COPPERLODE FALLS DAM EMERGENCY ACTION PLAN
(Dam EAP)
REFERABLE DAM NUMBER 0257

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<td>Cairns Regional Council, Water &amp; Waste</td>
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Approved by the delegate of the Chief Executive, Department of Natural Resources, Mines and Energy until 31 July 2021.
Contents

Abbreviations .................................................................................................................. 4
Endorsement Table ........................................................................................................ 6
Document Control Sheet .................................................................................................. 7
1 Introduction ................................................................................................................... 8
  1.1 Background ............................................................................................................ 8
  1.2 Dam Safety Coordination ..................................................................................... 8
  1.3 Purpose .................................................................................................................. 9
  1.4 Scope ..................................................................................................................... 9
  1.5 Objectives ............................................................................................................ 9
  1.6 Definitions .......................................................................................................... 10
  1.7 Review process ................................................................................................... 10
2 Copperlode Falls Dam Risk Profile ............................................................................ 10
  2.1 Dam Emergency Event ....................................................................................... 10
3 Dam Emergency Response Framework ........................................................................ 12
  3.1 Normal Operations ............................................................................................. 12
  3.2 Emergency Activation Levels ............................................................................ 13
  3.3 Dam Emergency Triggers ................................................................................... 14
  3.4 Notification and Assessment .............................................................................. 14
  3.5 Activation .......................................................................................................... 15
  3.6 Terrorist Event ................................................................................................... 15
4 Roles and Responsibilities ........................................................................................... 16
  4.1 Normal Operations ............................................................................................. 16
  4.2 General Manager Water & Waste ...................................................................... 18
  4.3 Pre Event Planning and Preparation ................................................................... 18
  4.4 Emergency Control Organisation ....................................................................... 19
  4.5 Local Disaster Coordinator ................................................................................ 21
  4.6 Local Disaster Management Group – Cairns Region ......................................... 21
5 Copperlode Falls Dam Emergency Communications ............................................... 23
  5.1 Internal Communications .................................................................................... 23
  5.2 External Communications ................................................................................... 25
  5.3 Dam Safety Regulator Notification .................................................................... 27
6 Emergency Control Organisation Support Tools ....................................................... 28
  6.1 Event Records .................................................................................................... 28
  6.2 Situation Report ................................................................................................ 28
  6.3 Post Event .......................................................................................................... 28
7 Training Exercise and Testing Requirements ............................................................. 29
8 Dam Information ......................................................................................................... 31
  8.1 General Description ............................................................................................ 31
8.2 General Arrangement Drawings ................................................................. 31
8.3 Dam Hazard Inundation Information .......................................................... 31
8.4 Storage Catchment Area Drawing ............................................................ 34
8.5 Mapping .................................................................................................... 35
9 Charts and Rating Table ............................................................................. 37
10 Appendices ............................................................................................... 38
Appendix 1: Notification and Activation Flowchart ........................................ 39
Appendix 2: Notification Listing Contacts ....................................................... 40
Appendix 3: Copperlode Falls Dam - Emergency Control Organisation Operational
Checklists ....................................................................................................... 42
Appendix 4: Copperlode Falls Dam Emergency Evacuation Plan ...................... 50
Appendix 5: Whispir Emergency Notifications ............................................... 67
Appendix 6: NEAS Polygon Map and Alert Request Forms ............................. 69

Figures

Figure 1: CRC Dam Emergency Management Framework Error! Bookmark not defined.
Figure 2: Lake Morris Catchment Area ............................................................ 34
Figure 3: Access routes to Copperlode Falls Dam ........................................... 35
Figure 4: Copperlode Falls Dam Level versus Reservoir Capacity ................. 37
Figure 5: Copperlode Falls Dam Level versus Spillway Discharge ................. 37

Tables

Table 1: Dam Emergency Triggers and Activation Levels ................................ 14
Table 2: ECO Role Holders ............................................................................ 20
Table 3: Internal Whispir Notifications ......................................................... 24
Table 4: Listing of Flood Maps ..................................................................... 32
### Abbreviations

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<tr>
<th>Abbreviation</th>
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<tr>
<td>BOM</td>
<td>Bureau of Meteorology</td>
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<td>CEO</td>
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<tr>
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<td>Copperlode Falls Dam Caretaker</td>
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<tr>
<td>CRC</td>
<td>Cairns Regional Council</td>
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<tr>
<td>CRC WW</td>
<td>Cairns Regional Council Water &amp; Waste</td>
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<tr>
<td>DDC</td>
<td>Disaster Coordination Centre</td>
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<tr>
<td>DDMG</td>
<td>District Disaster management group</td>
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<td>Dam Emergency Controller</td>
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<td>DNRME</td>
<td>Department of Natural Resources, Mines and Energy</td>
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<td>Emergency Action Plan</td>
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<td>Emergency Control Organisation</td>
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<td>FIA</td>
<td>Failure Impact Assessment</td>
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<td>Guardian Control Centre System</td>
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<td>General Manager Water &amp; Waste</td>
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<td>Manager Operations (Water &amp; Waste)</td>
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<td>NEAS</td>
<td>National Emergency Alert System</td>
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<td>PAR</td>
<td>Population at Risk</td>
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<td>PMF</td>
<td>Probable Maximum Flood</td>
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<tr>
<td>QEW</td>
<td>Quality Environment and Water Team</td>
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<td>QFES</td>
<td>Queensland Fire and Emergency Services</td>
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<td>SCADA</td>
<td>Supervisory Control and Data Acquisition</td>
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<tr>
<td>SDF</td>
<td>Sunny Day Failure</td>
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<tr>
<td>SITREP</td>
<td>Situation Report</td>
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<td>Short Message Service</td>
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<td>TC</td>
<td>Treatment Coordinator</td>
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<td>Water &amp; Waste</td>
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## Distribution Control Sheet

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<td>Water Services Coordinator</td>
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<td>16.</td>
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<td>Dam Safety Regulator – Department of Natural Resources, Mines and Energy</td>
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<td>21.</td>
<td>Counter Terrorism Liaison Officer – QPS Northern Region</td>
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Endorsement Table

This document has been prepared by the dam owner Cairns Regional Council, Water & Waste, in consultation with key disaster and local government personnel and is endorsed by the following personnel:

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**Pursuant to section 352HB Water Legislation (Dam Safety) Amendment act 2017 – the local government has reviewed this Emergency Action Plan and considers it consistent with Cairns Regional Council’s Disaster Management Plan**

| Chair                                         |               |            |        |
| Local Disaster Management Group – Cairns Region|               |            |        |
| Chief Executive Officer on behalf of           |               |            |        |
| Cairns Regional Council                        |               |            |        |

**Pursuant to section 352HC Water Legislation (Dam Safety) Amendment act 2017 – the Local Disaster Management Group has reviewed this Emergency Action Plan and considers it consistent with Cairns Regional Disaster Management Plan**

| Chair                                         |               |            |        |
| Northern Regional District Disaster Management Group |               |            |        |
| Chief Superintendent                           |               |            |        |
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1 Introduction

1.1 Background

Dam safety of referable dams is regulated to protect the community from dam failure. The chief executive of the Department of Natural Resources, Mines and Energy (DNRME) is responsible for regulating referable dams in accordance with the Water Supply (Safety and Reliability) Act 2008 (the Act).

The Act (s352E and s352F) requires dam owners to develop and have approved by the chief executive, an Emergency Action Plan (EAP) for each referable dam under their control. A dam only becomes a ‘referable’ dam if it would put population at risk (PAR) if it were to fail. Copperlode Falls Dam (CFD) meets this requirement and therefore requires this EAP.

Under the EAP Guideline (2017) issued by DNRME, the EAP is to be consistent with the disaster management plan/s and provide the procedures to respond collaboratively with disaster management groups, local government/s and emergency agencies to manage the consequences of a dam hazard event and a dam emergency event.

Cairns Regional Council (CRC), as both the dam owner and the local government whose area may be affected by the event, has developed this EAP in close consultation with our Local Disaster Coordinator (LDC) and, where possible, has applied existing local disaster management plans and procedures to communicate with and manage the safety of the identified PAR.

CRC Water & Waste ensure regular contact with the Local Disaster Management Group for the Cairns Region (LDMG-CR). Upon review, the EAP is also supplied to the Chair of the LDMG and Coordinator of the Local Disaster Centre to ensure consistency.

1.2 Dam Safety Coordination

CRC WW holds Dam Safety Coordination (DSC) meetings at least once a quarter. The DSC’s responsibilities and intent is:

- To review and assess recommendations following the Annual/ Comprehensive Inspection;
- To maintain awareness of compliance issues to meet the CFD Dam Safety Conditions;
- To identify training and competence requirements for WW and other CRC staff involved in dam safety management activities;
- To ensure that the CFD EAP is reviewed and updated within the timescales prescribed by the Regulator;
- To ensure integration of the EAP with the CRC Disaster Management Framework; and
- To review and endorse community engagement / communication activities in relation to dam safety.

The DSC reports to the Water and Waste Management Team.

Membership of the DSC is identified in the Referable Dams Safety Management System DM #5939595.
1.3 **Purpose**

The purpose of this plan is to provide CRC the framework within which it can effectively manage any dam hazard or emergency event at CFD and communicate with and manage the safety of the identified PAR.

1.4 **Scope**

This plan details the requirements of the CFD Emergency Control Organisation (ECO) and their management of the response to any dam hazard or emergency event and applies to all CRC staff.

1.5 **Objectives**

The primary objectives of this plan are to:

- Minimise the risk of harm to persons or property if a dam hazard event or emergency event occurs;
- Clearly define the roles, responsibilities, instructions, accountabilities and authority in managing a dam hazard event or emergency event;
- Provide a coordinated response in the shortest possible time to minimise the loss of life and/or injury to PAR and to minimise the damage to property;
- Provide a structured assessment framework to facilitate the activation and escalation of an appropriate response in a timely manner; and
- Integrate with CRC’s Local Disaster Management Group capability.

1.6 **Definitions**¹

A dam hazard means a reasonably foreseeable situation or condition that may:

a. cause or contribute to the failure of the dam, if the failure may cause harm to persons or property; or
b. require an automatic or controlled release of water from the dam, if the release of the water may cause harm to persons or property.

A dam hazard becomes a **dam hazard event** when persons or property may be harmed due to the event, but the actions undertaken by the dam owner is **unlikely** to require a **coordinated response** involving two or more relevant entities.

A dam hazard event becomes a **dam emergency event** when persons or property may be harmed due to the event and there is a requirement for a **coordinated response** by the dam owner and two or more relevant entities. Note that providing notification to other entities is not a coordinated response. A coordinated response involves these entities **taking action** to respond to the dam emergency event.

The ‘relevant entities’ mentioned above are:

- the local government whose local government area may be affected by the event (CRC);
- the relevant local disaster management group/s CRC - LDMG;

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¹ Source: DNRME Emergency Action Plan for Referable Dam Guideline 2017
• the relevant district disaster management group/s Northern Region - DDMG;
• the chief executive (CRC CEO); and
• other entities such as the Queensland Fire and Emergency Service (QFES) or the Queensland Police Service (QPS).

1.7 Review process

This EAP shall be reviewed annually, as required by the Dam Safety Regulator or following an emergency event. This is to ensure that the plan incorporates any lessons learnt from each event and that the training requirements are also reviewed.

2 Copperlode Falls Dam Risk Profile

All dam information including general and technical dam information, number of PAR under threat of each hazard event, drawings, hazard inundation information and relevant mapping is contained in the Dam Data Book #3198193.

CRC undertook a Failure Impact Assessment (FIA) to identify dam hazards, dam hazard events and dam emergency events. The dam hazards which have been identified with the potential to cause an emergency event at CFD are:

• Earthquake;
• Seepage;
• Movement of the dam;
• Damage to the dam;
• Terrorist activity; and/or
• Weather event causing flooding.

These hazards may lead to a dam emergency event (detailed below) which may impact on the identified PAR and require activation of this EAP.

