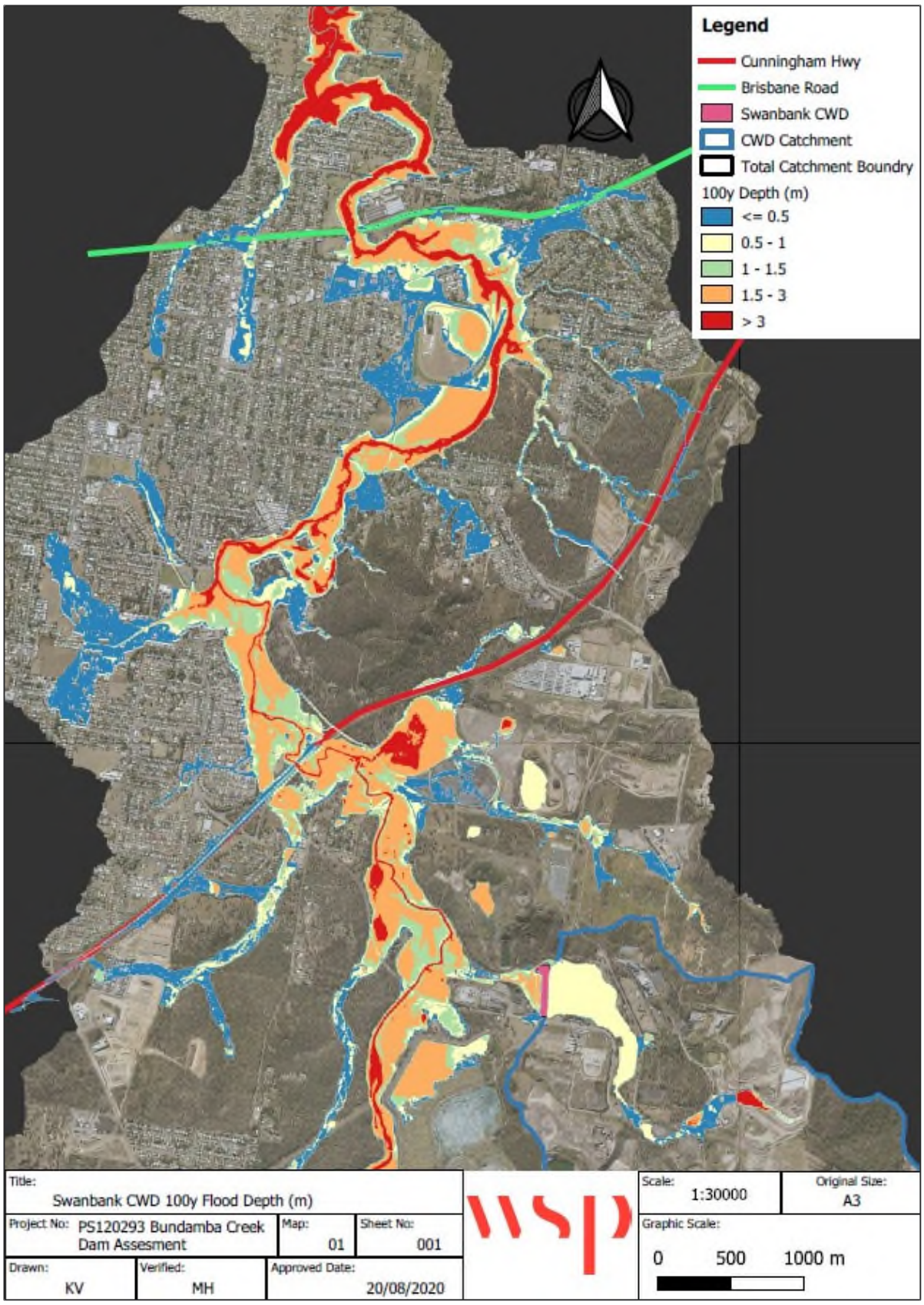


Figure 17: 1% AEP regional flood depth mapping

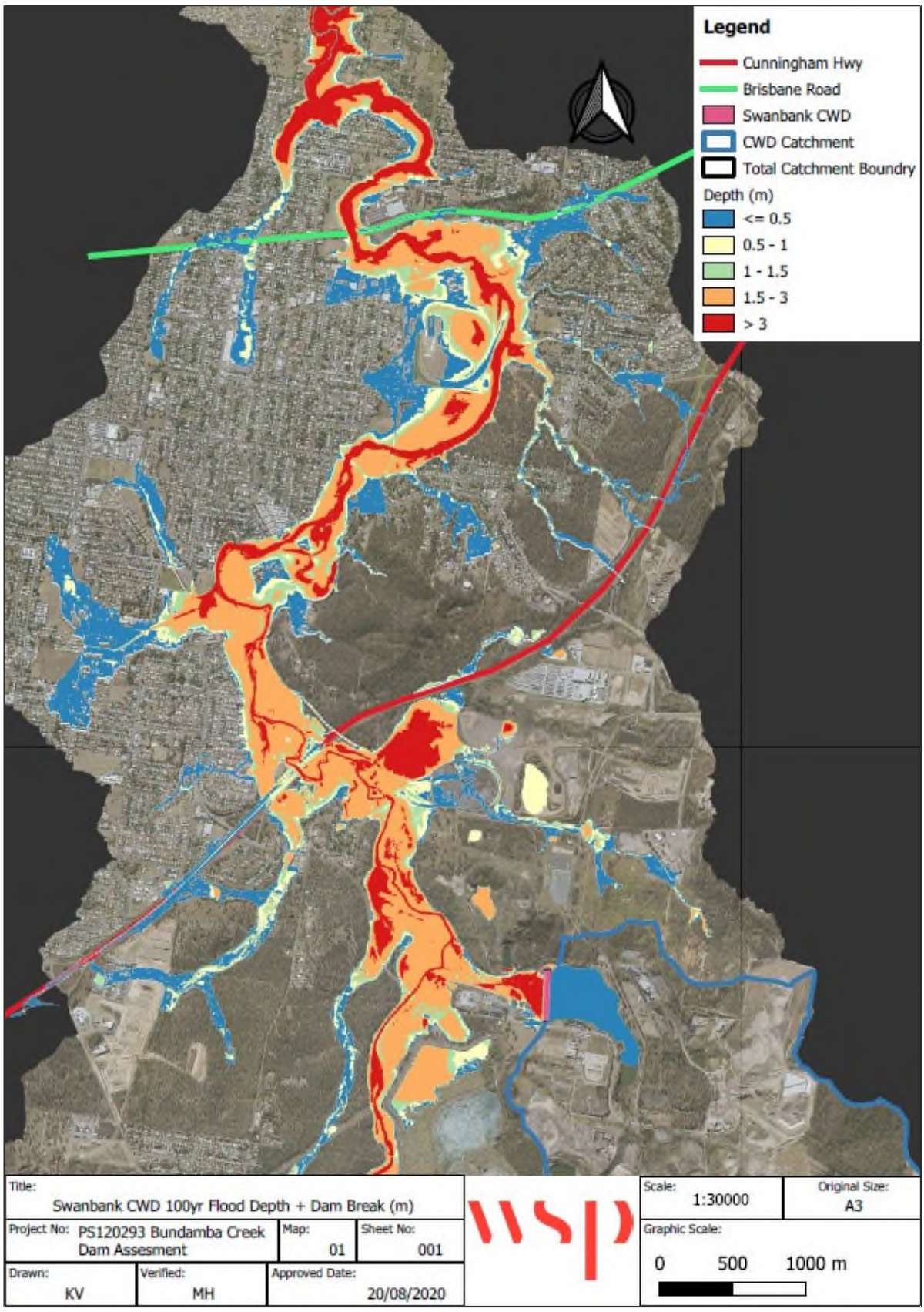


Figure 18: Coincident flood failure - 1% AEP regional flood depth mapping

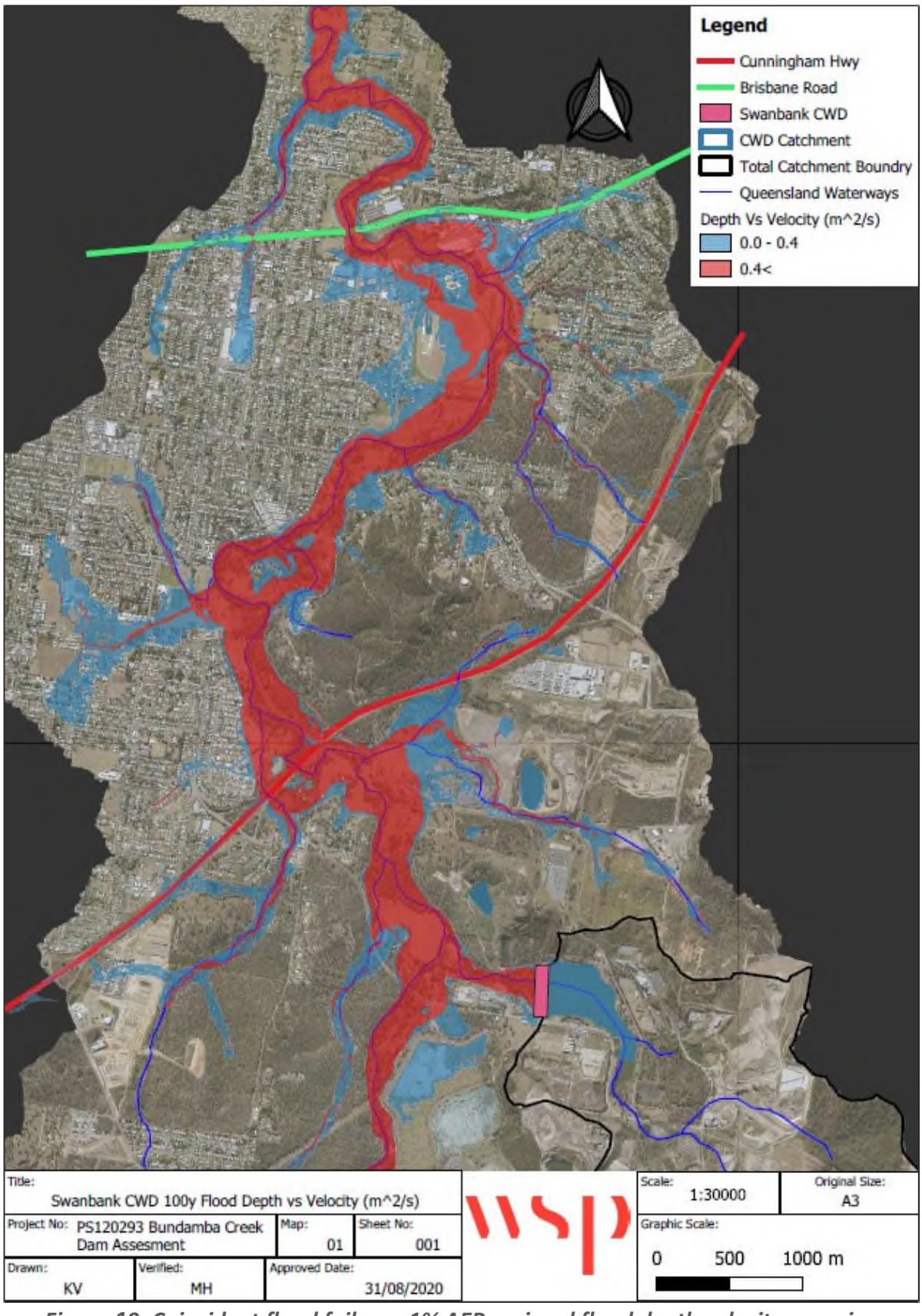


