EMERGENCY ACTION PLAN

<<Dam Name>> Dam ID: <<dam ID>>

Owner: <<dam owner name>>

Date: <<month, year>>

Address: <<dam address>>

Version: <<version #>>



<Insert a photo of your dam>

|  |
| --- |
| QUICK REFERENCE GUIDE**Emergency Condition Level** |
| **Dam Hazard** | **Alert** | **Lean Forward** | **Stand Up** | **Stand Down** |
| Flood Event **Go to Section 4.2** | Reservoir level equal to XXX metres above FSL  | Reservoir above FSL, but as yet spill is unlikely to impact on downstream PAR | Extreme Flood Level: Reservoir approaching record flood level, AND likely to impact PAR | Reservoir levels stabilised to FSL and no further rain is forecasted |
| Contact |  | * PAR
* LDMG
 | * PAR
* LDMG
* Local police
* DSR
 | Inform all previously notified contacts of stand down |
| Sunny Day Failure**Go to Section 4.3** | Earthquake of Magnitude 3 or higher detected in the vicinity or the Dam or.Significant new or increased seepage areas identified at the Dam or.Seepage flow containing sediment (cloudy appearance) observed at the Dam or.New structural damage or movement areas identified at the Dam | Seepage is increasing or earth material evident in the seepage is increasing and.The increase cannot be controlled or.New structural damage or movement areas have not stabilised and are demonstrating indication of continued worsening | Dam failure is considered possible via an identified failure mechanism or. New structural damage or movement areas indicate some potential for structural failure of the Dam | Seepage through the Dam is controlled and.No indicators of potential Dam failure are present and.Dam embankment is stable and.No potential indicators of potential Dam failure are present. |
| Contact | * LDMG
* Local police
* DSR
 | * As per previous activation level, AND:
* PAR
 | As per previous activation level | Inform all previously notified contacts of stand down |

* General dam information can be found in section 5 (page 6)
* Contact information can be found in section 7 (page 11)

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# Document Overview

## Authorisation of document

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dam owner | Responsible person | Signature | Date | Revision No. |
| Company name here | Name and position |  |  |  |

## Controlled document distribution list

|  |  |  |
| --- | --- | --- |
| Copy no. | Position | Physical location |
| 1 | Dam owner | Dam site office |
| 2 | Alternative contact |  |
| 3 | Local Disaster CoordinatorLocal Disaster Management Group (LDMG1)  | Local council office, town |
| 4 | Executive Officer District Disaster Management Group (DDMG1,  | DDMG office, town |
| **Note:** Communication information for each ‘Controlled Copy Holder’ is attached in dam notification list. |

## Document revision history

|  |  |  |
| --- | --- | --- |
| Revision number of approved EAP | Date | Summary of changes |
|  |  |  |
|  |  |  |
|  |  |  |

# Purpose

The purpose of this EAP is to:

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

It is possible for more than one dam hazard to occur at this dam at the one time. In such a circumstance, it may be necessary to act on the procedures within separate sections simultaneously.

The focus of this EAP is the management of dam hazards at this dam by the dam owner and the communication and notification of dam hazards to the <<insert name of Local Government >> Local Disaster Management Group (LDMG) and those persons at risk (PAR) downstream. The EAP sits within the broader local council emergency response framework and has been developed to be consistent with the relevant Local Disaster Management Plan.

# Scope

This EAP covers:

* dam hazards
* details about the dam that are relevant to a dam hazard
* identification of circumstances that indicates an increase in the likelihood of a dam hazard event or emergency event
* triggers for activation of a tiered response to a dam hazard event or emergency event
* roles and responsibilities in responding to a dam hazard event or emergency event
* notification, warning, and communication protocols
* inspection, monitoring, and reporting protocols during emergencies
* the area likely to be impacted by a dam hazard