Any of these dam emergency events can escalate such that they can result in failure of the dam wall or spillway. Such events are listed in the CRC WW Business Risk Register. The overall CRC risk rating for the failure of the dam or spillway is high because the consequences would be catastrophic.

Please note, the hazard category for CFD according to the referrable dam hazard rating system is extreme as noted in the Dam Data Book #5895790.

2.1 Dam Emergency Event

A Dam Emergency Event can include risk to dam integrity resulting from movement of dam, earthquake, change in piezometer and or pore pressure, or dam failure caused by flooding or terrorist activity.

The FIA identified that the likely mode of a non-flood event is a piping failure of the dam embankment. Potential failure modes that may be visualised as damage to the dam and trigger an event response include:

• Damage to the embankment, such as slope instability, foundation failure;
• Damage to the spillway such as sliding or overturning failure; and
• Damage to the dam due to terrorist activity leading to foundation or spillway failure.
A Dam Emergency event resulting from flooding, includes:

1. Without dam breach failure where unprecedented rainfall causes the dam to reach its absolute peak water level and associated peak discharge by overtopping of dam crest and spillway discharge.

2. With dam breach failure where unprecedented rainfall causes the dam to reach its absolute peak and overtops the embankment damaging the dam wall quickly.

The identified flood event which is most likely to impact to the downstream community is during a flood when the dam embankment is likely to be overtopped and lead to a breaching failure of the dam.
3 Dam Emergency Response Framework

The CRC emergency response framework (see Figure 1) for CFD is aligned to disaster management principles and emergency management standards to ensure that CRC can effectively respond to a dam emergency and activate the resources of the Local Disaster Management Group – Cairns Region (LDMG-CR) to assist. It provides a scalable response based on pre-determined triggers against the SDF or PMF emergency events identified in Section 2.

Figure 1: CRC Dam Emergency Management Framework.

3.1 Normal Operations

The Dam Safety Conditions stipulate the requirements of the Regulator in relation to the operation and maintenance of Copperlode Falls Dam. The operational procedures relate to the following specific monitoring activities:

- Water level at the dam relative to the spillway level;
- Seepage at the left and right abutments of the dam embankment, and at the dam spillway;
- Movement of the dam embankment;
- Cracking of the dam embankment; and
- Rainfall at the dam.

These operational procedures utilise automated monitoring and visual inspections. Automated monitoring includes:

- Sensors to monitor the dam water level;
- Piezometers to monitor static water pressure in the dam embankment;
- Sensors to monitor seepage, spillway discharge levels and flows, and outlet discharge flows; and
- Remotely controlled spillway camera and tower camera used to supplement other forms of monitoring.
Weekly visual inspections of the general condition of the dam are conducted by the Copperlode Falls Dam Caretaker (CFDC) and treatment plant operators. The visual inspections look for signs of the following potential problems:

- Wave erosion;
- Toe erosion;
- New springs, seeps or gullyng;
- Foundation failure;
- Slide in downstream slope; and
- Landslide.

In addition to changes in dam condition, the following security alerts may indicate a potential emergency event:

- Security alert (QPS/AFP) showing increase in security alert levels with local indicators identified; and
- Suspicious activities in vicinity of CFD.

In addition to the activities undertaken regularly by CRC officers, the Dam Safety Conditions stipulate that a series of periodic safety inspections be carried out – from annual, comprehensive (five-yearly) and special (following specific events).

### 3.2 Emergency Activation Levels

This plan applies the standard disaster activation levels consistent with those applied by the LDMG-CR and other disaster management agencies. These are:

- **Alert**: A heightened level of vigilance due to the possibility of an event in the area of responsibility.
- **Lean Forward**: An operational state prior to 'stand up' characterised by a heightened level of situational awareness of a disaster event (either current or impending) and a state of operational readiness.
- **Stand Up**: The operational state following 'lean forward' whereby 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 recovery operations. There is no longer a requirement to respond to the event and the threat is no longer present.
3.3 Dam Emergency Triggers

The three triggers and their corresponding level of activation for a dam emergency is detailed in Table 1 below. Table 1: Dam Emergency Triggers and Activation Levels

<table>
<thead>
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<th>Trigger Level</th>
<th>1</th>
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<tr>
<td>Activation Level</td>
<td>Alert</td>
<td>Lean Forward</td>
<td>Stand-Up</td>
</tr>
<tr>
<td>Emergency Event</td>
<td>Infrastructure integrity failure</td>
<td>Identification during routine inspection of signs of embankment distress such as cracks and bulges. and/or Unusual change in piezo readings. and/or Identification of new areas of seepage growth in existing areas of seepage.</td>
<td>Cracks and bulging becoming significant to the point where stability may be impaired. and/or Detection of signs of cloudy water in seepage.</td>
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<tr>
<td>Flood</td>
<td>1.5m over spillway</td>
<td>2.2m over spillway</td>
<td>2.5m over spillway</td>
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**Possible Impacts**

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<th>Alert</th>
<th>Lean Forward</th>
<th>Stand-Up</th>
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<td>Water flows retained within primary channel of watercourse.</td>
<td>Some minor breaching of primary channel but retained within main channel of water course.</td>
<td>Major breaching of creek will commence.</td>
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<tr>
<td>Infrastructure Impact</td>
<td>No impact on infrastructure.</td>
<td>No inundation of homes or major infrastructure. Mary Parker Drive Bridge likely to be inundated.</td>
<td>Inundation of low lying properties. Further increase in levels may result in inundation of caravan parks, homes and major infrastructure.</td>
</tr>
</tbody>
</table>

3.4 Notification and Assessment

The process of notifying a dam emergency event, invoking this plan and activating the ECO and the LDMG-CR is shown in the Notification and Activation Flowchart contained in Appendix 1.

Identification of a dam emergency, or an event which could lead to one, may be via the activities undertaken by CRC. During normal operations this makes use of existing sensors and monitoring devices, routine inspections, or from any other external triggers. Once alerted to a dam emergency, or an event which could lead to one, CRC officers are to immediately notify the MO. If the MO cannot be contacted, the TC is to be contacted and if the TC cannot be contacted the CFDC is to be notified.

The MO or alternate will then assess the situation against the conditions detailed in Table 1. This will identify the trigger level and dictate the required ECO activation level.

See Appendix 1 – Notification and Activation Flowchart
3.5 Activation

This EAP will be activated, the ECO initiated and appropriate internal CRC stakeholders notified as soon as any of the conditions of a dam emergency event described in Table 1 are met. This will primarily be managed through the use of Whispir (see Section 5.1.1) or, if this is not possible, by phone using the notification listing contacts in Appendix 2.

The overall responsibility for invoking the EAP rests with the MO. However, the CFDC and TC can invoke the EAP and activate the ECO if the MO is unavailable or it is necessary and urgent to ensure those proximate to the dam receive timely warnings.

The activation of the LDMG-CR is defined in the Local Disaster Management Plan (see Appendix1. Activation of the LDMG) and will be managed by the LDC to provide the appropriate level of support to the ECO through each level of activation.

See Appendix 2 – Notification Listing Contacts

3.6 Terrorist Event

Note that in the event of terrorist activity, associated communications, actions and priority order of notifications will be escalated to the National Security Hotline (1 800 123 400), Police Counter-Terrorism Liaison Officer and Triple Zero to ensure an effective Counter-Terrorism response.
4 Roles and Responsibilities

4.1 Normal Operations

CRC staff actions in regard to monitoring CFD during normal operations are contained in the CFD operational procedures. Specific responsibilities under this EAP prior to the activation of the ECO are detailed below.

4.1.1 Copperlode Falls Dam Caretaker

The responsibilities of the Copperlode Falls Dam Caretaker are:

- Identify lead indicators of a potential dam emergency or an event which could lead to one by referring to Detailed Operations Maintenance Manuals;
- Escalate notifications of a dam emergency to the Treatment Coordinator and Manager Operations;
- Be prepared to invoke the EAP and activate the ECO if the Treatment Coordinator and Manager Operations are unavailable;
- Be prepared to initiate notification of PAR by contacting the Manager Operations if a dam failure is imminent; and
- Fill the role of Dam Emergency Observer within the ECO when it is activated.

4.1.2 Treatment Operators

The responsibilities of the Treatment Operators are:

- Identify lead indicators of a potential dam emergency;
- Escalate notifications of a dam emergency to the Treatment Coordinator; and
- Be prepared to fill the role of Dam Emergency Observer within the ECO when the incumbent is not available or needs relief.

4.1.3 Treatment Coordinator

The responsibilities of the Treatment Coordinator are:

- Identify lead indicators of a potential dam emergency or an event which could lead to one by referring to Detailed Operations Maintenance Manuals;
- Review and assess any notifications received of a dam emergency and confirm requirement to escalate;
- Escalate notifications of a dam emergency to the Manager Operations;
- Be prepared to invoke the EAP and activate the ECO if the Manager Operations is unavailable;
- Be prepared to notify PAR via the Redlynch Valley early warning system if a SDF emergency event is imminent and timing of the normal notification procedures may impact the safety of PAR;
- maintain and test equipment needed during dam emergencies, including radios, satellite phones, cameras and monitoring equipment such as SCADA, and
- Fill the role of Dam Emergency Support Officer within the ECO when it is activated.
4.1.4 Manager Operations

The responsibilities of the Manager Operations are:

- Review and assess any notifications of a dam emergency;
- Invoke the EAP and activate the ECO if the conditions detailed in Table 2 – Dam Emergency Triggers and Activation Levels are met;
- Notify CRC stakeholders (via Whispir) that the EAP has been invoked and the ECO is activating including:
  - Mayor
  - Chair Local Disaster Management Group
  - Chief Executive Officer
  - General Manager Waste and Water
  - Manager Business Performance and Compliance
  - Local Disaster Coordinator
  - Manager Marketing and Communications
  - All potential ECO members.
- Chair a teleconference with all ECO members to confirm role allocation; and
- Fill the role of Dam Emergency Controller within the ECO when it is activated.

4.1.5 Manager Business Performance and Compliance

The responsibilities of the Manager Business Performance and Compliance are:

- Coordinate collaboration with local and district disaster management groups and other entities about reviewing EAP and communicating with PAR;
- Maintain Water and Waste Department Whispir Communication Procedure (#5748810);
- Work with CRC Information Systems Branch to undertake an annual review of PAR lists within Whispir to ensure their accuracy for use during a dam emergency;
- Ensure all EAP related training and exercise requirements detailed in Section 7 are met;
- Ensure this plan is reviewed in accordance with statutory timelines;
- Collaborate with LDMG to plan for management of assembled people during SDF events;
- Manage the communication of CRC educational information regarding CFD, its risks and associated dam emergency arrangements to identified PAR and the broader Cairns community in consultation with Manager Marketing and Communications; and
- Manage regulatory compliance.

4.1.6 Manager Marketing and Communication

The responsibilities of the Manager Marketing and Communication are:

- Review and approve messages to PAR annually; and
- Manage day to day communications with PAR outside an event.

4.1.7 Manager Infrastructure

The responsibilities of the Manager Infrastructure are:
• Ensure dam safety inspections are undertaken in accordance with Dam Safety Conditions;
• Manage capital works; and
• Ensure Redlynch Valley sirens are maintained and tested in accordance with technical requirements.

4.1.8 Local Disaster Coordinator
The responsibilities of the Local Disaster Coordinator are:

• Establishing and maintaining user profiles within the Guardian Incident Management System (GUARDIAN IMS);
• Providing initial and annual refresher training on the GUARDIAN IMS to all ECO role holders (as per Table 2);
• Participating in ECO training and exercises including the set-up of the GUARDIAN IMS in training mode; and
• Conduct yearly review with WW of GIS polygons and formatted media releases and pre-lodging with State Disaster prior to wet season/cyclone season in consultation with Manager Marketing and Communications.