Figure 19: Coincident flood failure - 1% AEP regional flood depth velocity mapping

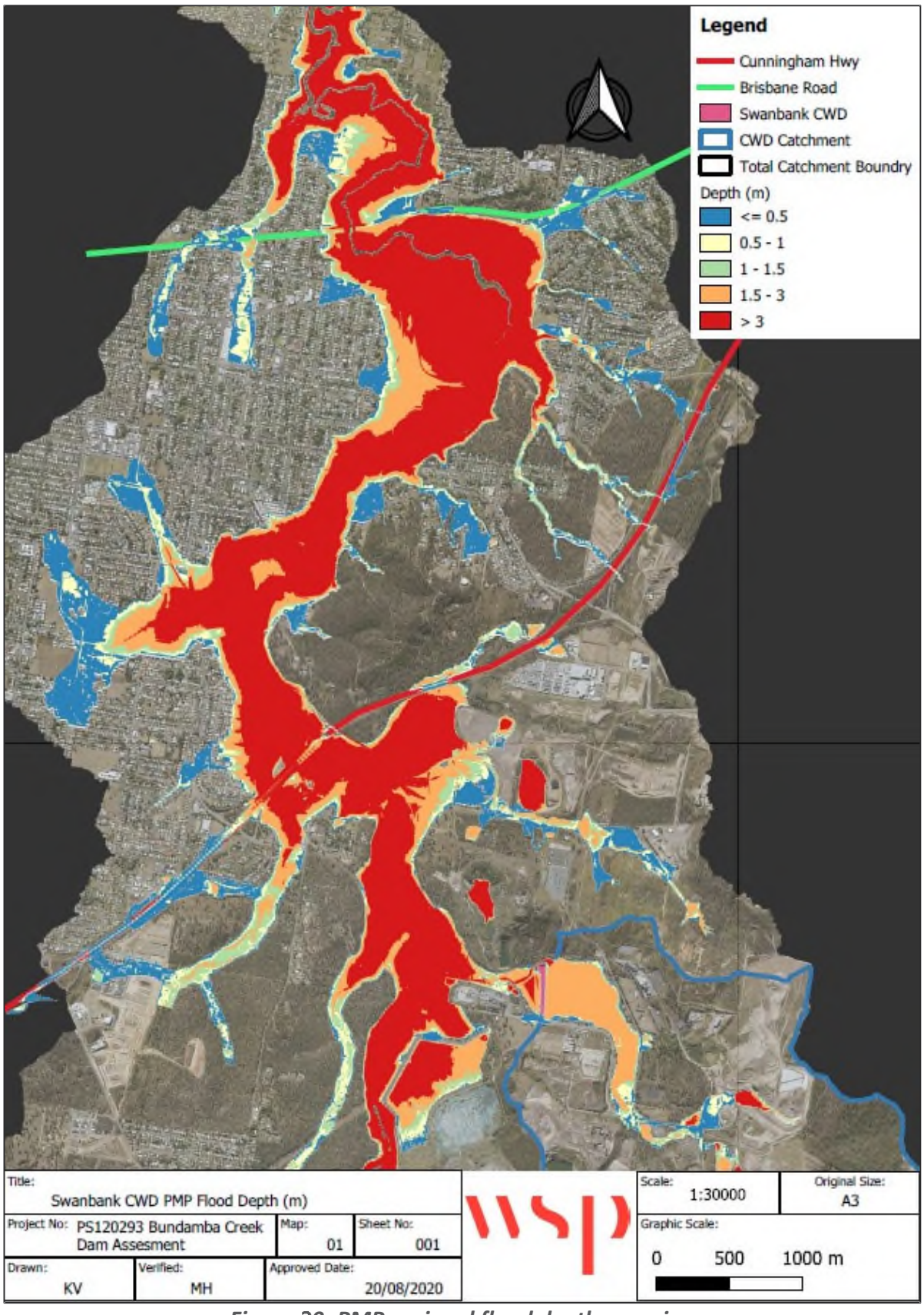


Figure 20: PMP regional flood depth mapping

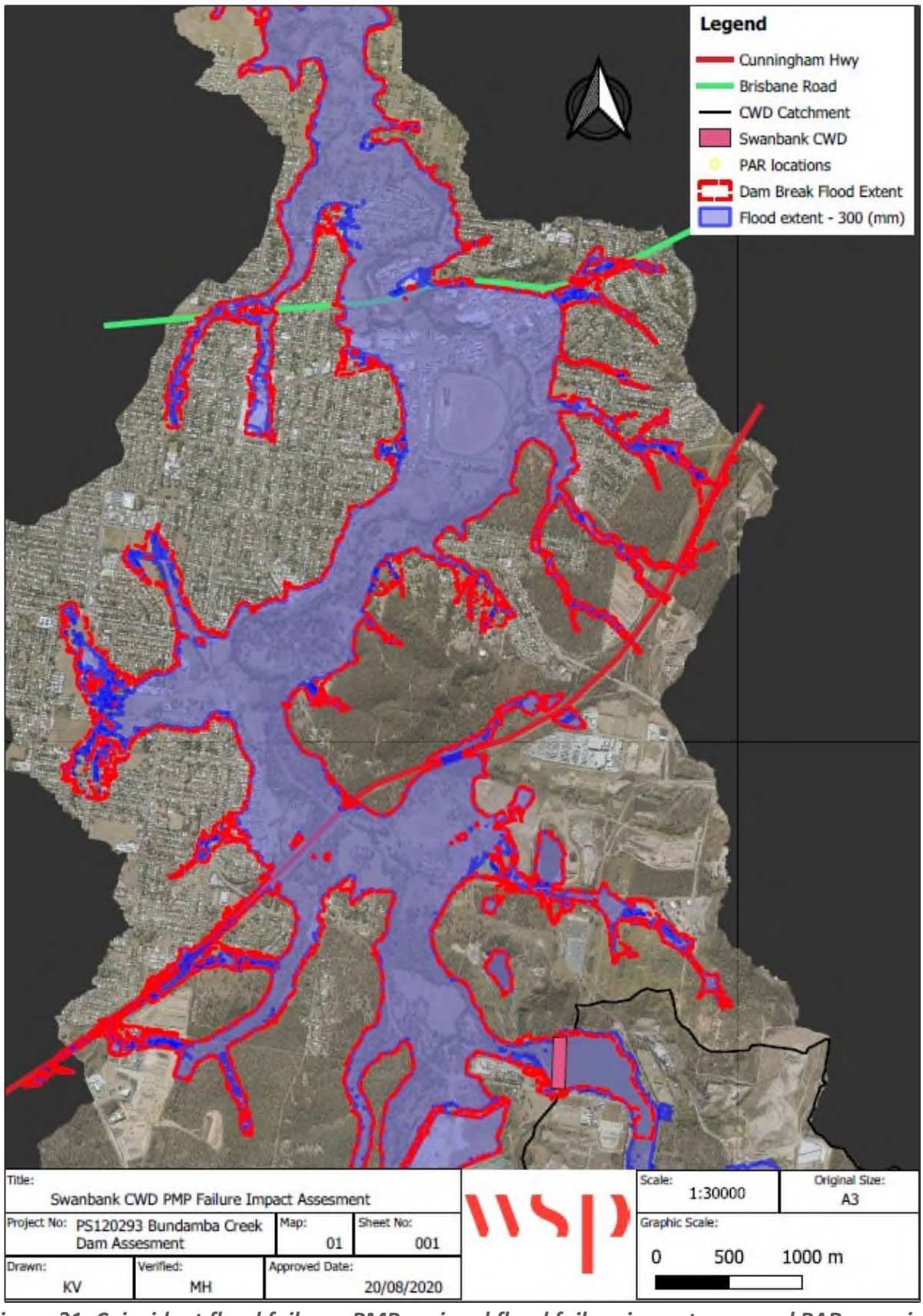


Figure 21: Coincident flood failure - PMP regional flood failure impact zone and PAR mapping