# Roles and responsibilities

| Role | Responsibilities |
| --- | --- |
| **Dam Owner**  | * Dam safety is the responsibility of the dam owner.
* Develop and maintain an emergency action plan (EAP).
* Respond in accordance with the approved EAP in all dam related emergencies.
* Ensure the EAP is kept current and up to date, particularly contact details, and seek approval for changes. The EAP must be reviewed by 1 October each year.
* Distribution of current approved EAP to all parties listed in the distribution list.
* Communicate effectively to all relevant entities listed in the notification list in the event of a dam hazard event or emergency event. Activate the EAP and maintain an incident log when an emergency condition is identified at the dam.
* Consider periodic testing of the EAP.
* Prepare an Emergency Event Report (EER) and submit to the dam safety regulator within 30 business days after the end of the emergency event.
* The dam owner is responsible for conducting regular inspections of the dam to identify any deficiencies ([Small dam safety pocketbook)](https://www.dnrme.qld.gov.au/__data/assets/pdf_file/0003/1521192/small-dam-safety.pdf). Where deficiencies exist, the dam owner is required to take appropriate steps to address these with a suitably experienced registered professional engineer of Queensland (RPEQ)
* Make appropriate dam safety related decisions based on advice from an RPEQ where appropriate. The dam owner is also responsible for authorising immediate expenditure so that urgent repair work will not be delayed.
 |
| **LDMG** | * Notify and communicate with other emergency agencies (i.e., QFES, QPS, SES).
* Assess the severity of possible flooding and determine necessary actions based on information provided by the dam owner, as well as other available information such as localised flooding.
* Provide DDMG status reports on situation.
 |
| **DDMG** | * Provide support to LDMG where capacity and capability to respond is reached.
 |

# General Dam information

**<<Provide a short narrative about the dam and history. Information can be found in the DSCs or the FIA>>**

Table 1 Summary of locality information for <<dam name>> Dam.

|  |  |
| --- | --- |
| Description | Specification |
| **Dam name** | <<insert details>> |
| **Dam ID**  | <<insert details>>  |
| **Lot/plan** | <<insert details>> |
| **Address** | <<insert details>> |
| **Latitude / longitude** | <<insert details>> |
| **Local government area** | <<insert details>> |
| **Nearest town** | <<insert details>> |
| **Nearest watercourse** | <<insert details>> |
| **Catchment name and description** | << if applicable>> |
| **Access information and other local information of note** | <<Enter any other information about how to access the dam in an emergency or about the local area>> |

Table 2 Summary of technical information for <<dam name>> dam

|  |  |
| --- | --- |
| Description | Specification |
| **Dam type** | <<For example, gully dam, hillside storage, ring tank/turkeys nest/off stream storage>> |
| **Type of embankment**  | <<For example, earth, earth with clay core, concrete, rockfill>> |
| **FSL (m AHD)** | <<insert details>> |
| **DCL (m AHD)** | <<insert details>> |
| **Storage capacity at FSL (ML)** | <<insert details>> |
| **Embankment max height (m)** | <<insert details>> |
| **Embankment length (m)** | <<insert details>> |
| **Embankment crest width (m)** | <<insert details>> |
| **Catchment area (Ha)** | << if applicable>> |
| **Number of spillways** | <<Enter number of spillways/by washes>> |
| **Type of spillways** | <<For example, earth by wash, concrete, outlet pipe>> |
| **Spillway crest level(s) (m AHD)** | <<insert details>> |
| **Spillway capacity/capacities (m3/s)** | <<insert details>> |
| **Outlet description** | <<insert details>> |
| **Outlet capacity** | <<insert details>> |
| **Monitoring equipment details** | <<insert details>> |
| **Other relevant technical information** | <<insert details>> |

# Dam hazards

## Emergency actions

A dam emergency event is an event which has arisen from a dam failure hazard. The events that will initiate emergency conditions at the dam may include floods and seepage etc.

The following events are defined as emergency events that apply to this dam:

Dam flooding

Significant rainfall in the dam catchment with the storage level rising rapidly and overtopping expected. This has the potential to overtop and fail the embankment.

**Follow table 3 during flood events**.

Seepage events

Detection of new seepage or an increase in previously observed seepage, not due to inflow or a storage level rise. Even if no seepage can be seen, the presence of sinkholes and slumps could indicate internal erosion of the dam.

**Follow table 4 during seepage events**.

Structural issues

Signs of distress or abnormalities in the embankment such as cracking, deformation or scouring of the embankment. This could also include structural damage identified following an earthquake event.

**Follow table 4 during structural issues**.

**EAP activation**

This EAP will be activated when an emergency condition (activation level) is triggered at the dam.