4.1.9 Emergency Control Organisation - Role Holders
All CRC staff identified as a primary or alternate ECO role holder (see Table 2) are to:

• Attend all annual training and exercises as defined in Section 7;
• Attend annual refresher training on the GUARDIAN IMS; and
• Remain cognisant of their ECO role requirements.

4.1.10 General Manager Water & Waste
The role of the General Manager Water & Waste is to direct and manage the activities of the CRC WW department with regard to ensuring water security for the Cairns population. GM WW is therefore responsible for ensuring WW staff meet their responsibilities as described in Section 4.1.

During a dam emergency event GM WW is responsible for:

• Confirming the DEC has notified the Dam Safety Regulator;
• Activating as part of the LDMG to provide advice on CFD and its emergency arrangements; and
• Managing water security objectives and activating contingency plans if necessary.
• Making the decision and calling “000” if dam failure is imminent and immediate i.e. if contacting emergency services through normal process is possible due to time limitations.

Following a dam emergency event the GM WW is responsible for:

• Producing the Emergency Event Report which is required within 30 business days of the incident;
• Distributing the Emergency Event Report to the Dam Safety Regulator; and
• Arranging a follow-up evaluation after the emergency event.

4.2 Pre Event Planning and Preparation
When BOM forecasts an extreme weather event with rainfall likely to be greater than 200mm for more than one day in the Lake Morris catchment the MO will commence planning and preparation for the activation of the EAP.

4.2.1 Role

The role of the MO is to call a meeting of ECO members, alternates and key stakeholders, at least one full business day prior to an extreme weather event to appoint ECO members, ensure situational awareness and plan for CRC WW business continuity.

4.2.1 Responsibilities

The ECO has the following responsibilities during prevent planning and preparation:

- Appoint and confirm availability of officers for all ECO roles;
- Conduct a scenarios and impacts assessment based on current BOM forecast;
- Clarify expectations of roles and responsibilities;
- Ensure officers maintain situational awareness and be prepared to activate EAP;
- Test access to GUARDIAN IMS;
- Assess current situation and condition of the dam; and
- Check communication tools are operational.

4.3 Emergency Control Organisation

Following the invocation of this EAP based on the triggers described in Table 1, the ECO will be established to manage CFD related CRC response activities.

4.3.1 Role

The role of the ECO is to monitor, assess and report the condition of CFD during a dam hazard or emergency event.

4.3.2 Responsibilities

The ECO has the following responsibilities during a dam hazard or emergency event:

- Assess the condition of the CFD;
- Manage the impact of the event on CRC and associated assets at CFD;
- Coordinate response actions at CFD;
- Collect and collate data on the condition of CFD;
- Maintain a chronological record of actions taken and data collected during the event;
- Provide subject matter expert advice to the LDMG;
- Monitor key metrics on the condition of CFD;
- Recommend PAR communication activities to the LDMG;
- Recommend PAR evacuations to the LDMG;
- Manage access to CFD by the public and commercial operators;
- Issue Whispir alerts to PAR during the Lean Forward and Stand Up activation levels for a SDF emergency event;
- Notify PAR via Redlynch Valley emergency warning alert if a SDF emergency event is imminent and normal notification procedures may impact the safety of PAR;
- Maintain communications with the LDMG;
Conduct a Special Inspection within 48 hours of activation of the EAP, if directed by the Dam Safety Regulator, in accordance with Dam Safety Condition 9; and

Notify and manage communications with Dam Safety Regulator.

Note: In the event of a Dam Emergency Event the ECO is responsible for communication with PAR until the LDMG is stood up. This includes the activation of the Redlynch Valley emergency warning system and provision of advice via the emergency warning system to people within the Valley and at assembly points.

4.3.3 ECO Roles

The ECO comprises four roles to monitor, assess and report the condition of CFD during a dam hazard or emergency event. The primary and alternate holders of each role are detailed in Table 2.

Table 2: ECO Role Holders

<table>
<thead>
<tr>
<th>Position</th>
<th>Primary Holder</th>
<th>Alternate 1</th>
<th>Alternate 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dam Emergency Controller</td>
<td>Manager Operations</td>
<td>Water Services Coordinator</td>
<td>Treatment Coordinator</td>
</tr>
<tr>
<td>Dam Emergency Support Officer</td>
<td>Treatment Coordinator</td>
<td>Technical Officer Treatment</td>
<td>Principal Engineer Operations</td>
</tr>
<tr>
<td>Dam Emergency Observer</td>
<td>CFD Caretaker</td>
<td>Water Treatment Duty Operator</td>
<td>Team Leader Water Treatment</td>
</tr>
<tr>
<td>Dam Emergency Compliance Coordinator</td>
<td>QEW Duty Officer*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dam Emergency Communications Officer#</td>
<td>Manager Marketing &amp; Communications</td>
<td>Media Coordinator</td>
<td>Community Engagement officer WW</td>
</tr>
<tr>
<td>Dam Emergency Administration Officer</td>
<td>Quality &amp; Reporting Officer WW Operations Administrative Officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dam Emergency Quality Officer</td>
<td>Quality Systems Officer</td>
<td>Team Leader Quality &amp; Reporting</td>
<td></td>
</tr>
</tbody>
</table>

* Note this role has an established duty roster so no alternate is nominated.

# Note this role sits in the ECO only when the LDMG is not activated – see box in 4.4.2 above.

4.3.4 ECO Duties

Specific role and duties for each member of the ECO are contained in the operational checklists contained in Appendix 3. These checklists are also available within the GUARDIAN IMS used by LDMG-CR for the management of disaster events.

See Appendix 3 – Emergency Control Organisation Operational Checklists

- Dam Emergency Controller
- Dam Emergency Support Officer
- Dam Emergency Observer
- Dam Emergency Compliance Coordinator
• Dam Emergency Quality Officer
• Dam Emergency Administration Officer

4.3.5 Dam Safety Inspections
During a dam emergency event, dam safety inspections are conducted as follows:

• **Alert:** Every 12 hours in daylight hours only. At night only if there is a significant change in the condition of CFD and it is safe to do so
• **Lean Forward:** Every 6 hours in daylight hours only. At night only if there is a significant change in the condition of CFD and it is safe to do so
• **Stand Up:** Only if it is critical to, every 2 hours, obtain an update on the condition of CFD and it is safe to do so.

Dam safety surveillance inspections checklist is available at #2729584, and is also available in GUARDIAN IMS.

4.4 Local Disaster Coordinator

4.4.1 Role
The role of the LDC is to activate the LDMG to act on reports from the ECO during a dam hazard or emergency event.

4.4.2 Responsibilities
The LDC has the following responsibilities following the invocation of this EAP and the activation of the DAM ECO:

- If no current Operation is active, create a new Operation Name for the dam emergency event in GUARDIAN IMS;
- Initiate an extraordinary meeting of the LDMG Executive when notified that the DAM EAP has been invoked and the ECO is activating;
- Brief the LDMG Executive on the situation;
- Activate relevant Local Disaster Management Plan Sub-Plans;
- Open the LDCC; and
- Activate the LDMG as required to act on reports from the DAM ECO.

Once the LDMG has been activated, the responsibilities of the LDC are in accordance with the LDC operational checklist and normal LDMG operating procedures and plans based on the situational information provided by the DAM ECO and other relevant information obtained from external sources (e.g. BOM).

4.5 Local Disaster Management Group – Cairns Region

4.5.1 Role
The role of the LDMG-CR is to coordinate CRC response and recovery actions and joint agency response during a dam emergency event.

4.5.2 Responsibilities:
The LDMG has the following responsibilities during a dam emergency event:

- Activate LDMG when requested by DEC, if concurrent flooding has not resulted in the activation of the LDMG;
• Post emergency warning issued by ECO, take over management of communication with PAR and the broader Cairns community for the remaining stages of the emergency;
• Work with ECO to take over management of PAR at assembly points; and
• Manage the notification of PAR once activated:
  o Communication with PAR and the broader Cairns community;
  o Undertake strategic decision making to assess the requirement to evacuate PAR;
  o Issue voluntary evacuation advice to PAR;
  o Request directed evacuation through the DDMG Cairns; and
  o Manage the evacuation of PAR (voluntary and directed).
5 Copperlode Falls Dam Emergency Communications

CRC has a range of communication channels and platforms to assist in internal and external communication during a dam emergency event. External communications will be managed by the Manager Marketing and Communications in consultation with LDC.

5.1 Internal Communications

In the case of an emergency, direct contact with ECO members can be conducted using; Satellite phones, VoIP, UHF (Ultra-High Frequency) radio and Mobile telephone technologies. In addition, operations staff can be contacted using the below radio frequencies.

- Transmit frequency
- Receive frequency
- Receive frequency
- Encode and decode

The following communication systems are also used for internal communication during the invocation of the EAP, activation of the ECO and management of a dam emergency. These are in addition to normal phone and SMS communications outlined above. Note that email should not be used for high priority communications.

5.1.1 Whispir

Whispir is a communication platform which allows CRC to issue alerts and warnings via SMS, email and voicemail. This system allows internal and external tiered communication trees with automatic trigger points with emergency alerts/ warnings disseminated as required. Whispir features rich text messaging enabling the use of GIS mapping and live cam pictures.

Whispir will be used for communication with internal and external CRC stakeholders in the following circumstances:

- When the EAP has been invoked and the ECO is activating (internal only);
- When a change in the level of activation of the ECO has occurred (internal and external); and
- End of dam emergency event and stand down of the ECO (internal level 1/2/3 and external level 2/3).
Table 3: Whispir Notifications

<table>
<thead>
<tr>
<th>Circumstance</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial activation</td>
<td>The trigger conditions for a Level [insert level assessed (1/2/3)] [insert type of emergency event (SDF/PMF)] dam emergency event have been identified and the ECO has activated to [ALERT/LEAN FORWARD/STAND UP] status</td>
</tr>
<tr>
<td>Escalation of trigger level</td>
<td>The trigger conditions for a Level [insert level assessed (2/3)] [insert type of emergency event (SDF/PMF)] dam emergency event have now been met and ECO is now at [LEAN FORWARD/STAND UP] status</td>
</tr>
<tr>
<td>De-escalation of trigger levels</td>
<td>The trigger conditions for a Level [insert level assessed (1/2/3)] [insert type of emergency event (SDF/PMF)] dam emergency event have now moderated and the ECO has de-escalated to [ALERT/LEAN FORWARD/STAND UP] status</td>
</tr>
<tr>
<td>Emergency over</td>
<td>The dam emergency event is now over and the ECO has been stood down</td>
</tr>
</tbody>
</table>

5.1.2 GUARDIAN IMS

Following the activation of the ECO and LDMG, the GUARDIAN IMS will be used to manage communication between these teams as it is during all CRC disaster and emergency events. DAM ECO roles are included in the CRC GUARDIAN IMS, which allows ECO members to:

- Access role-specific operational checklists;
- Provide regular SITREPS to the LDMG;
- Request LDMG support; and
- Recommend evacuation of PAR.

ECO members access GUARDIAN IMS, using the following log on convention:

- Web address: 
- Sign In rules: Email (<initial.surname>@cairns.qld.gov.au
  Password (<indivdual password>)

ECO members and their alternates maintain a quick link on their computer toolbar.

The GUARDIAN IMS will also be used during exercises in training mode to allow ECO members to maintain their knowledge and familiarity of the system and practice its use during an emergency event.

For assistance and troubleshooting in GUARDIAN IMS during an emergency, the following phone numbers are available:

- Head Office: 
- After Hours: 

5.1.3 Loss of systems

If, during a dam emergency event, the ECO loses the functionality of Whispir or the GUARDIAN IMS, it will revert to phone communications (if operational), and the use of paper-based checklists and guides to manage its response.
5.2 External Communications

In the event of an emergency situation everyone has a responsibility for their own personal safety and that of the community. The following communication systems are used to communicate with PAR and the broader community around the area at risk from dam inundation so that they can take suitable actions to ensure their personal safety.