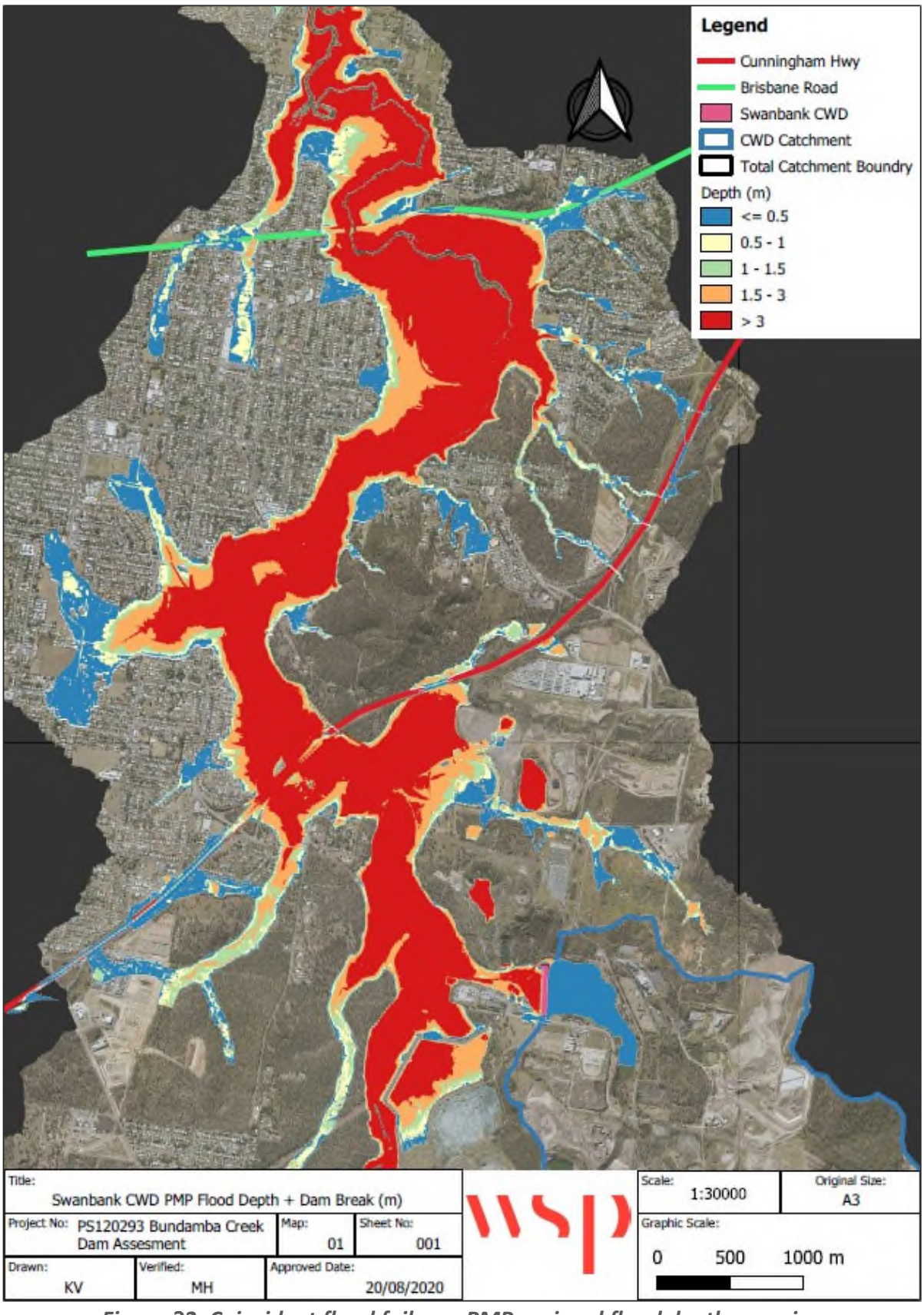


Figure 22: Coincident flood failure - PMP regional flood depth mapping

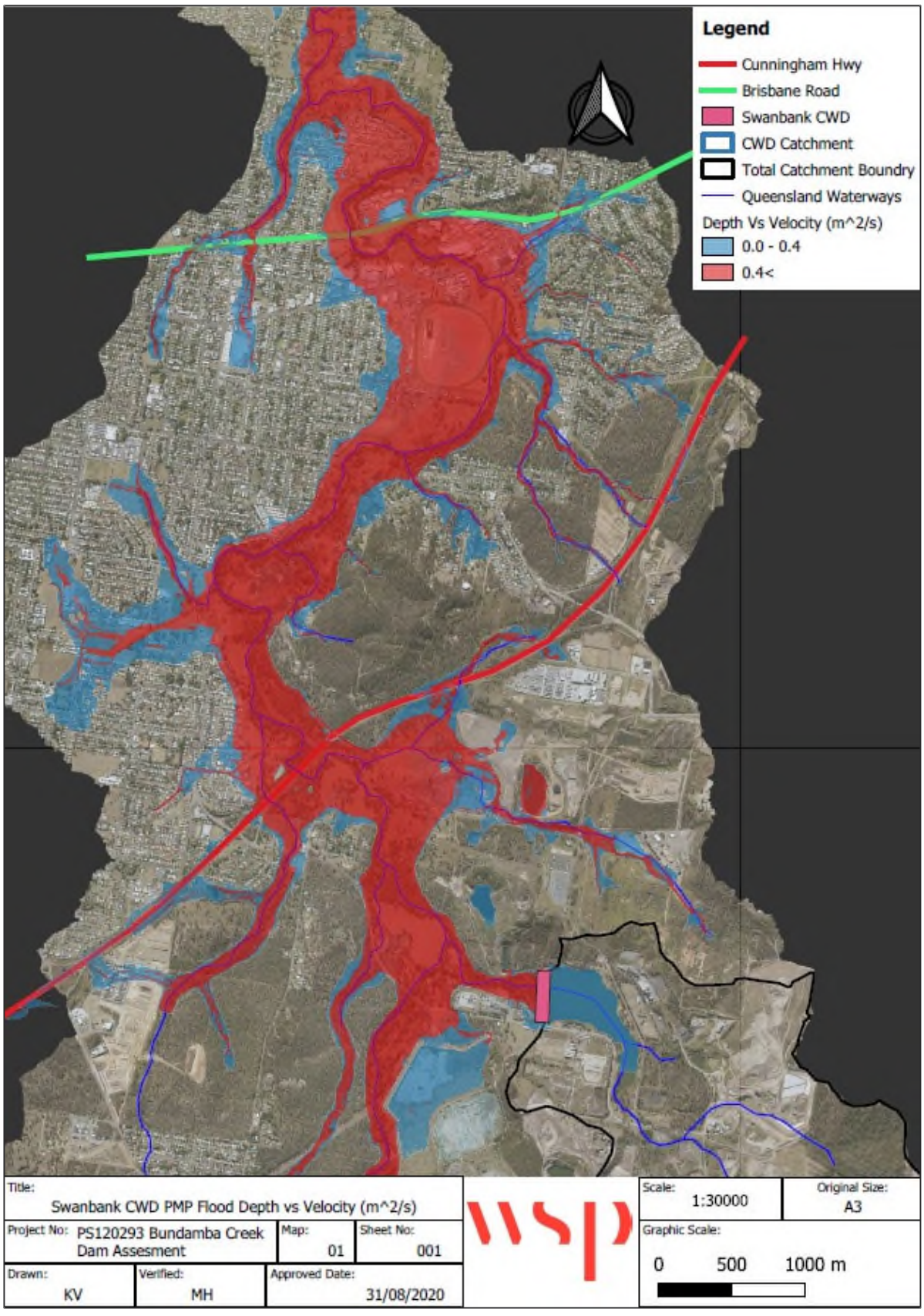


Figure 23: Coincident flood failure - PMP regional flood depth velocity mapping

APPENDIX C: Emergency Contact List

Appendix C and Appendix D have been redacted

APPENDIX E: AWS prepared messages

APPENDIX E shows AWS messages, prepared in accordance with the Queensland flood warning templates (version 0.4) issued by the Queensland Fire and Emergency Services. The yellow highlighted fields indicate content that will likely requires adapting/input according to specific circumstances.

E1 RIVERINE FLOOD > WATCH AND ACT > PREPARE TO LEAVE

PREPARE TO LEAVE – Bundamba – flood as at 00:00, Day, xx/xx/20XX

Warning level: WATCH AND ACT

Warning area: Areas along Bundamba Creek

People in the following places must prepare to leave:

Suburb	Streets/locations
Flinders View	Swanbank Rd E Owen St
Raceview	Kordan Blvd Bremervale Park Harding St Prunda Pde David W Coultas Park
Silkstone	Knight St Sealy St Creek St
Blackstone	Mary St Graham St Queen St Blackstone Rd Henry St

Suburb	Streets/locations
Bundamba	Videroni St Barclay St Bergins Hill Rd Lindsey Rd Tibbits St Herbert St Mining St Agnes St Macartney St Creek St Cleary St Mary St
North Booval	Helen St David St Diane St Gledson St

[Provide link to map of affected area]

Water in the Bundamba Creek is rising and there is wide-spread flooding. You might need to leave if the flood gets worse.

Do not expect emergency services to come to your door.

If your life is in danger, call Triple Zero (000) immediately. For flood and storm emergency help, call the SES on 132 500 or download the SES Assistance QLD app.

What you should do

- Prepare to leave so you can go quickly and safely if the flood gets worse. Get ready now.
- If you have children make sure they are with you or a responsible adult.
- Move cars to high ground.
- Decide where you and the people you live with will go. Find a safe and high place away from flooding. This could be with family or a friend.

- People who do not live or work in the warning area (like visitors) should leave now.
- If you do not have a safe place, [an evacuation centre has / evacuation centres have] been set up at:
  - venue name and full address [add map link if available].
  - venue name and full address [add map link if available].
- Prepare to leave so you can go quickly and safely if the flood gets worse. Get ready now:
  - Lift important things onto benches, tables, high shelves or upstairs to protect them.
  - Charge mobile phones now.
  - Block toilets, sinks and drains with sandbags to stop sewerage backflow if you can. You can get sandbags from [XX].
  - Lock windows and doors.
  - Be ready to take your pets, pet food, pet lead or crate, mobile phone, charger, enough clothes for three days, important documents (like identification, insurance papers and passports), medicine, cash and keys with you.
  - If you have very young children, pack enough nappies for up to five days, wipes, bottles, formula or baby food. Plan to not have a fridge or microwave.
  - Batten down and tie up boats, jetskis. Haul out if you can.
- Decide how you will get to your safe place. If you come to a flooded road, turn around and go another way. Do not drive through floodwater.
- Warn friends, family and neighbours in the area that a flood is coming.
- Help others to get ready to leave if you can.
- If you find it hard to move quickly, leaving now is safer.
- If you do not drive, call your support service, a family member or a friend to organise transport if the flood gets worse and you need to leave.
- Stay informed:
  - Click here for all warnings https://disaster.ipswich.qld.gov.au/.
  - Listen to your local radio station ABC 612 Brisbane or River 94.9FM

Impacts in your area [insert what suits your area and event, such as]

- Flooding above ground floor level likely in some places.
- Main roads and bridges may be closed due to flooding.
- Evacuation routes might be cut off. You could be stuck.
- Power, phones, internet and water might stop working.
- Public transport could stop soon.

More information

- Ipswich City Council updates and a map of areas that flood near you, go to https://disaster.ipswich.qld.gov.au/, [social media accounts].
- Weather warnings go to Bureau of Meteorology Queensland warnings page.
- Power outage information, go to Energex – https://www.energex.com.au/home/power-outages
- Traffic information and closed roads, go to QLD Traffic or call 13 19 40.
- Public transport information go to Translink.
- Find out how to get ready for a flood at qfes.qld.gov.au/prepare/flooding. [or similar]

The next update will be sent at [time, day, date] or when the situation changes.

This warning is from [Ipswich City Council/ CleanCo]

E2: RIVERINE FLOOD > WATCH AND ACT > MOVE TO HIGHER GROUND

MOVE TO HIGHER GROUND AWAY FROM CREEKS AND RIVERS – Bundamba – flood as at 00:00, Day, xx/xx/20XX

Warning level: WATCH AND ACT

Warning area: Areas along Bundamba Creek

People in the following places must move to high ground away from creeks and rivers:

Suburb	Streets/locations
Flinders View	Swanbank Rd E Owen St
Raceview	Kordan Blvd Bremervale Park Harding St Prunda Pde David W Coultas Park
Silkstone	Knight St Sealy St Creek St
Blackstone	Mary St Graham St Queen St Blackstone Rd Henry St

Suburb	Streets/locations
Bundamba	Videroni St Barclay St Bergins Hill Rd Lindsey Rd Tibbits St Herbert St Mining St Agnes St Macartney St Creek St Cleary St Mary St
North Booval	Helen St David St Diane St Gledson St

[Provide link to map of affected area]

Water in the Bundamba Creek is rising quickly and there is wide-spread flooding.

You have [XX hours / until HH:MM] to go safely.

Do not expect emergency services to come to your door.

If your life is in danger, call Triple Zero (000) immediately. For flood and storm emergency help, call the SES on 132 500.

What you should do

- Go and stay in a safe place in a high part of Ipswich, away from creeks and rivers. This could be with family or friends.
- If you do not have a safe place, [an evacuation centre has / evacuation centres have] been set up at:
  - venue name and full address [add map link if available].
  - venue name and full address [add map link if available].

- If you find it hard to move quickly leave as soon as you can. If you do not drive, call your support service, a family member or a friend to organise transport.
- Decide how you will get to your safe place. If you come to a flooded road, turn around and go another way. Do not drive through floodwater.
- Take your pets, pet food, pet lead or crate, mobile phone, charger, enough clothes for three days, important documents (like identification, insurance papers and passports), medicine, cash and keys with you.
- If you have very young children, pack enough nappies for up to five days, wipes, bottles, formula or baby food. Plan to not have a fridge or microwave.
- If you have children make sure they stay with you or a responsible adult.

Use the below points if there is still time for people to prepare their homes

- If it is still safe, prepare your home quickly before you leave:
    - Lift important things onto benches, tables, high shelves or upstairs.
    - Block toilets, sinks and drains with sandbags to stop sewerage backflow if you can.
    - Move cars to high ground.
    - Lock doors and windows.
    - Help others if you can.
    - Batten down and tie up boats, jetskis and pontoons. Haul out if you can.
- Stay informed:
    - Click here for all warnings https://disaster.ipswich.qld.gov.au/.
    - Listen to your local radio station ABC 612 Brisbane or River 94.9FM

Impacts in your area

- Flooding above ground floor level likely in some places.
- Main roads and bridges may be closed due to flooding.
- Evacuation routes might be cut off. You could be stuck.
- Power, phones, internet and water might stop working.
- Public transport could stop soon.

More information

- Ipswich City Council updates and a map of areas that flood near you, go to https://disaster.ipswich.qld.gov.au/, [social media accounts].
- Weather warnings go to Bureau of Meteorology Queensland warnings page.
- Power outage information, go to Energex – https://www.energex.com.au/home/power-outages
- Traffic information and closed roads, go to QLD Traffic or call 13 19 40.
- Public transport information go to Translink.

The next update will be sent at [time, day, date] or when the situation changes.

This warning is from [Ipswich City Council/ CleanCo]

E3: RIVERINE FLOOD > EMERGENCY WARNING > LEAVE IMMEDIATELY

LEAVE IMMEDIATELY – Bundamba – flood as at 00:00, Day, xx/xx/20XX

Warning level: EMERGENCY WARNING

Warning area: Areas along Bundamba Creek

People in the following places must LEAVE IMMEDIATELY:

Suburb	Streets/locations
Flinders View	Swanbank Rd E Owen St
Raceview	Kordan Blvd Bremervale Park Harding St Prunda Pde David W Coultas Park
Silkstone	Knight St Sealy St Creek St
Blackstone	Mary St Graham St Queen St Blackstone Rd Henry St

Suburb	Streets/locations
Bundamba	Videroni St Barclay St Bergins Hill Rd Lindsey Rd Tibbits St Herbert St Mining St Agnes St Macartney St Creek St Cleary St Mary St
North Booval	Helen St David St Diane St Gledson St

[Provide link to map of affected area]

Major flooding is happening now. Water in the Bundamba Creek is rising fast. Your life is at risk.

Do not expect emergency services to come to your door.

If your life is in danger call Triple Zero (000) immediately. If you are flooded in your home, call the SES on 132 500.

What you should do

- GO NOW to a safe place in a high part of Ipswich away from the flood. This could be with family or a friend.
- If you do not have a safe place, [an evacuation centre has / evacuation centres have] been set up at:
  - venue name and full address [add map link if available].
  - venue name and full address [add map link if available].
- Take your mobile phone, medicine, identification, cash, and keys with you.

- Decide how you will get to your safe place. If you come to a flooded road, turn around and go another way. Do not drive through floodwater. Do not walk, swim or boat through floodwater.
- Help others if you can.
- Stay informed:
    - Click here for all warnings https://disaster.ipswich.qld.gov.au/.
    - Listen to your local radio station ABC 612 Brisbane or River 94.9FM

Impacts in your area

- Flooding above ground floor level likely in some places.
- Main roads and bridges may be closed due to flooding.
- Evacuation routes might be cut off. You could be stuck.
- Power, phones, internet and water might stop working.
- Public transport could stop soon.

More information

- Ipswich City Council updates and a map of areas that flood near you, go to https://disaster.ipswich.qld.gov.au/, [social media accounts].
- Weather warnings go to Bureau of Meteorology Queensland warnings page.
- Power outage information, go to Energex – https://www.energex.com.au/home/power-outages
- Traffic information and closed roads, go to QLD Traffic or call 13 19 40.
- Public transport information go to Translink.
- Find out how to get ready for a flood at qfes.qld.gov.au/prepare/flooding. [or similar]

The next update will be sent at [time, day, date] or when the situation changes.

This warning is from [Ipswich City Council/ CleanCo]

E4: AFTER THE FLOOD > ADVICE > THREAT IS REDUCED

THREAT IS REDUCED – Bundamba – flood as at 00:00, Day, xx/xx/20XX

Warning level: ADVICE

Warning area: Areas along Bundamba Creek

- Swanbank
- Raceview
- Blackstone
- Silkstone
- Bundamba

Flooding has stopped and the water has gone down. If you left, it is now safe to come back. Be careful of damage.

What you should do:

- Return to your home or business to check the damage.
- Stay away from creeks, rivers and drains.
- If you have children make sure they are with you or an adult you trust.
- Drive slowly, obey all road signs and never drive through floodwaters. If the road is flooded or damaged, go another way.
- Stay away from the area unless you live or work there, or you are helping.

If your home or business has been flooded:

- Check for building damage before you go inside.
- Have all electrical and gas equipment professionally tested before use.
- If water went above power points have the house checked by an electrician before turning the power back on.
- Clean and dry out the building as soon as you can.
- Be careful where you walk – do not trip or slip.

- Protect your health and safety:
    - Wear strong boots, gloves and protective clothing when cleaning up.
    - Wash your hands and clothes often.
    - Do not eat food that has touched floodwater or mud.
    - Throw away food that should be kept cold or frozen if you lost power.
    - Drink only fresh drinking water, like bottled water.
- For flood and storm emergency help, call the SES on 132 500 or download the SES Assistance Queensland app. Help yourself and others if you can.