5.2.1 Redlynch Valley Early Warning System

In the extremely unlikely situation where a Dam Emergency Event is as a result of risk that the dam wall will fail, normal warning systems cannot be put in place by the LDMG for notification to PAR. The Redlynch Valley Early Warning System will be activated by the Dam Emergency Controller, or if time does not allow the Dam Emergency Observer.

The Redlynch Valley early warning system includes sirens followed by a recorded voice message delivered through nine outdoor warning stations (sirens). The voice message is:

‘EMERGENCY – EMERGENCY – EVACUATE NOW – MOVE TO HIGHER GROUND’.

Speakers mounted to towers have been positioned throughout the Redlynch Valley from Crystal Cascades to Brinsmead. These stations can transmit automated warning signals and allow the broadcast of public address and pre-recorded voice messages.

Residents and business owners in the Redlynch Valley and adjoining areas have been provided a CFD emergency evacuation guide template to enable them to prepare a customised evacuation plan for their own safety should the dam wall fail. They have been encouraged to prepare, share and practise their own emergency evacuation plan.

The template includes Redlynch Valley maps with likely flood zones marked to allow residents and business owners to locate and mark their property, identify a primary and alternate safe location to evacuate to and mark the route between their property and those safe points. It also provides advice on:

- Preparing an emergency kit;
- Immediate actions to take on hearing the sirens;
- Key information sources; and
- Emergency and CRC contacts.

See Appendix 4 – CFD Emergency Evacuation Plan #5881804

5.2.1 Cairns Alert and Cairns Disaster Management Dashboard

CRC has a ‘Cairns Alert’ system which uses text messages (SMS) and email to send out information about local disasters, severe weather and emergency events. The alerts are official communication from the LDMG, who manages the community response to disasters.

‘Cairns Alert’ utilises the Whispir communication platform to issue alerts and warnings to residents and PAR. Resident details are obtained from the CRC rates database for emergency alerts. Also, residents can ‘opt-in’ to be included in Cairns regional emergency alerts which would include dam hazard events. Pre-approved messages have been developed and are contained in Appendix 5.
See Appendix 5 – Whispir Emergency Notifications

- Alert 2: Notification at Lean Forward
- Alert 3: Notification at Stand Up

CRC Disaster Management also has a Cairns Disaster Management Dashboard at disaster.cairns.qld.gov.au which provides disaster news and intelligence via a CRC webpage information gateway.

5.2.2 National Emergency Alert System

CRC can utilise the NEAS system to ensure those closest to the Dam will be notified via voice message and/or SMS. NEAS notifications are authorised and sent by the LDC with support from the LDMG.

Appendix 5 includes a map reflecting the emergency alert polygon area in which emergency alerts will be issued for dam related incidents. The polygon has been approved and has been imported into the Emergency Alert system. Pre-approved messages have also been prepared to ensure timely dissemination of alerts to PAR. These are also included in Appendix 5. All PAR will be notified as a priority at the same time.

See Appendix 6 – NEAS Polygon Map

- NEAS Polygon Map #5573843
- Emergency Alert Request Form #5573638:
  - Emergency Alert Request Form: CFD Failure – Alert Lv 2 – Lean Forward
  - Emergency Alert Request Form: CFD Failure – Alert Lv 3 – Stand-up

5.2.3 Media and Social Media

In addition to the voice messages, texts and emails, CRC has pre-developed media releases as part of its Disaster Management Plan. Social media and local media outlets including TV and radio will be engaged to release information as deemed appropriate at the time.

The LDMG Communication Officer (Manager Marketing and Communications) conducts communication with the community and PAR with the support of local disaster management staff. CRC can also call upon the emergency services.

CRC Disaster Management also has a Cairns Disaster Management Dashboard at disaster.cairns.qld.gov.au which provides disaster news and intelligence via a CRC webpage information gateway.

In the unlikely event that the dam structure is at risk of failure, Media release templates in line with the Local Disaster Management Plan media templates have been developed and are located in Appendix 7:

See Appendix 7 – Dam Emergency Media Release Templates

- Media Template Failure of Copperlode inundation of low lying areas (#5567609)
- Media Template Emergency Evacuation Notice – properties downstream of Copperlode Dam (#4120548)

Media release templates are contained in the LDMP Sub-Plan A.10 Public Information and Warnings (#5567607) including:
• Major Floor Warning Freshwater Valley – Evacuation Notice;
• Official Evacuation Advice; and
• Evacuation Recommendation.

In addition to CRC social media, communication with PAR can be achieved through the Redlynch Valley Facebook page at:

https://www.facebook.com/redlynchvalleycommunityinc

5.3 Dam Safety Regulator Notification

Following each notification level the Dam Emergency Compliance Officer (DECO) will notify DNRME Dam Safety Regulator about the change in activation level. The contact details are listed in Appendix 2 under:

DNRME Incident Hotline – 1300 596 709

Director Dam Safety –

Email – Damsafety@dnrme.qld.gov.au

In addition, as a stakeholder listed in GUARDIAN IMS, the Dam Safety Regulator will receive media releases and bulletins via email when released by the LDMG.
6 Emergency Control Organisation Support Tools

The following tools will be used by the ECO during a dam emergency in addition to the functionality provided by the GUARDIAN IMS.

6.1 Event Records

Once the ECO is activated, GUARDIAN IMS is used to record details on communications, major decisions, and actions taken to ensure appropriate information is provided to other CRC staff quickly if required.

Prior to activation event logs are used by all ECO members to ensure details of the event can be included in the emergency event report. Any documentation produced outside the GUARDIAN IMS system is to be uploaded to ensure a complete repository of records for the event.

6.2 Situation Report

The Situation Report (SITREP) is used to provide a structured update to the LDMG on the current situation at CFD during the emergency event. The timing of when a SITREP is to be provided to the LDMG will be advised by the LDMG and will change depending on the status of the emergency. As a guide, a SITREP would be provided to the LDMG as follows:

- **Alert**: Every 12 hours
- **Lean Forward**: Every 6 hours
- **Stand Up**: Every 2 hours

The SITREP will provide the LDMG and other CRC stakeholders with information on the current status of CFD.

Templates for the tools can be located in Appendix 7. This SITREP is also available in GUARDIAN IMS.

See Appendix 8 – ECO Support Tools

- Event Log Template
- SITREP Template

6.3 Post Event

CRC is required as the recognised dam owner to submit an emergency event report within 30 business days after the end of an emergency event. It is important to capture all the information required during an event using the correct templates and procedures to ensure all the appropriate details can be included in the emergency event report.

The General Manager WW will convene a post event review with all CRC primary and alternate officers to inform the emergency event report. A controlled template for the event report can be located in CRC’s document management system (#4087967).
7 Training Exercise and Testing Requirements

CRC officers undertake a range of emergency preparedness activities as part of their normal designated responsibilities which include:

- Review and update of the EAP;
- Annual hazard identification review;
- Training of relevant CRC staff; and
- Exercising the EAP.

7.1.1 Training

ECO members and those personnel who provide support to the ECO during a dam emergency event are to be trained in this plan and its application. Training is to be conducted to ensure individuals who have a specific role understand:

1. Their responsibilities;
2. How notification, assessment and activation will occur;
3. What facilities and resources they will utilise;
4. How the team will function and communicate during an event;
5. What key decisions they may need to make; and
6. The complexities associated with managing a crisis.

Training is to include scenario-based activities relevant to dam operations and consider the range of risks it may be exposed to.

Ongoing ECO training is to be conducted at least annually and new CRC staff that will be required in the ECO or to support it are to be provided introductory training as part of their induction.

In addition to ECO training all ECO members and their alternates undertake Queensland Disaster Management Arrangements training at least once every three years.

7.1.2 Exercises

Exercises are to be conducted annually and are facilitated by the Manager Business Performance and Compliance with assistance from the LDC to facilitate engagement with the LDMG and use of the GUARDIAN IMS. Individuals who may fill a role in the ECO are to attend.

Where possible, CRC will initiate additional exercises, such as field exercises, to further support continued training and effectiveness of ECO activations.

7.1.3 Testing Equipment

The Treatment Coordinator will maintain and test equipment needed during dam emergencies, including radios, satellite phones, cameras and monitoring equipment such as SCADA.

7.1.4 Feedback

Post all training or exercises, WW seek feedback from participants to evaluate the benefits, raise improvements for future exercises and highlight any further training requirements of the group. Feedback is provided to the Dam Safety Committee for consideration.
7.1.5 Training Records

Records of attendance at training and participation in exercises are maintained on attendance records and individual employee HR files.
8 Dam Information

8.1 General Description

All relevant details for CFD are available in the Dam Data Book #3198193.

8.2 General Arrangement Drawings

Appendix 9 – General Arrangement Drawings

- #3220693 - General Arrangement of Dam
- #3220745 - Dam Embankment Details
- #3220859 - Spillway details

8.3 Dam Hazard Inundation Information

The flood modelling assessment undertaken in support of developing the EAP has indicated that rainfall-based design flood conditions (i.e. maximum peak flow and timing to peak) for a given probability or average recurrence interval within Freshwater Creek are more likely to be due to rainfall-runoff from the catchment downstream of CFD. The modelling indicates that all but extreme floods passing through the spillway do not incrementally impact on floods occurring in the catchment downstream of the dam in either extent or timing. Generally, the dam reduces downstream flooding for all average recurrence intervals providing the dam remains intact.

8.3.1 Concurrent flooding

The nature of the Freshwater Creek catchment is such that flood events caused by rainfall runoff from downstream of the dam (i.e. unrelated to CFD spillway conditions), has the potential to lead to flooding that would require an emergency response with generally higher peak flows and shorter response times than associated with flood flows originating from CFD spillway. Whilst these local catchment conditions are not dealt with explicitly within the EAP, the flood hazard assessment work underpinning the EAP has been undertaken with consideration of these potential concurrent conditions.

Specifically, inundation mapping has been developed under concurrent flood circumstances assuming:

- Tributary flows: 1% AEP (Annual Exceedance Probability) design rainfall across the entire Freshwater Creek catchment downstream of CFD. This approach is consistent with the Copperlode Falls Dam Failure Impact Assessment (GHD, 2008) and based on the Queensland Government Failure Impact Assessment guidelines (Department of Energy and Water Supply, 2012). Mapping has also been formatted to clearly show the incremental difference in flooding inundation associated specifically with the 1% AEP local tributary conditions.
- Tail water conditions: Barron River flood conditions, consistent with tail water conditions, adopted in the Copperlode Falls Dam Failure Impact Assessment (GHD, 2008) and as presented in Barron River Delta Flood Study (Connell-Wagner, 2007) representing maximum of:
  - 1% AEP Barron River flood level (assuming HAT tail water and greenhouse sea-level rise); and
  - 1% AEP peak storm tide level with a nominal allowance of 0.5 m for wave setup.
8.3.2 Areas affected

The areas affected by the dam hazard events lie along the valley of Freshwater Creek towards its confluence with the Barron River. A relatively low lying area of the suburb of Brinsmead is affected by backwater flooding from Freshwater Creek and also flows overtopping the Western Arterial Road.

The areas affected consist of the following land uses:

- Residential land predominantly comprised of detached housing, but also attached housing such as townhouses and units;
- Schools (St Andrew’s Catholic College and Freshwater Christian College);
- Commercial and light industrial land;
- Caravan parks (Cool Waters Holiday Park, BIG4 Cairns Crystal Cascades Holiday Park); and
- Agricultural land for cane, with accompanying houses and sheds.

Flood maps have been developed to identify areas at risk due to dam failure and extreme floods passing through the dam. The maps define the extent of flooding and categorise the maximum depths of inundation and the time to maximum depth.

The emergency events for which flood maps are provided are listed in Table 5: Listing of Flood Maps including the corresponding map of maximum flood depth and time to maximum depth.