Impacts in your area

- Roads and buildings have been badly damaged. Visit QLD Traffic to find out about closed roads or call 13 19 40.
- Power and water are off in some places. These will be restored when it is safe. For power outage information, visit Energex https://www.energex.com.au/home/power-outages
- There is a lot of mud and rubbish on the ground and in the water.
- There could be more spiders, rats and snakes inside.

Support and recovery help

- Go to Ipswich City Council https://www.ipswich.qld.gov.au/services/flood-recovery for clean-up and recovery information.
- For general relief and recovery information go to getready.qld.gov.au/after-disaster.
- Natural disasters can affect your mental health. If you need help, call any of these groups:
    - Lifeline: Go to http://www.lifeline.org.au or phone 13 11 14.
    - Beyond Blue: Go to http://www.beyondblue.org.au or phone 1300 224 636.
    - Kids Helpline: Go to http://www.kidshelpline.com.au or phone 1800 551 800.

This will be the last warning issued for this flood in Bundamba.

This warning is from [Ipswich City Council/ CleanCo]

APPENDIX F: Storage and Spillway Discharge Curves

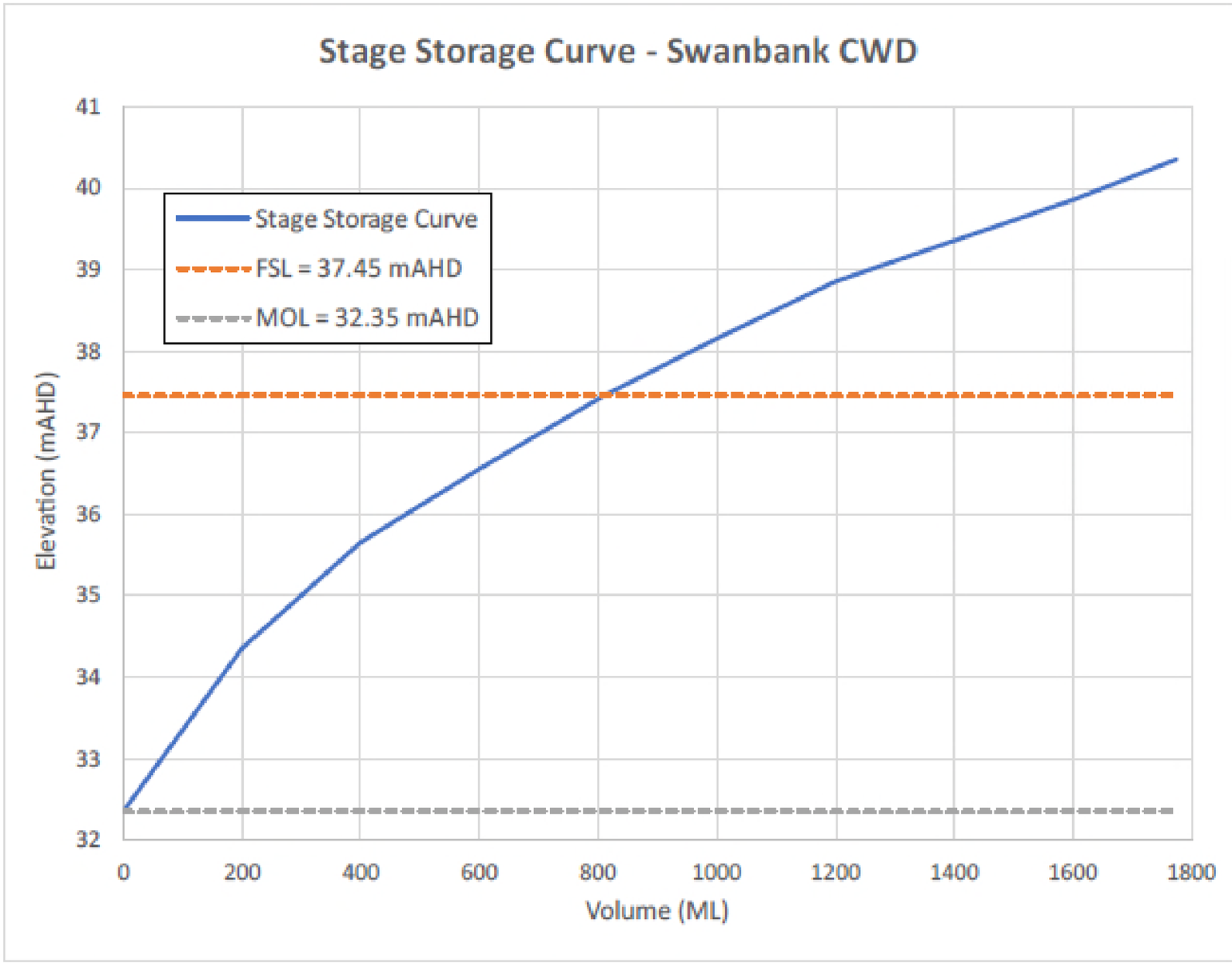


Figure 24: Swanbank CWD Stage Storage Curve (taken from 2023 CRA)

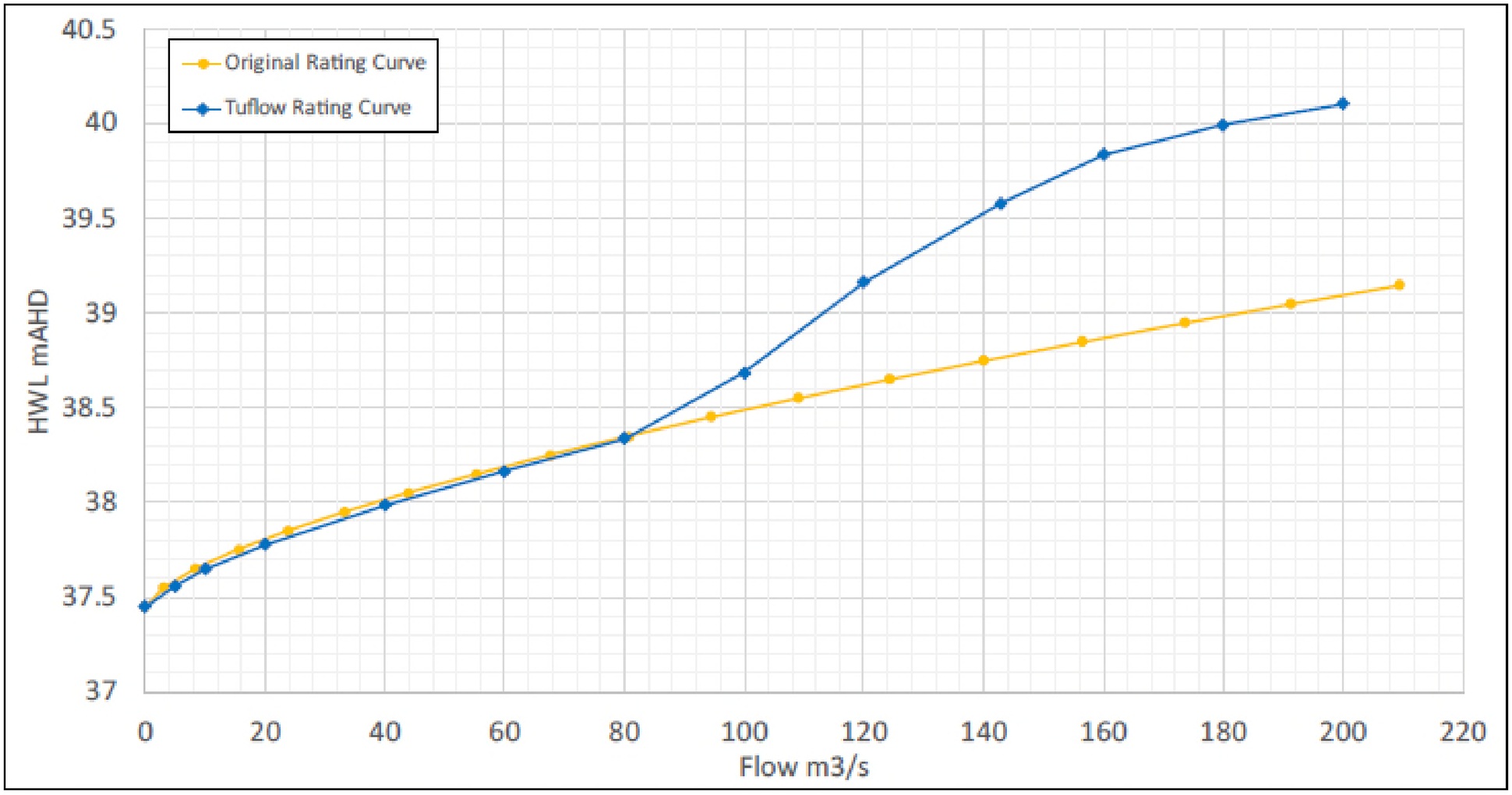
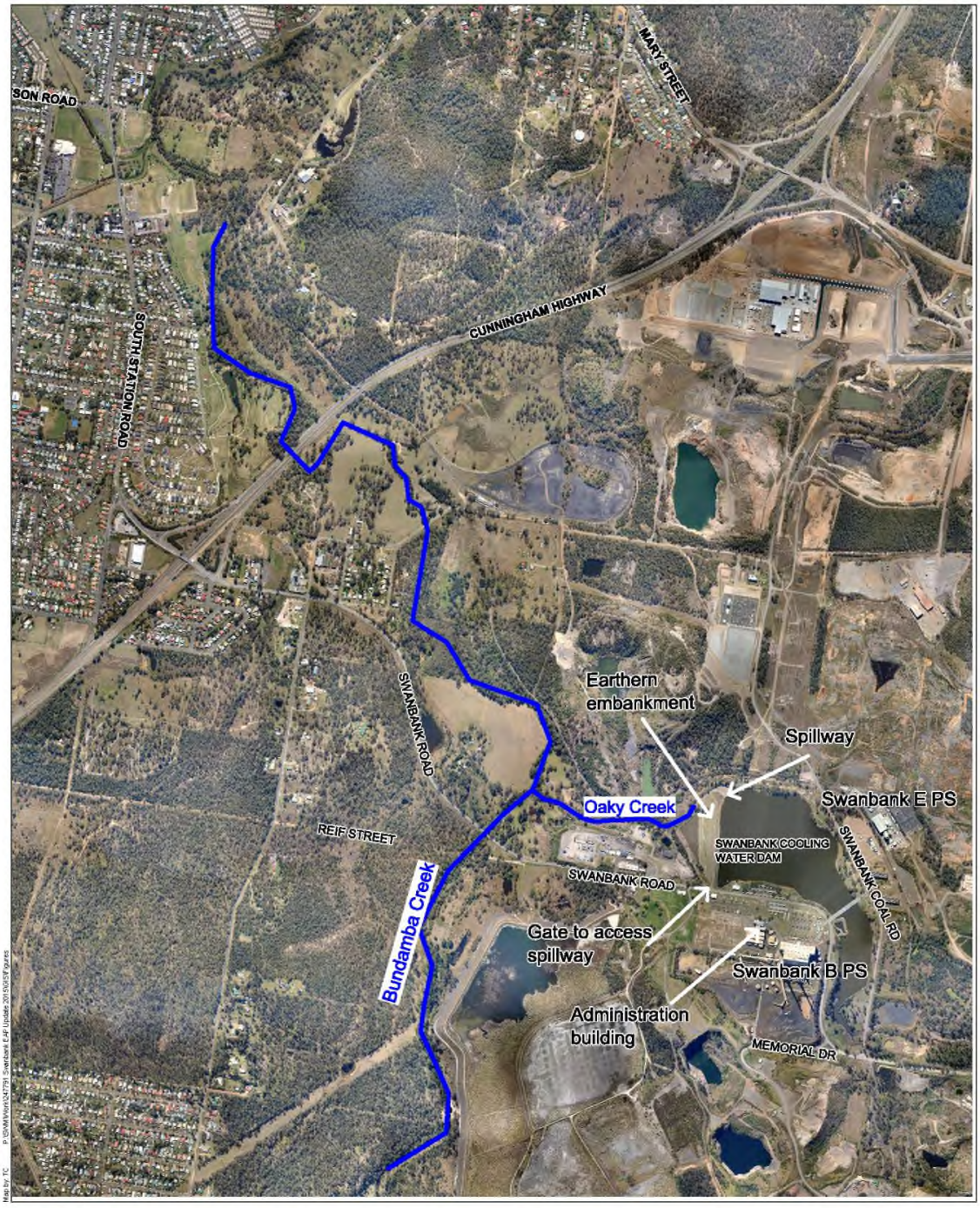
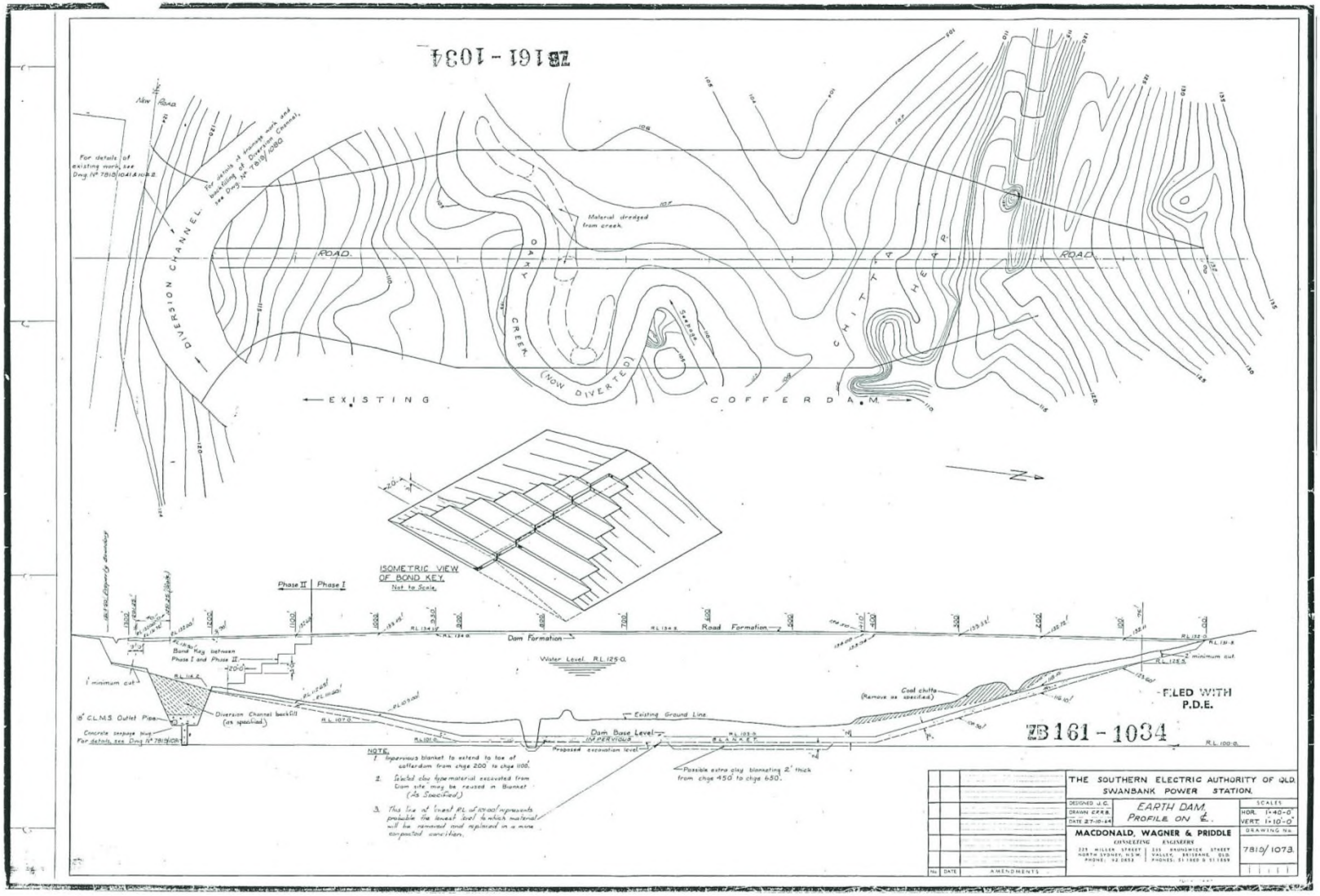
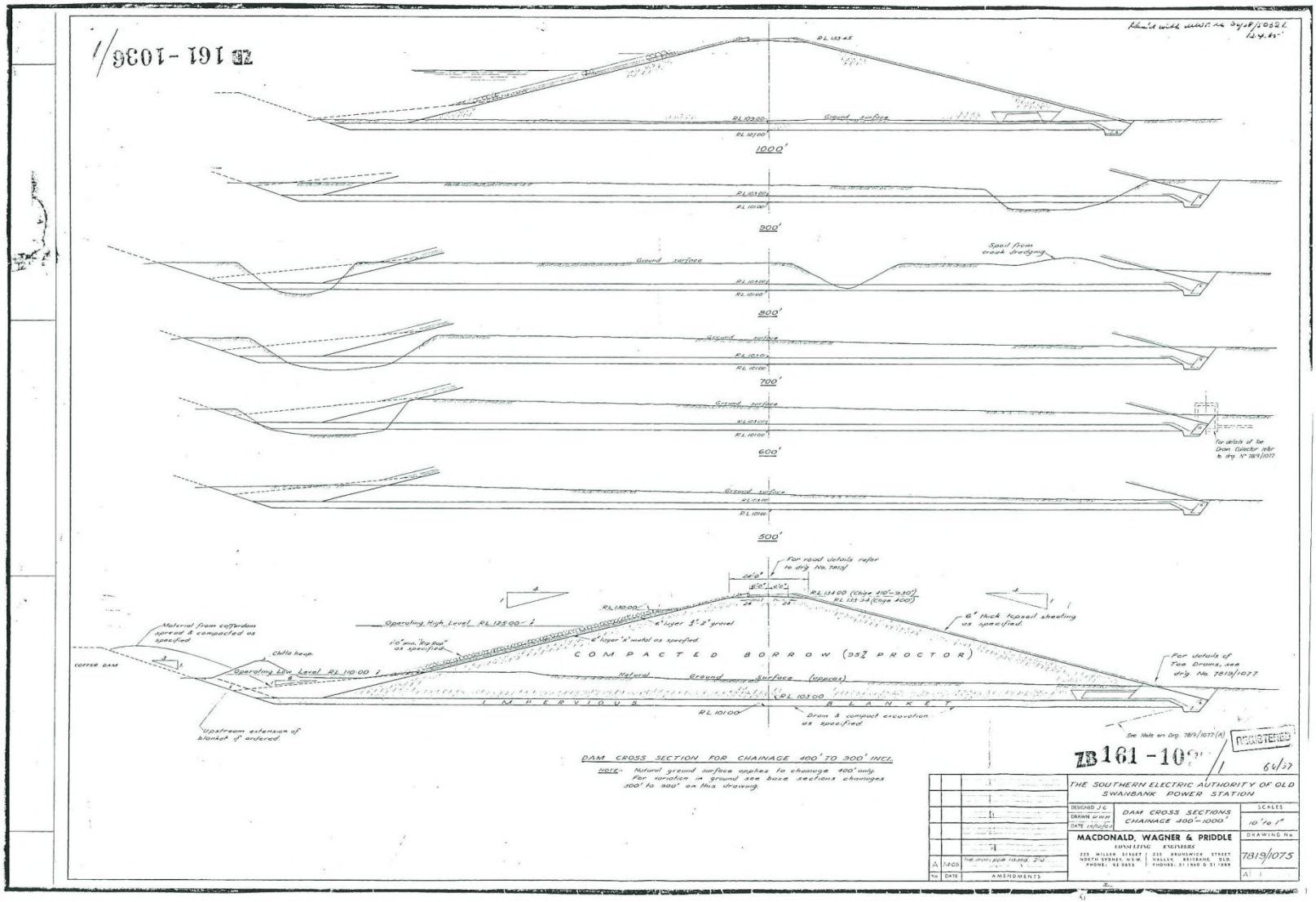