<table>
<thead>
<tr>
<th>Emergency event</th>
<th>Map of Maximum Flood Depth</th>
<th>Map of Time to Maximum Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day Failure</td>
<td>Drawing No. 1.1A</td>
<td>Drawing No. 2.1A</td>
</tr>
<tr>
<td></td>
<td>Drawing No. 1.1B</td>
<td>Drawing No. 2.1B</td>
</tr>
<tr>
<td>Probable Maximum Flood without overtopping breach failure</td>
<td>Drawing No. 1.2A</td>
<td>Drawing No. 2.2A</td>
</tr>
<tr>
<td></td>
<td>Drawing No. 1.2B</td>
<td>Drawing No. 2.2B</td>
</tr>
<tr>
<td>Probable Maximum Flood with overtopping breach failure</td>
<td>Drawing No. 1.3A</td>
<td>Drawing No. 2.3A</td>
</tr>
<tr>
<td></td>
<td>Drawing No. 1.3B</td>
<td>Drawing No. 2.3B</td>
</tr>
</tbody>
</table>

The flood maps are also complemented with information about the relative timing of inundation at selected reporting points throughout the affected area. The inundation hydrographs for the identified emergency events are illustrated in the following hydrographs contained in Appendix 10:

- DF hydrograph showing depth of inundation at reporting points;
- PMF hydrograph showing depth of inundation at reporting points; and
- PMF with embankment overtopping hydrograph showing depth of inundation at reporting points.

8.3.3 Limitations and accuracy

1. **Flood levels**: Based on the accuracy of the digital terrain model used and the model calibration, the peak flood levels estimated in this study are considered to be generally accurate to within 1 metre.
2. **Inundation extent**: Given the application of the mapping (i.e. emergency response during dam failure and/or PMF conditions) it is expected (and recommended) that the EAP response with regards to areas notified, takes a conservative approach and provides a buffer (e.g. 100m lateral extent) for notification of potentially inundated areas/properties.

3. **Timing**: The maps of time to peak flood depth provided are intended to give high quality indicative information regarding response times from key moments in EAP trigger (e.g. first point of dam failure). Given the extreme nature of the hazards represented in the mapping, these times should be used for information and communication purposes rather than for the specific timing of emergency response actions. Actual EAP triggers and responses should be based on the approach of “as soon as possible” from the moment in which a dam hazard is considered likely.

Inundation maps for events identified can be found Appendix 10.

**Appendix 10 – Inundation Maps**

- Inundation Maps #5181760
- Hydrographs for identified events #4115096.
8.4 Storage Catchment Area Drawing

Copperlode storage catchment information can be located in the Dam Data Book.

- #3198193 – CFD Dam Data Book

Figure 2: Lake Morris Catchment Area
8.5  Mapping

8.5.1  Access Area Map

CFD is accessible primarily via Lake Morris Road, but can also be accessed via Clohesy River Road. In times of extreme emergency or if all access points are blocked, the dam can be accessed by helicopter and land in the kiosk car park.

Lake Morris Road is susceptible to landslides and large trees falling, often partially or totally blocking access. Large scale upgrade works are currently being conducted on the road to improve the safety and accessibility. The distance from Spence Street offices to the dam using this route is approximately 22km and on average may take 42mins.

Clohesy River Rd is only accessible using 4WD. To access this route, travel via the Kuranda Range and along the Kennedy Highway towards Mareeba. Turn left approximately 1.3km after the Koah Roadhouse (at Koah Road) onto Clohesy River Road. This track should not be used during wet weather events. There are several creek crossings along the route which during wet weather may be impassable. The distance from CRC’s Spence Street offices to the dam using this route is approx. 62 km and on average may take 80 minutes.

Figure 3: Access routes to Copperlode Falls Dam
8.5.2 Affected Area Mapping

CRC’s GIS mapping system, Exponare, maintains the affected area boundary from the Polygon developed for the PAR. The layer can be found at Mail Merge > Copperlode Flooding.

Updates to the public mapping presentation were completed in March 2017 and are available in Appendix 10. The mapping utilises colours appropriate for individuals whom suffer from colour vision deficiencies, and no longer differentiates the flood levels, rather an ‘in or out’ approach to reduce complacency in the community and ensure understanding.

Appendix 11 – Public Information Mapping

- CFD DAM EAP Zone Map Overview #5500390
9 Charts and Rating Table

Refer to: LIVE-#3198193-WW - CFD DS5 - Copperlode Falls Dam Data Book

Figure 4: Copperlode Falls Dam Level versus Reservoir Capacity

![Chart showing Copperlode Falls Dam Level versus Reservoir Capacity]

Figure 5: Copperlode Falls Dam Level versus Spillway Discharge

![Chart showing Copperlode Falls Dam Level versus Spillway Discharge]
10 Appendices

Appendix 1: Notification and Activation Flowchart
Appendix 2: Notification Listing Contacts
Appendix 3: CFD Emergency Control Organisation Operational Checklists
  • Dam Emergency Controller Operational Checklist
  • Dam Emergency Support Officer Operational Checklist
  • Dam Emergency Observer Operational Checklist
  • Dam Emergency Compliance Coordinator Operational Checklist
Appendix 4 Copperlode Falls Dam Emergency Evacuation Plan #5881804
Appendix 5: Whispir Emergency Notifications
  • SDF Notifications to PAR
  • Maximum Probable Flood Notifications to PAR
Appendix 6: NEAS Polygon Map and Alert Request Forms
  • NEAS Polygon Map
  • Alert 2 SDF
  • Alert 3 SDF
  • Alert 2 PMF
  • Alert 3 PMF
Appendix 7: Dam Emergency Media Release Templates
  • Copperlode Falls Dam Emergency Evacuation Notice
  • SDF Inundation Notice
Appendix 8: Emergency Control Organisation Support Tools
  • Event Log
  • Situation Report
Appendix 9: General Arrangement Drawings
  • General Arrangement of Dam #3220693
  • Dam Embankment Details #3220745
  • Spillway Details #3220859
Appendix 10: Inundation Maps
  • Inundation Maps #5181760
  • Hydrographs for identified events #4115096
Appendix 11: Public Information Mapping
  • CFD DAM EAP Zone Map Overview #5500390
Appendix 1: Notification and Activation Flowchart

- **Event Occurs**
  - Earthquake
  - Seepage
  - Movement of dam
  - Damage to dam
  - Terrorism activity
  - Weather event causing flooding

- **Event Identified by CRC**
  - Event effects (shockwaves)
  - Visual inspection (CFDC)
  - SCADA alert (Piezometer, On-line Dam Level Gauge, Spillway Flow)
  - Spillway Camera and Tower Camera (plus associated manual gauges)

- **Assess and Classify**
  - Refer to EAP Table 1: Dam Emergency Triggers and Activation Levels
  - Classify type of dam emergency event (Failure/Flood)
  - Determine activation level (Alert, Stand Forward or Stand-Up)

- **Monitor situation**
  - Reassess if situation changes

- **Invoke Dam EAP?**
  - Yes
  - Notify EAP Stakeholders
  - Establish DAM Emergency Control Organisation (DAM ECO)
    - Monitor and report the conditions at CFD (As per Operational Checklists)
    - Communicate with PAR if LDMG has not activated

- **Situation resolved**
  - DAM ECO

- **External Alerts**
  - Event effects (shockwaves)
  - Security alert (GPS/AFP)
  - Report from member of public
  - BOM Warnings

- **References**
  1. Local Disaster Management Operational Plan A.1: Activation of the LDMG-CR
  2. Local Disaster Management Operational Plan A.2: Activation of the LDCC
  3. Local Disaster Management Operational Plan A.5: Evaluation Operational Plan
  4. Local Disaster Management Operational Plan A.10: Public Information and Warnings Operational Sub – Plan

- **WhispAlert**
  - LDC
  - Internal Level 1/2/3
  - External Level 2/3
  - Appendix 2

- **Local Disaster Coordinator**
  - Notify LDMG and convene Extraordinary Meeting
  - Activate LDMG
    - Refer to References 1 and 2
  - Manage Persons at Risk
    - Refer to References 3 and 4

- **Communicate with PAR if LDMG has not activated**

- **Stand Down**
### Dam Emergency Controller (Manager Operations) - Operational Checklist

The role of the DEC is to lead the ECO during a dam emergency event and coordinate notifications of PAR with the LDMG-CR.

<table>
<thead>
<tr>
<th>Action / Task (Pre-event)</th>
<th>Commenced</th>
<th>Completed</th>
<th>Status / Remarks / Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Maintain situation awareness to identify lead indicators of a potential dam emergency event. Call ECO pre planning meeting.</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>2. Start a personal event log and keep a chronological record of actions &amp; observations.</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>3. Review and assess any notifications of a dam emergency.</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>4. Invoke the EAP and activate the ECO if the conditions detailed in Table 2 are reached or when conditions determine.</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action / Task (During Event)</th>
<th>Commenced</th>
<th>Completed</th>
<th>Status / Remarks / Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Notify CRC stakeholders (via Whispir) that the EAP has been invoked and the ECO is activating.</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>2. Log onto GUARDIAN IMS in the DEC profile and fill the role of Dam Emergency Controller within the ECO.</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>3. Chair a teleconference with all ECO members and confirm each ECO role has been filled allocated and all members are logged into GUARDIAN IMS.</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>4. Ensure all ECO actions, decisions and events are accurately recorded and documented in the event log.</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>5. Liaise with the LDC to confirm LDMG activation and ECO reporting requirements.</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>6. Obtain an update on the current situation from the DEO and DESO.</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>7. If a SDF emergency event is imminent and normal notification procedures may impact the safety of PAR, activate the Redlynch Valley early warning system to warn PAR.</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>Action / Task (During Event)</td>
<td>Commenced</td>
<td>Completed</td>
<td>Status / Remarks / Comments</td>
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</tr>
<tr>
<td>8. Manage the activities of the ECO and maintain overall control of the dam emergency response.</td>
<td>Yes  No</td>
<td>Yes  No</td>
<td></td>
</tr>
<tr>
<td>9. Revise and approve draft ECO SITREPs and send to DESO.</td>
<td>Yes  No</td>
<td>Yes  No</td>
<td></td>
</tr>
<tr>
<td>10. Make recommendations to the LDMG on communications with PAR.</td>
<td>Yes  No</td>
<td>Yes  No</td>
<td></td>
</tr>
<tr>
<td>11. Request Manager Infrastructure to arrange a Special Inspection in accordance with Condition DS9 of the Dam Safety Conditions.</td>
<td>Yes  No</td>
<td>Yes  No</td>
<td></td>
</tr>
<tr>
<td>12. Request LDMG to arrange Infrastructure support to manage access to Lake Morris Road.</td>
<td>Yes  No</td>
<td>Yes  No</td>
<td></td>
</tr>
<tr>
<td>13. Request additional CRC resources to manage the emergency response as required.</td>
<td>Yes  No</td>
<td>Yes  No</td>
<td></td>
</tr>
<tr>
<td>14. Decide when to replace key staff, including self, due to fatigue if the emergency is protracted.</td>
<td>Yes  No</td>
<td>Yes  No</td>
<td></td>
</tr>
<tr>
<td>15. Request additional specialist support for the ECO, if required.</td>
<td>Yes  No</td>
<td>Yes  No</td>
<td></td>
</tr>
<tr>
<td>16. If SDF emergency event, issue warning communications to PAR via Whisp ir in line with the activation level (as per Appendix 5).</td>
<td>Yes  No</td>
<td>Yes  No</td>
<td></td>
</tr>
<tr>
<td>17. Recommend to the LDMG that warning communications be issued to PAR (i.e. Whisp ir, NEAS, media, social media, Cairns Alert and Cairns Disaster Management Dashboard).</td>
<td>Yes  No</td>
<td>Yes  No</td>
<td></td>
</tr>
<tr>
<td>18. Decide when the emergency is over, inform ECO, LDMG and other relevant stakeholders.</td>
<td>Yes  No</td>
<td>Yes  No</td>
<td></td>
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<tr>
<td>19. Lead contribution to the post-event review and Emergency Event Report.</td>
<td>Yes  No</td>
<td>Yes  No</td>
<td></td>
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</tbody>
</table>
# Dam Emergency Support Officer (Treatment Coordinator) - Operational Checklist

The role of the DESO is to assist the DEC in the management of the CRC response to a dam emergency and manage communications with the DEO.

## Action / Task (Pre-event)

<table>
<thead>
<tr>
<th>Action</th>
<th>Commenced</th>
<th>Completed</th>
<th>Status / Remarks / Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Maintain situation awareness to identify lead indicators of a potential dam emergency event. Attend ECO pre planning meeting.</td>
<td>Yes</td>
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<td></td>
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<td>Yes</td>
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<td>No</td>
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<tr>
<td>2. Start a personal event log and keep a chronological record of actions and observations.</td>
<td>Yes</td>
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<td>No</td>
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<td>Yes</td>
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<tr>
<td>3. Review and access any notifications received of a dam emergency and confirm requirement to escalate.</td>
<td>Yes</td>
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<td>4. Escalate notifications received of a dam emergency to Manager Operations.</td>
<td>Yes</td>
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<tr>
<td>5. Be prepared to invoke the EAP and activate the ECO if Manager Operations is not available.</td>
<td>Yes</td>
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</table>

## Action / Task (During event)

<table>
<thead>
<tr>
<th>Action</th>
<th>Commenced</th>
<th>Completed</th>
<th>Status / Remarks / Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Log onto GUARDIAN IMS in the DESO profile and fill role of Dam Emergency Support Officer within the ECO.</td>
<td>Yes</td>
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<tr>
<td>2. Participate in a teleconference with all ECO members.</td>
<td>Yes</td>
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<tr>
<td>3. Maintain a chronological record of ECO actions taken, photographs, correspondence and data collected during the event.</td>
<td>Yes</td>
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<tr>
<td>4. Support the actions of the DEO and ensure activities are kept inside the Safety Circle.</td>
<td>Yes</td>
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<td>No</td>
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<tr>
<td>5. Oversee operations to maintain communication with dam monitoring activities (SCADA, CCTV, Telstra).</td>
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<td>6. Monitor dam spillway for sudden change in levels.</td>
<td>Yes</td>
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<td>7. Monitor remote instrumentation and CCTV.</td>
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<td>8. Read piezometers regularly and increase frequency if significant changes are occurring.</td>
<td>Yes</td>
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<tr>
<td>Action / Task (During event)</td>
<td>Commenced</td>
<td>Completed</td>
<td>Status / Remarks / Comments</td>
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<tr>
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<td>----------------------------</td>
</tr>
<tr>
<td>9. Daft Situation Reports and send to DEC for review and approval.</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>10. Publish approved Situation Reports on GUARDIAN IMS, or email if GUARDIAN IMS is off line.</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>11. Coordinate suitable CRC staff to relieve the DEO during prolonged ECO activation (see Table 2).</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>12. Identify what additional CRC resources are required to assist the emergency response.</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>13. Provide regular updates to the DEC via GUARDIAN IMS, phone or email depending on situation.</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>14. Attend the post-emergency review.</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>15. Compile all data and dam safety inspection records.</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>16. Assist in the development of the post-event Emergency Event Report.</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
</tbody>
</table>
### Dam Emergency Observer (CFD Caretaker) - Operational Checklist

The role of the DEO is to monitor and report the condition of the dam and manage access to the CFD area during an emergency event.

**Actions detailed below must only be undertaken if it is safe to do so.**

<table>
<thead>
<tr>
<th>Action / Task (Pre-event)</th>
<th>Commenced</th>
<th>Completed</th>
<th>Status / Remarks / Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Maintain situation awareness to identify lead indicators of a potential dam emergency event. Attend ECO pre-planning meeting.</td>
<td>Yes [ ] No [ ]</td>
<td>Yes [ ] No [ ]</td>
<td></td>
</tr>
<tr>
<td>2. Start a personal event log and keep a chronological record of actions &amp; observations.</td>
<td>Yes [ ] No [ ]</td>
<td>Yes [ ] No [ ]</td>
<td></td>
</tr>
<tr>
<td>3. Notify Treatment Coordinator when conditions indicate that a dam emergency event may be imminent.</td>
<td>Yes [ ] No [ ]</td>
<td>Yes [ ] No [ ]</td>
<td></td>
</tr>
<tr>
<td>4. Be prepared to initiate notification of PAR by contacting the Manager Operations if a dam failure is imminent.</td>
<td>Yes [ ] No [ ]</td>
<td>Yes [ ] No [ ]</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action / Task</th>
<th>Commenced</th>
<th>Completed</th>
<th>Status / Remarks / Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Log onto GUARDIAN IMS in the DEO profile and fill role as Dam Emergency Observer.</td>
<td>Yes [ ] No [ ]</td>
<td>Yes [ ] No [ ]</td>
<td></td>
</tr>
<tr>
<td>2. Participate in a teleconference with all ECO members.</td>
<td>Yes [ ] No [ ]</td>
<td>Yes [ ] No [ ]</td>
<td></td>
</tr>
<tr>
<td>3. Monitor dam water levels and spillway flow.</td>
<td>Yes [ ] No [ ]</td>
<td>Yes [ ] No [ ]</td>
<td></td>
</tr>
<tr>
<td>4. Conduct a routine dam safety inspection.</td>
<td>Yes [ ] No [ ]</td>
<td>Yes [ ] No [ ]</td>
<td></td>
</tr>
<tr>
<td>5. Coordinate response actions at CFD as directed by the DEC or DESO.</td>
<td>Yes [ ] No [ ]</td>
<td>Yes [ ] No [ ]</td>
<td></td>
</tr>
<tr>
<td>6. Monitor access to CFD by the public and commercial operators.</td>
<td>Yes [ ] No [ ]</td>
<td>Yes [ ] No [ ]</td>
<td></td>
</tr>
<tr>
<td>7. Recommend closure of Lake Morris Rd when conditions may put public safety is at risk.</td>
<td>Yes [ ] No [ ]</td>
<td>Yes [ ] No [ ]</td>
<td></td>
</tr>
<tr>
<td>8. Provide regular updates to DEC and DESO DEC via GUARDIAN IMS, phone or email depending on situation.</td>
<td>Yes [ ] No [ ]</td>
<td>Yes [ ] No [ ]</td>
<td></td>
</tr>
<tr>
<td>9. Complete final dam safety inspection including reading of piezometers and seepage weirs.</td>
<td>Yes [ ] No [ ]</td>
<td>Yes [ ] No [ ]</td>
<td></td>
</tr>
<tr>
<td>10. Prepare event data for input into the post-event Emergency Event Report.</td>
<td>Yes [ ] No [ ]</td>
<td>Yes [ ] No [ ]</td>
<td></td>
</tr>
</tbody>
</table>
Dam Emergency Compliance Coordinator (QEW On Call officer) - Operational Checklist

The role of the DECC is to assist the DEC meet all internal and external compliance obligations.

<table>
<thead>
<tr>
<th>Action / Task (Pre-event)</th>
<th>Commenced</th>
<th>Completed</th>
<th>Status / Remarks / Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Maintain situation awareness. Attend ECO pre planning meeting.</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td></td>
</tr>
<tr>
<td>2. Start a personal event log and keep a chronological record of actions &amp; observations.</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td></td>
</tr>
</tbody>
</table>

Dam Emergency Quality Officer (Water Quality Officer) - Operational Checklist

<table>
<thead>
<tr>
<th>Action / Task</th>
<th>Commenced</th>
<th>Completed</th>
<th>Status / Remarks / Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Log onto GUARDIAN IMS in the DECC profile and undertake role as Dam Emergency Compliance Coordinator.</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td></td>
</tr>
<tr>
<td>2. Participate in a teleconference with all ECO members.</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td></td>
</tr>
<tr>
<td>3. Advise the DEC on CRC compliance requirements during the emergency.</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td></td>
</tr>
<tr>
<td>4. Provide regular updates to the Dam EC via GUARDIAN IMS, phone or email depending on situation.</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td></td>
</tr>
<tr>
<td>5. Create LIMS OFI database record for the event and save event related documents in to DM system referencing LIMS.</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td></td>
</tr>
<tr>
<td>6. Ensure regulatory reporting requirements for the Dam Safety Regulator and other applicable authorities are met.</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td></td>
</tr>
<tr>
<td>7. Attend the post-emergency review.</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td></td>
</tr>
<tr>
<td>8. Assist in the development of the post-event Emergency Event Report.</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td></td>
</tr>
<tr>
<td>9. Notify the Dam Safety Regulator when the ECO has been stood down.</td>
<td>Yes □ No □</td>
<td>Yes □ No □</td>
<td></td>
</tr>
</tbody>
</table>
The role of the Dam Emergency Quality Officer is to assist the DEC meet all internal and external compliance obligations.

<table>
<thead>
<tr>
<th>Action / Task (Pre-event)</th>
<th>Commenced</th>
<th>Completed</th>
<th>Status / Remarks / Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Attend ECO pre planning meeting.</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>2. Attend to pre event logistics.</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action / Task</th>
<th>Commenced</th>
<th>Completed</th>
<th>Status / Remarks / Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ensuring all physical and system needs are in placed (physical location, tables &amp; chairs, stationary, IT, GUARDIAN IMS, etc.).</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>2. Attend to logistical support needs of ECO.</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>3. Attend the post-emergency review.</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Action / Task (Pre-event)</td>
<td>Commenced</td>
<td>Completed</td>
<td>Status / Remarks / Comments</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------</td>
<td>-----------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>1. Attend ECO pre planning meeting.</td>
<td>Yes No</td>
<td>Yes No</td>
<td></td>
</tr>
<tr>
<td>2. Start event file and keep a chronological record of actions &amp; observations.</td>
<td>Yes No</td>
<td>Yes No</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action / Task</th>
<th>Commenced</th>
<th>Completed</th>
<th>Status / Remarks / Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Maintaining a record and chronology of activities in check lists and GUARDIAN IMS.</td>
<td>Yes No</td>
<td>Yes No</td>
<td></td>
</tr>
<tr>
<td>2. Maintaining records in DM.</td>
<td>Yes No</td>
<td>Yes No</td>
<td></td>
</tr>
<tr>
<td>3. Manage ECO Roster.</td>
<td>Yes No</td>
<td>Yes No</td>
<td></td>
</tr>
<tr>
<td>4. Attend to incoming and outgoing phone calls.</td>
<td>Yes No</td>
<td>Yes No</td>
<td></td>
</tr>
<tr>
<td>5. Attend the post-emergency review.</td>
<td>Yes No</td>
<td>Yes No</td>
<td></td>
</tr>
<tr>
<td>6. Assist in the development of the post-event Emergency Event Report.</td>
<td>Yes No</td>
<td>Yes No</td>
<td></td>
</tr>
</tbody>
</table>

The role of the DEAO is to assist the DEC meet all internal and external compliance obligations.
Appendix 4: Copperlode Falls Dam Emergency Evacuation Plan
Copperlode Falls Dam Emergency Evacuation Guide

**MY INFORMATION**

<table>
<thead>
<tr>
<th>Name:</th>
<th>Map No:</th>
<th>Page No:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Property Address:

NOTE: This Emergency Evacuation Guide relates ONLY to announcements by the Early Warning System should the dam wall fail.
Copperlode Falls Dam Emergency Action Plan

As the owner of Copperlode Falls Dam, and as part of its legislative requirements, Cairns Regional Council has in place an Emergency Action Plan (EAP) - available on Council’s website - should the dam wall fail and threaten properties or human life. The EAP details what will happen to notify people who live immediately downstream of the dam and this includes an Early Warning System.

AN EARLY WARNING SYSTEM

The Early Warning System uses the latest technology delivered through nine Outdoor Warning Stations (sirens) - pictured left. These are speakers mounted to towers and have been positioned throughout the Redlynch Valley from Crystal Cascades to Brinsmead. These stations can transmit automated warning signals and allow public address and pre-recorded voice messages.