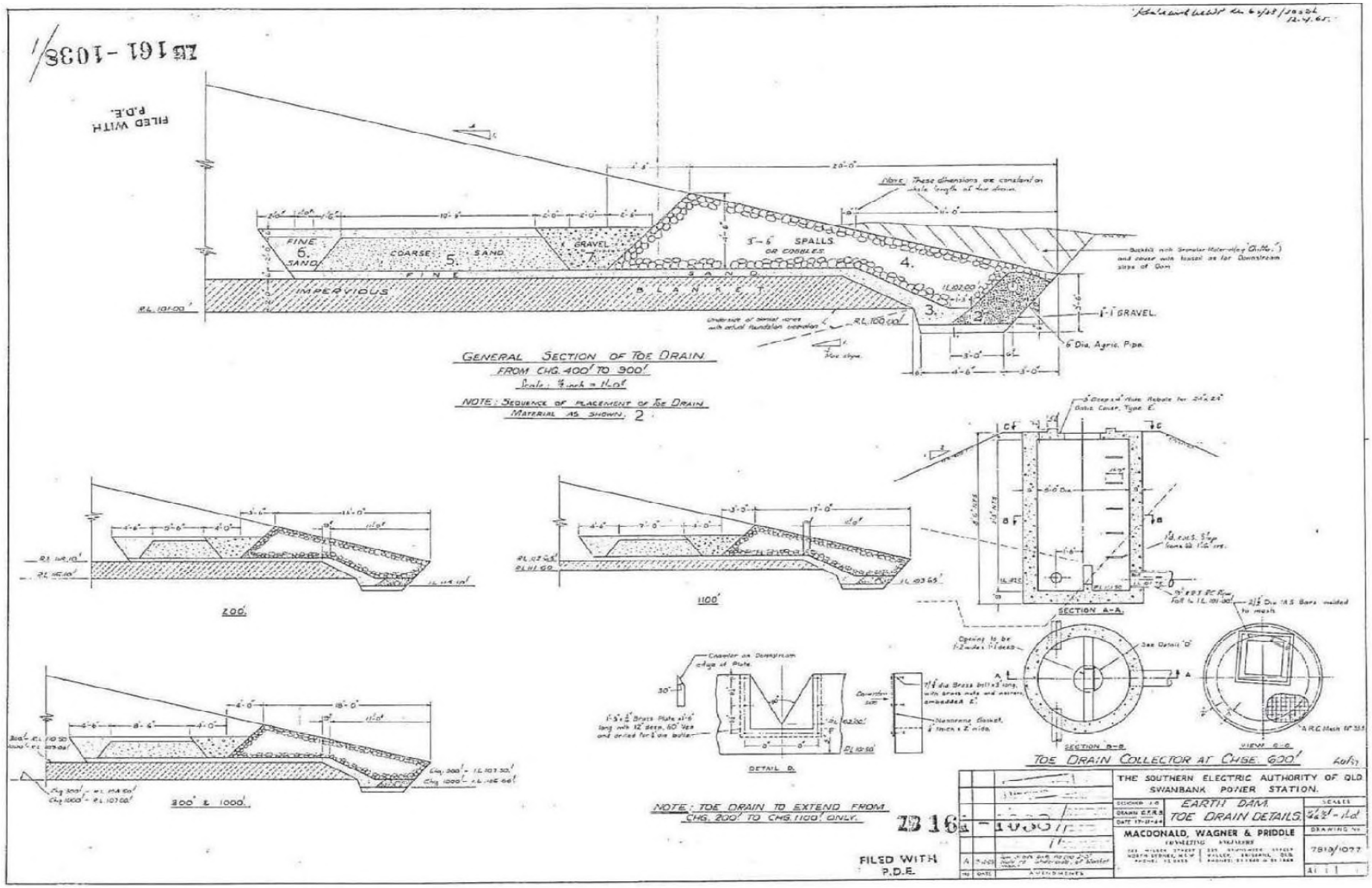
Figure 25: Swanbank CWD spillway discharge curve (taken from 2023 CRA)

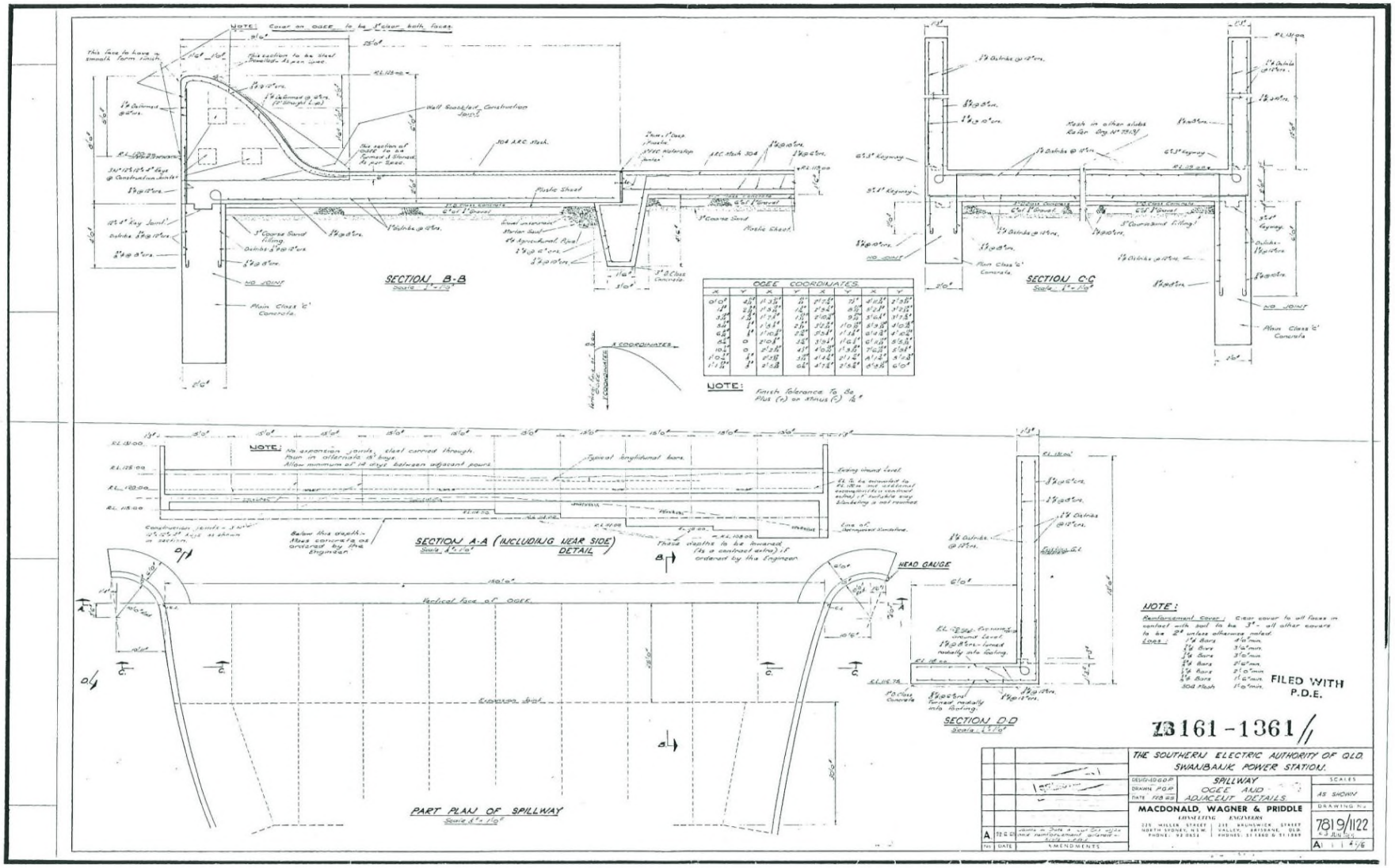
APPENDIX G: Drawings











APPENDIX H: Forms

Table 34: Lake level table template example

DATE	TIME	LAKE LEVEL (SCADA)	LAKE LEVEL (PROBE)

Table 35: Log of events template example

LOG OF EVENTS

DATE	TIME	EVENT DESCRIPTION / ACTION CARRIED OUT	RECORD ENTERED BY

Table 36: Record of communication template example

RECORD OF COMMUNICATION

DATE	TIME	PHONE NUMBER	CONTACT PERSON	MESSAGE SENT / RECEIVED	CALL RECEIVED BY

Table 37: Emergency Event Record template example

Type of Event: *(e.g. Embankment leakage, Earthquake)*					
Commencing:	…..:….hrs	…./…./……	**Finishing**:	…..:….hrs	../../……
Description of Event: *(Describe the lead up to and progress of the event*					
Weather conditions / Rainfall in catchment					
Rate of rise in Reservoir:					
When spillway overflowed:					
Peak level:					
Describe any immediate downstream damage:					
Any other relevant information:					
Statistics:					
Total Inflow:		Mega litres			
Total Discharge:		Mega litres			
Capacity / volume of Reservoir prior to event:		%			
Volume prior to inflow		Mega litres			
Maximum Inflow:		Mega litres per day			
Maximum Discharge		Mega litres per day			
Event Progress: *(Briefly describe daily rate of rise, time to peak level and weather conditions. Attach copies of the Reservoir Level Data Sheet)*					
General Comments: *(Include any observations or comments regarding the event such as Areas inspected, type of monitoring carried out, equipment malfunctions and safety issues.*					
Damage Report: *(Detail any tail water damage to the embankment or stream bank damage in the immediate area of the dam. Attach photos) Include location of areas affected.*					
Attachments: *(List photos, video of the event, Spillway Level versus Time Graph, Communication Record Sheet, Log of Events / Action Sheet)*					
Signed:	,,	**Designation:**	…………………………….	**Date**:	…./…./…….