Further real-time alerts and information will be transmitted to residents and visitors via text messages, phone calls, radio broadcasting and social media messaging (note: some of these alerts require residents to ‘opt-in’ - see Additional Warnings, opposite page for details).

SIREN SOUNDS

In the extremely unlikely event of the dam wall failing the siren will sound followed by the recorded voice message:

**EMERGENCY - EMERGENCY - EVACUATE NOW - MOVE TO HIGHER GROUND**

This is not the standard emergency warning signal but a unique sound and message specific to the dam wall failing. On hearing this warning all residents and visitors in the area should immediately implement their Emergency Evacuation Plan - using this guide.

TAKE IMMEDIATE ACTION

If you hear a notice to evacuate you should **leave immediately** and, if safe to do so, make your way **on foot** to your previously identified safe spot - **DO NOT DRIVE.**
Why you need an Emergency Evacuation Plan

In the event of an emergency situation, everyone has a responsibility for their own personal safety.

Residents and business owners in the Redlynch Valley and adjoining areas should use this guide to prepare, share and practise their own Emergency Evacuation Plan.

WHAT AREAS ARE LIKELY TO BE AFFECTED?

While the likelihood of a dam failure is extremely low, the consequences could be severe across a large area that extends from Crystal Cascades through the Redlynch Valley to Freshwater and Brinsmead (see map page 13 - Affected Area Maps). It is extremely important that if you live in the identified red zone, that you, and your household, understand the potential risk and know what to do if an evacuation is ordered, and most importantly know where to go.

People with disabilities residing in the red zone are advised to contact Council to discuss actions specific to the individual’s needs.

HOW MUCH NOTICE WILL I HAVE?

The sirens will only alert residents and visitors in the area to evacuate when a dam failure is imminent or has occurred. The safest thing to do on hearing the sirens is to take immediate action and move on foot to previously identified safe spot on higher ground away from the red zone.

THE LIKELIHOOD OF A DAM FAILURE?

The likelihood of a dam failure is extremely low. Council has measures in place to ensure the integrity of the dam including detailed monitoring and inspection procedures and ongoing maintenance programs. This evacuation guide relates only to an unforeseen non-weather event that threatens the integrity of the dam e.g. natural disaster or terrorist attack.

ADDITIONAL WARNINGS

Cairns Regional Council also utilises ‘Cairns Alert’ as a communication platform to issue alerts and warnings via SMS, email and voicemail. Resident details are obtained from the Council rates database for emergency alerts.

Residents can also sign up to the ‘Cairns Alert’ system which uses text messages (SMS) and email to send out information about local disasters, severe weather and emergency events. The alerts are official communication from the Local Disaster Management Group which manages the community response to disasters.

CERC Disaster Management also has a Cairns Disaster Management Dashboard at disaster.cairns, which provides disaster news and intelligence via a Council webpage information gateway.

IMPORTANT NOTE

Evacuation warnings will only be made if the Copperlode Falls Dam wall has failed without warning or it is highly likely the dam will fail in the near future.
Mark your evacuation route now

Following these steps now will save you time should the warning system sound.

**STEP 1**
FIND YOUR PROPERTY ON MAP 1-10

☐ Turn to this map and clearly mark your property.

**STEP 2**
IF YOUR PROPERTY IS IN THE RED ZONE

☐ Mark a spot outside of the red zone that you would evacuate to - this will be your safe spot. This will be in a higher area to your property and in most instances may only be a street or two away. It should be easily accessible on foot.

☐ Make sure that the evacuation route to your safe spot is clear of potential hazards including streams etc. Practise walking this route.

☐ Identify and mark on the map an alternative/secondary safe spot and evacuation route in case the first becomes inaccessible.

**STEP 3**
IF YOUR PROPERTY IS NOT IN THE RED ZONE BUT CLOSE TO IT

☐ Consider where you will go if you felt you needed to go to higher ground further away from the red zone, and mark this on the map.

☐ Make sure that the route to this spot is clear of potential hazards including streams. Mark on the map the route you would take to this spot. Practise walking this route.

**ASSEMBLY POINTS**

Assembly Points have been identified on the maps. These do not take the place of your identified safe spot but are outside of the red zone where people can assemble and where emergency services can provide assistance after the immediate hazard threat has passed. You should only move to Assembly Points when advised to do so by emergency services or via the early warning system and it is safe to do so. If access to your nearest Assembly Point is not possible remain where you are.

**LISTEN FOR FURTHER ADVICE OR CALL 000 FOR HELP.**
Areas outside the red zone may still be affected.

If your home or business is located anywhere in the red zone or close to it, you should be prepared and know what to do if the Copperlode Falls Dam Emergency Evacuation Plan is activated.
Be prepared and know where to go

Discussing and sharing this plan with your family and household members is essential for everyone’s safety. Taking the time to walk the proposed evacuation route now, so that everyone knows exactly where they need to go, will save time in an emergency.

IN THE EVENT OF AN EVACUATION

On hearing sirens, take immediate action and move on foot to previously identified safe spot. Stay in your high ground location until advised it is safe to leave. It may not be safe to return to your property. If you need help, and it is safe to do so, make your way to an identified Assembly Point (see page 2). Keep out of flooded areas even if you know them well.

KEEP LISTENING

Listen out for further messages broadcast through the Early Warning System. During and after an evacuation more information will be broadcast on local radio, TV, websites and social media. Advice and instructions will be issued by Emergency Services Queensland via the CRC Disaster Coordination Centre. Call for help if you need it (see Emergency Contacts back page).

MAP 1  CRYSTAL CASCADES

LEGEND
- Outdoor Warning Station
- Reference Point
- Red Zone
- Assembly Point
- Suggested route to Assembly Point
EMERGENCY CONTACTS

Police Fire Ambulance
Emergencies only 000

State Emergency Service (SES) 13 25 00

Ergon Energy
For power emergencies and urgent hazardous situations 13 22 96

Road and Traffic Conditions (TMR) 13 19 40

Health and Hospital Information (QH) 13 HEALTH (13 43 25 84)

Water Supply Emergencies (CRC) 1300 69 22 47

Non-Emergency Situations
Police: 13 14 44
Ambulance: 13 12 33

COUNCIL CONTACTS

Customer Service Centres 1300 69 22 47

Disaster Coordination Centre 4044 3377

CAIRNS DISASTER DASHBOARD
www.disaster.cairns.qld.gov.au

MORE INFORMATION
www.cairns.qld.gov.au/copperlodeEAP

DISCLAIMER NOTICE: While every care is taken to ensure the accuracy of the data, Cairns Regional Council makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitations, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which you might incur as a result of the data being inaccurate or incomplete in any way or for any reason.
## Appendix 5: *Whispir* Emergency Notifications

### Notifications to PAR

<table>
<thead>
<tr>
<th>Activation Level</th>
<th>Type</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lean Forward Alert 1</td>
<td>SMS</td>
<td>Flash Flood Watch &amp; Act from Cairns Disaster Group- Redlynch Valley &amp; Brinsmead- Prepare to seek higher ground- Listen to radio <a href="http://www.disaster.cairns.qld.gov.au">www.disaster.cairns.qld.gov.au</a></td>
</tr>
<tr>
<td></td>
<td>Voice Message</td>
<td>This is a FLASH FLOOD WATCH AND ACT from the Cairns Disaster Group. Areas in Redlynch Valley and Brinsmead may experience rapidly rising water levels from Copperlode Falls Dam and surrounding catchments, posing a potential threat to people and property. You should warn neighbours and prepare to move to higher ground. For more information listen to ABC radio or go to disaster dot cairns dot qld dot gov dot au</td>
</tr>
<tr>
<td></td>
<td>Email</td>
<td>This is a FLASH FLOOD WATCH AND ACT from the Cairns Disaster Group. Areas in Redlynch Valley and Brinsmead may experience rapidly rising water levels from Copperlode Falls Dam and surrounding catchments, posing a potential threat to people and property. You should warn neighbours and prepare to move to higher ground. For more information visit disaster.cairns.qld.gov.au or listen to local radio. For flood assistance contact the State Emergency Services on 132500.</td>
</tr>
</tbody>
</table>

| Stand Up Alert 2 | SMS   | EMERGENCY EVACUATE NOW-DAM FAILURE IMMINENT-from Cairns Disaster Group-Immediate threat to life-Redlynch Valley & Brinsmead-Seek higher ground-Listen to radio |
| Voice Message | EMERGENCY. EMERGENCY. EVACUATE NOW. This is a Flash Flood Emergency Warning from the Cairns Disaster Group. COPPERLODE FALLS DAM FAILURE IMMINENT. Areas in Redlynch Valley and Brinsmead will experience rapidly rising water levels and property inundation posing an immediate threat to life. You should warn neighbours and move to higher ground now. For more information visit w w w dot disaster dot cairns dot q l d dot gov dot a u or listen to local radio. |
| Email | EMERGENCY. EMERGENCY. EVACUATE NOW. This is a Flash Flood Emergency Warning from the Cairns Disaster Group. COPPERLODE FALLS DAM FAILURE IMMINENT. Areas in Redlynch Valley and Brinsmead will experience rapidly rising water levels and property inundation posing an immediate threat to life. You should warn neighbours |
and move to higher ground NOW. For more information listen to ABC radio or go to [www.disaster.cairns.qld.gov.au](http://www.disaster.cairns.qld.gov.au) For flood assistance contact the State Emergency Services on 132 500
Appendix 6: NEAS Polygon Map and Alert Request Forms
EMERGENCY ALERT REQUEST

Location: Copperlode Falls Dam / Redlynch Valley & Brinsmead area, Cairns
Date: / /
Time: : hrs

Requesting Officer: Telephone:
Agency/Position: Email:

Event Type
- ☑ Cyclone
- ☑ Storm Surge
- ☑ Flash Flood
- ☐ Flood
- ☑ Bushfire
- ☑ Fire Incident
- ☐ Smoke or Toxic Plume
- ☐ Chemical Spill
- ☑ Tsunami (NOTE Tsunami EA campaigns will be sent as Location Based Text Message ONLY)
- ☑ Other (please specify): Potential Dam Failure

Message Severity
- ☑ Emergency Warning (NOTE activates the SEWS)
- ☑ Watch & Act
- ☐ Advice

Campaign Mode
- ☑ Voice
- ☑ SMS – Location Based
- ☐ SMS – Service Address Based

LDMG Advised: YES / NO
DDMG Advised: YES / NO

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

STEP 1. EA Polygon Area: Map attached
STEP 2. Filename: Flood_CRC_01.kml

STEP 3. Spatial format: (Indicate the format used)
- ☑ KML *.kml (preferred format as per Spatial guidelines)
- ☑ ESRI *.dbf, *.prj, *.shp, *.shx
- ☑ GML *.gml, *.xsd
- ☑ MapInfo TAB *.dat, *.id, *.map, *.tab
- ☑ MapInfo Mid/Mif *. MIDI Sequence, *.mif
- ☑ OTHER (insert)

STEP 4. Messaging/spatial data, is it supplied via
- ☑ DMportal - specify filenames below
- ☐ FTP - specify filenames below
- ☑ Email
- ☐ Other (please specify)

Type (please use capitals for clarity) or handwrite Voice message (Ideally message should be less than 450 characters).
This is a FLASH FLOOD WATCH AND ACT from the Cairns Disaster Group. Areas in Redlynch Valley and Brinsmead may experience rapidly rising water levels from Copperlode Falls Dam and surrounding catchments, posing a potential threat to people and property. You should warn neighbours and prepare to move to higher ground. For more information listen to ABC radio or go to disaster dot cairns dot qld dot gov dot au

Type or handwrite SMS below (maximum of 160 characters including spaces)
Flash Flood Watch & Act from Cairns Disaster Group Redlynch Valley & Brinsmead. Prepare to seek higher ground - Listen to radio www.disaster.cairns.qld.gov.au

SEND TO sdcc@qfes.qld.gov.au and call 07 36352387 TO CONFIRM

FOR USE BY SDCC

Requesting Officer: Signature / /20
EA User Name: Signature / /20
Authorising Officer Name: Signature / /20

Manual Transmission
EMS Transmission
EA Campaign No. __________
EMS Report ID: __________

EA Manual and the Emergency Alert Request Form Template are available at: www.disaster.qld.gov.au
**Copperlode Falls Dam Emergency Action Plan**

### ALERT 3 CFD Flood - Evacuation Message

**EMERGENCY ALERT REQUEST**

**Location:** Copperlode Falls Dam / Redlynch Valley & Brinsmead, Cairns  
**Date:** / /  
**Time:** : hrs

**Requesting Officer:**  
**Telephone:**  
**Agency/Position:**  
**Email:**

<table>
<thead>
<tr>
<th>Event Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Cyclone</td>
</tr>
<tr>
<td>□ Storm Surge</td>
</tr>
<tr>
<td>✔ Flash Flood</td>
</tr>
<tr>
<td>□ Flood</td>
</tr>
<tr>
<td>□ Bushfire</td>
</tr>
<tr>
<td>□ Fire Incident</td>
</tr>
<tr>
<td>□ Smoke or Toxic Plume</td>
</tr>
<tr>
<td>□ Chemical Spill</td>
</tr>
<tr>
<td>□ Tsunami (NOTE Tsunami EA campaigns will be sent as Location Based Text Message ONLY)</td>
</tr>
<tr>
<td>✔ Other (please specify): Copperlode Falls Dam Failure</td>
</tr>
</tbody>
</table>

**Message Severity**  

- ✔ Emergency Warning (NOTE activates the SEWS)  
- □ Watch & Act  
- □ Advice

**Campaign Mode**  

- ✔ Voice  
- ✔ SMS – Location Based  
- □ SMS – Service Address Based

**LDMG Advised**  

- □ YES  
- □ NO

**DDMG Advised**  

- □ YES  
- □ NO

**Threat Direction Required?**  

- □ YES  
- □ NO  

**Note:** Can only be used for Emergency Warnings. Indicate direction on map

---

**STEP 1.** EA Polygon Area:  
**Map attached**

**STEP 3.** Spatial format: (Indicate the format used)  

- ✔ KML *.kml (preferred format as per Spatial guidelines)  
- □ ESRI *.dbf, *.prj, *.shp, *.shx  
- □ GML *.gml, *.xsd  
- □ MapInfo TAB *.dat, *.id, *.map, *.tab  
- □ MapInfo Mid/Mif *.MIDI Sequence, *.mif  
- □ OTHER (insert)

**STEP 2.** Filename: Flood_CRC_01.kml

**STEP 4.** Messaging/spatial data, is it supplied via  

- □ DMportal - specify filenames below  
- □ FTP - specify filenames below  
- ✔ Email  
- □ Other (please specify)

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

**EMERGENCY. EMERGENCY. EVACUATE NOW.** This is a Flash Flood Emergency Warning from the Cairns Disaster Group. COPPERLODE FALLS DAM FAILURE IMMINENT. Areas in Redlynch Valley and Brinsmead will experience rapidly rising water levels and property inundation posing an immediate threat to life. You should warn neighbours and move to higher ground now. For more information visit www.disaster.cairns.qld.gov.au or listen to local radio.

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

**EMERGENCY EVACUATE NOW - DAM FAILURE IMMINENT** from Cairns Disaster Group-Immediate threat to life-Redlynch Valley & Brinsmead-Seek higher ground-Listen to radio

SEND TO sdcc@qfes.qld.gov.au and call 07 36352387 TO CONFIRM

---

**FOR USE BY SDCC**

<table>
<thead>
<tr>
<th>Requesting Officer: /20</th>
<th>Signature /</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA User Name: /20</td>
<td>Signature /</td>
</tr>
<tr>
<td>Authorising Officer Name: /20</td>
<td>Signature /</td>
</tr>
</tbody>
</table>

**Manual Transmission**  

**EMS Transmission**

**EA Campaign No.**  

**EMS Report ID:**

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**EA Manual and the Emergency Alert Request Form Template are available at:** www.disaster.qld.gov.au
## ALERT 3 CFD Failure - Evacuation Message

### EMERGENCY ALERT REQUEST

**Location:** Copperlode Falls Dam / Redlynch Valley & Brinsmead area, Cairns  
**Date:** / /  
**Time:** : hrs  
**Requesting Officer:**  
**Agency/Position:**  
**Telephone:**  
**Email:**

#### Event Type

- [ ] Cyclone
- [ ] Storm Surge
- [ ] Flash Flood
- [ ] Flood
- [ ] Bushfire
- [ ] Fire Incident
- [ ] Smoke or Toxic Plume
- [ ] Chemical Spill
- [ ] Tsunami *(NOTE Tsunami EA campaigns will be sent as Location Based Text Message ONLY)*
- [ ] Other (please specify): Potential Dam Failure

#### Message Severity

- [ ] Emergency Warning *(NOTE activates the SEWS)*
- [ ] Watch & Act
- [ ] Advice

#### Campaign Mode

- [ ] Voice
- [ ] SMS – Location Based
- [ ] SMS – Service Address Based

#### LDMG Advised

- [ ] YES
- [ ] NO

#### DDMG Advised

- [ ] YES
- [ ] NO

#### Threat Direction Required?

- [ ] YES
- [ ] NO

## STEP 1. EA Polygon Area:

- [ ] Map attached

## STEP 3. Spatial format:

- [ ] KML *.kml (preferred format as per Spatial guidelines)
- [ ] ESRI *.dbf, *.prj, *.shp, *.shx
- [ ] GML *.gml, *.xsd
- [ ] MapInfo TAB *.dat, *.id, *.map, *.tab
- [ ] MapInfo Mid/Mif *.mid, *.mif
- [ ] OTHER (insert)

## STEP 2. Filename:

- [ ] Flood_CRC_01.kml

## STEP 4. Messaging/spatial data, is it supplied via

- [ ] DMportal - specify filenames below
- [ ] FTP - specify filenames below
- [ ] Email
- [ ] Other (please specify)

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

**EMERGENCY. EMERGENCY. EVACUATE NOW.** This is a Flash Flood Emergency Warning from the Cairns Disaster Group. COPPERLODE FALLS DAM FAILURE IMMINENT. Areas in Redlynch Valley and Brinsmead will experience rapidly rising water levels and property inundation posing an immediate threat to life. You should warn neighbours and move to higher ground now. For more information visit w w w dot disaster dot cairns dot q l d dot gov dot au or listen to local radio.

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

**EMERGENCY EVACUATE NOW - DAM FAILURE IMMINENT** from Cairns Disaster Group - Immediate threat to life - Redlynch Valley & Brinsmead - Seek higher ground - Listen to radio

SEND TO sdcc@qfes.qld.gov.au and call 07 36352387 TO CONFIRM

### FOR USE BY SDCC

- **Requesting Officer:** /20  
  **Signature**  
- **EA User Name:** /20  
  **Signature**  
- **Authorising Officer Name:** /20  
  **Signature**

[ ] Manual Transmission  
[ ] EMS Transmission

**EA Campaign No. ___________**

**EMS Report ID:**

[ ] YES

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Appendix 7: Copperlode Falls Dam Emergency Media Release Templates

Copperlode Falls Dam Emergency Evacuation Notice

Disaster Management Unit
MEDIA RELEASE

<table>
<thead>
<tr>
<th>Updated information</th>
<th>Date:</th>
<th>Time:</th>
</tr>
</thead>
</table>

FOR URGENT BROADCAST

Emergency Evacuation Notice – properties downstream of Copperlode Dam

Residents in the vicinity of Freshwater Creek are to evacuate to higher ground immediately.

A failure of the Copperlode Dam has occurred and inundation of low-lying areas is imminent.

Able-bodied people should evacuate on foot – do not move your vehicle.

Repeat – residents in low-lying areas along Freshwater Creek are to evacuate to higher ground immediately.

Further information will be forthcoming

ENDS
Disaster Management Unit
MEDIA RELEASE

Updated Information
Date: Time:

Failure of Copperlode Dam - inundation of low-lying areas

A failure of the Copperlode Dam has occurred and inundation of low-lying areas along Freshwater Creek is in progress.

An evacuation notice has been issued and all residents are required to move to higher ground, on foot, as a matter of urgency.

The creek is expected to rise by up to 6 metres and significant damage to property and infrastructure may occur.

Affected residents are asked to remain on higher ground until further notice. Other members of the public are advised to remain clear of the affected area.

Do not cross flooded roads or bridges.

Emergency services personnel are en route to assist those affected.

Information relating to places of refuge for affected residents will be released by the Disaster Management Unit shortly.

ENDS
## Event Log

Record all major observations, decisions, actions, messages IN and OUT etc

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>From</th>
<th>To</th>
<th>Item/Event</th>
<th>Comments/Action</th>
<th>Decision</th>
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<tbody>
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</table>
**Situation Report for CFD Dam Emergency (ECO to LDMG)**

<table>
<thead>
<tr>
<th>Advice Number:</th>
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<tbody>
<tr>
<td>Date:</td>
<td></td>
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<tr>
<td>Time of issue:</td>
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<td>Sent by:</td>
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</tbody>
</table>

### Current Water Levels

<table>
<thead>
<tr>
<th>Location</th>
<th>Level (m AHD)</th>
<th>Rate of Rise since last advice (m per hour)</th>
<th>Time of Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copperlode Falls Dam</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshwater Creek</td>
<td></td>
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</tbody>
</table>

### Current Spillway Operation

<table>
<thead>
<tr>
<th>Location</th>
<th>Spillway Outflow Level (m AHD)</th>
<th>Spillway Outflow (m3 per second)</th>
<th>Time of Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copperlode Falls Dam</td>
<td></td>
<td></td>
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</tbody>
</table>

### Current Outlet Operation

<table>
<thead>
<tr>
<th>Location</th>
<th>Outlet Open/Closed</th>
<th>Outlet Valve Flow (m3 per second)</th>
<th>Time of Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copperlode Falls Dam</td>
<td></td>
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</tbody>
</table>

### Rainfall

<table>
<thead>
<tr>
<th>Gauge Location</th>
<th>mm recorded</th>
<th>Time of Observation</th>
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<tbody>
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<tr>
<td>Element</td>
<td>Report</td>
<td></td>
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<tr>
<td>-------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------</td>
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<tr>
<td>Current Dam</td>
<td>Advise physical changes to dam wall including damage to the dam, spillway or outlet.</td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summary</td>
<td>Describe the major occurrences/events in the reporting period, actions taken and resources deployed. Cross-ref to any other outputs submitted since the last SITREP if appropriate.</td>
<td></td>
</tr>
<tr>
<td>Intentions</td>
<td>Describe actions planned for the next reporting period including staffing and resources; and mid-longer-term intentions.</td>
<td></td>
</tr>
<tr>
<td>Issues</td>
<td>Highlight any issues that may impact on CRC WW achieving its desired outcomes; that may attract media attention; or that are likely to have major community consequences.</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>Insert any administrative or other issues that need to be advised to CRC or its stakeholders.</td>
<td></td>
</tr>
<tr>
<td>Assessment</td>
<td>Include an overall assessment of the situation from CRC WW’s perspective.</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 9: General Arrangement Drawings

General Arrangement of Dam #3220693
Appendix 10: Inundation Maps and Hydrographs
PMF Outflow Depth Hydrograph of Inundation at Reporting Points

- Spillway
- Cascades bridge
- Mary Parker Rd bridge
- Rocks Rd
- St Andrews
- Cool Waters Holiday Park
- Western Arterial Rd (no inundation)
- FW Christian College
- Lower FW

Depth of Inundation (m) vs. Time (hr)
Hydrographs for identified events #4115096
Appendix 11: Public Information Mapping
CFD DAM EAP Zone Map Overview #5500390