Review of Event Actions / Activities
Describe the effectiveness of the communication during the event;
List any Improvements that have been identified for Communications during an Event;
Describe the effectiveness of the actions taken in response to the event;
List any Improvements that have been identified for actions taken in response to the event;
Assessment of whether and to what extent the Emergency Action Plan effectively dealt with the Event;
Recommend any changes to the Emergency Action Plan that would allow the plan to deal with a similar event more effectively;
Any other relevant matters to the emergency condition and how it was dealt;

Table 38: SitRep template example

Who is to be notified:

Ipswich Police Communication Centre ϒ
Ipswich LDMG ϒ
CleanCo CCQ (Crisis Communication Team) ϒ
Director Dam Safety (DNRME) ϒ

Message;

Hello (agency/contact) this is (SMSPS or Delegate),
Swanbank Cooling Water Dam is experiencing (event type) and the Emergency Action Plan has been activated at (activation level i.e. ALERT) and the following information is pertinent for your agency response to the situation.
Please repeat this information back to me at the end of this message to confirm you have received all information correctly.

Thank you, do you have any further questions;
--
-

Emergency Event Condition : *(Type of Event e.g.: #1-Heavy rainfall embankment damage, #5-Earthquake)*

Information as of : *(Time and Date)*

Description of Event :

Weather conditions and rainfall in Catchment –
Rate of rise in Reservoir if known –
If / When Spillway overflowed –
Peak level and Time –
Briefly describe any known immediate downstream damage -
Any other relevant information;

Statistics

Current Inflow –
Maximum Inflow -
Maximum Discharge -
Total Discharge (if available) -
Current Capacity and Volume of Reservoir -
Capacity and Volume of Reservoir prior to event -

Event Progress

(Briefly describe the daily rate of rise, time to peak level and weather conditions.)

General Comments

(e.g. Number of personnel on site, max numbers.)

Table 39: EA Template #1 - Watch & Act

QUEENSLAND GOVERNMENT

EMERGENCY ALERT REQUEST

March 2015

Date		**Time**	
Incident/Event: Swanbank Cooling Water Dam Emergency Event // (event # and description)//			
Requesting Officer: [redacted] Contact Details: [redacted] Swanbank Power Station Manager			
Prepared By: [redacted]		**Position:** Swanbank Power Station Manager	

Event Type	☐ Cyclone ☒ Flash Flood ☐ ☐ Storm Surge ☐ Tsunami* ☐ Bushfire ☐ Chemical Spill ☐ Fire Incident ☐ Smoke or Toxic Plume ☒ Other (please specify): Dam Emergency Event ***NB. Tsunami EA campaigns will be sent as Location Based Text Message ONLY**
Message Severity	☐ Emergency Warning** ☒ Watch & Act ☐ Advice ****N.B. activates the SEWS**
Campaign Mode	☒ Voice ☒ SMS – Location Based ☐ SMS – Service Address Based
LDMG Advised?	☒ YES ☐ NO **DDC Advised?** ☒ YES ☐ NO
Threat Direction Required?	☐ YES ☒ NO Note: Can only be used for Emergency Warnings. Indicate direction on map

1. EA Polygon Area: ☒ Map attached

2. Spatial format:	**Use only these file extensions:**	Indicate the format used:	For spatial data, is it supplied via
ESRI	*.dbf, *.prj, *.shp, *.shx	☐	
GML	*.gml, *.xsd	☐	☐ DMportal - specify filenames below
KML	*.kml	☐	☐ FTP - specify filenames below
MapInfo TAB	*.dat, *.id, *.map, *.tab	☐ **Filename:**	☐ Email
MapInfo Mid/Mif	*.MIDI Sequence, *.mif		☐ Other (please specify)

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

Emergency Emergency This is a Flash Flood Watch and Act from Swanbank Cooling Water Dam management. Properties beside Bundamba Creek and overflow areas may experience rapidly rising water levels, with property inundation posing a danger to residents. Access roads and bridges may also be impacted and properties isolated. You should warn neighbours, secure belongings and move to higher ground. For more information visit w w w dot DNRME dot q l d dot gov dot a u

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

Flash Flood Watch & Act from Swanbank Cooling Water Dam management for Bundamba Creek area-possible impact to life/property-warn others-leave area now-move to higher ground

For use by SDCC **Authorising Officer Name:**	Manual Transmission: ☐ EMS Transmission: ☐
EA User Name:	EMS Report ID:

EA Guidelines and the Emergency Alert Request Form Template are available at: www.disaster.qld.gov.au

Table 40: EA Template #2 - Emergency Warning

QUEENSLAND GOVERNMENT

EMERGENCY ALERT REQUEST

March 2015

Date		**Time**	

Incident/Event:
Swanbank Cooling Water Dam Emergency Event // (event # and description)//

Requesting Officer: [redacted]
Contact Details: [redacted]
Swanbank Power Station Manager

Prepared By: [redacted]	**Position:** Swanbank Power Station Manager

Event Type	☐ Cyclone ☒ Flash Flood ☐ Flood ☐ Storm Surge ☐ Tsunami* ☐ Bushfire ☐ Chemical Spill ☐ Fire Incident ☐ Smoke or Toxic Plume ☒ Other (please specify): Dam Emergency Event ***NB. Tsunami EA campaigns will be sent as Location Based Text Message ONLY**
Message Severity	☒ Emergency Warning** ☐ Watch & Act ☐ Advice ****N.B. activates the SEWS**
Campaign Mode	☒ Voice ☒ SMS – Location Based ☐ SMS – Service Address Based
LDMG Advised?	☒ YES ☐ NO **DDC Advised?** ☒ YES ☐ NO
Threat Direction Required?	☐ YES ☒ NO Note: Can only be used for Emergency Warnings. Indicate direction on map

1. EA Polygon Area: ☒ Map attached

2. Spatial format:	**Use only these file extensions:**	Indicate the format used:	For spatial data, is it supplied via
ESRI	*.dbf, *.prj, *.shp, *.shx	☐	☐ DMportal - specify filenames below
GML	*.gml, *.xsd	☐	☐ FTP - specify filenames below
KML	*.kml	☐	☐ Email
MapInfo TAB	*.dat, *.id, *.map, *.tab	☐ **Filename:**	☐ Other (please specify)
MapInfo Mid/Mif	*.MIDI Sequence, *.mif		

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

Emergency Emergency This is a Flash Flood Warning from Swanbank Cooling Water Dam management. Properties beside the Bundamba Creek and overflow areas are likely to experience rapidly rising water levels, with property inundation posing an immediate danger to residents. Access roads and bridges may also be impacted and properties isolated. You should warn neighbours and move to higher ground. For more information visit w w w dot DNRME dot q l d dot gov dot a u

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

Flash Flood Warning from Swanbank Cooling Water Dam management for the Bundamba Creek area-likely impact to life/property-warn others-leave area now-move to higher ground

For use by SDCC **Authorising Officer Name:**	Manual Transmission: ☐ EMS Transmission: ☐ EMS Report ID:
EA User Name:	

EA Guidelines and the Emergency Alert Request Form Template are available at: www.disaster.qld.gov.au

Table 41: Modified Mercalli Intensity Scale (Earthquake)

Average Peak Velocity (cm/s)	Value Description (MM)	Intensity	Average Peak Acceleration (g=9.8m/s^2)	Richter Scale Equivalent
	I	Not felt except by a very few under especially favourable circumstances.		0 – 4.3
	II	Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.		
	III	Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognise it as an earthquake. Standing automobiles may rock slightly. Vibrations like a passing truck. Duration estimated		
1 -2	IV	During the day felt indoors by many, outdoors by few. At night some awakened. Dishes, windows, doors disturbed; walls make creaking sound. Sensation like heavy truck striking building. Standing automobiles rocked noticeably.	0.015g – 0.02g	4.3 – 4.8
2 - 5	V	Felt by nearly everyone, many awakened. Some dishes, windows and so on broken; cracked plaster in a few places; unstable objects overturned. Disturbances of trees, poles and other tall objects sometime noticed. Pendulum clocks may stop.	0.03g – 0.04g	
5 - 8	VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster and damaged chimneys. Damage slight.	0.06g – 0.07g	4.8 – 6.2
8 - 12	VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving cars.	0.10g – 0.15g	

APPENDIX I: Local Government and DDMG Notices

CleanCo engaged with relevant disaster management groups to develop the v4.0 of the Swanbank CWD EAP. The engagement included a number of email exchanges where feedback on an advanced copy of the EAP was provided by LDMG and incorporated in amendments; and a meeting held with LDMG on 3 January 2023.

On 10 January 2023, CleanCo formally submitted a copy of the EAP to the LDMG and DDMG under s352HA of Water Supply (Safety and Reliability) Act 2008 ('the Act'). The LDMG and DDMG were invited to review the EAP.

On 23 January 2023, the LDMG issued CleanCo with a notice given under section 352HB of the Act. No further amendments to the EAP were requested by the LDMG. A copy of the notice is provided below.

On 31 January 2023, the DDMG issued CleanCo with a notice given under section 352HC of the Act considering that the Swanbank CWD EAP is consistent with the district disaster management plan. A copy of the DDMG notice is provided at the end of this appendices.