## Hazard– Flood Events

Table 3 Flood event hazard

| Activation level | Alert | Lean Forward  | Stand Up | Stand Down |
| --- | --- | --- | --- | --- |
| **Activationtrigger** | * Storage rising due to rain in catchment
 | * Storage above FSL, unlikely to impact PAR
 | * Storage above DCL, likely to impact PAR
 | * Storage level falling or stabilised to FSL (if no structural damage occurred)
 |
| **Actions** | * Record all communication
* Monitor dam and undertake visual inspection
 | * As per previous activation level, AND
* Undertake inspection every 4 hours minutes
 | * As per previous activation level, AND
* Continuously monitor water levels in the dam (if safe to do so)
* Support/supervise emergency works as required, such as storage lowering or controlled breaching
* Discuss with LDMG, closure of affected roads if not already closed by others
* Maintain surveillance of area immediately downstream of dam (if safe to do so)
 | * Prepare Emergency Event Report (EER) if required
* Inspect dam and contact RPEQ if new damage observed, or the dam was overtopped
* Return to routine activities
 |
| **Internal** **notifications** | * Advise onsite personnel if required
 | * As per previous activation level
 | * As per previous activation level
 | * Inform all previously notified contacts of stand down
 |
| **External** **notifications** |  | * PAR

LDMG | * PAR
* LDMG
* Local police
* DSR
 | * Inform all previously notified contacts of stand down
 |
| **External** **message** |  | * EAP has been activated to Lean Forward
* Describe current situation with dam:

What is the event? (Flood event)What is the status of the dam? (overtopping has started?) | * EAP has been activated to Stand Up
* Describe current situation with dam:

What is the event? (Flood event)What is the status of the dam? (any structural damage to dam?)What is the current storage? (dam overtopping flows increasing) * Is more rain coming? (continuing raining forecast)
* Confirm evacuations are required/underway/complete
 | * EAP has been deactivated
* Describe current situation with dam:

What is the status of the dam?Advise of current storage level (dam at FSL, overtopping flows decreasing)Advise weather conditions (no further rain forecasted) |

Dam hazard– Sunny Day Failure

Table 4 Sunny Day Failure Dam Hazard

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activation level | Alert | Lean Forward | Stand Up | Stand Down |
| **Activation trigger** | New embankment cracking or settlement observed, visual movement/slippage of the embankment | * Embankment abnormalities, dam wall movement, new or increased seepage with cloudy discharge, sinkholes observed on dam embankment or reservoir and/or cracks in the embankment/spillway with seepage
 | * Embankment abnormalities, dam wall movement, seepage/piping developing, and dam failure is likely, rapidly expanding sinkhole(s) and/or sudden or rapidly proceeding slides of the embankment slopes
 | * Seepage/piping is manageable and/or water levels reduced to a ‘safe’ level
 |
| **Actions** | * Record all communication
* Monitor dam (if safe to do so)
* Monitor and record any leakage and/or cracks
* Liaise with RPEQ if required
 | * As per previous activation level, AND
* Undertake inspection every hour (if safe to do so)
* Consider lowering storage (if safe to do so)
 | * As per previous activation level, AND
* Continuously monitor the dam (if safe to do so)
* Support/supervise remedial works as required
* Lower the storage if directed
* Close any affected roads if not already closed by others
* Maintain surveillance of area immediately downstream of dam
 | * Prepare Emergency Event Report (EER) if required
* Inspect dam and contact RPEQ if new damage observed
* Return to routine activities
 |
| **Internal** **notifications**  | * Advise onsite personnel if required
 | * As per previous activation level
 | * As per previous activation level
 | * Inform all previously notified contacts of stand down
 |
| **External** **notifications** | * LDMG
* Local police
* DSR
 | * As per previous activation level, AND:
* PAR
 | * As per previous activation level
 | * Inform all previously notified contacts of stand down
 |
| **External** **Message** | * Advise EAP has been Activated
* Describe current situation with dam:

What is the event? (Dam Safety risk)What is the status? (. identified embankment movement/cracks/leakage)* Advise of current storage level (dam at FSL)
 | * Advise EAP is at Lean Forward
* Describe current situation with dam:

What is the event? (Dam Safety risk)What is the status? (. observations of identified embankment movement/cracks/leakage)* Advise of current storage level (dam at FSL)
 | * Advise EAP is at Stand Up
* Describe current situation with dam:

What is the event? (Dam Safety risk)What is the status? (observations of identified embankment movement/cracks/leakage)* Advise of current storage level (dam at FSL)
* Confirm evacuations are required/underway/complete
 | * Advise EAP has been deactivated
* Describe current situation with dam:

What is the event? (Dam Safety risk)What is the status? (dam embankment is stable)Advise of current storage level (dam at FSL) |

# Dam Notification List

Table 5 Notification list

| Notification group | Contact order | Title/name | Ph business | Ph mobile | Ph A/H | Address/email |
| --- | --- | --- | --- | --- | --- | --- |
| Dam owner | 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| Standby Operator | ~~1~~ |  |  |  |  |  |
| LDMG  | 1 | Local Disaster Management Coordinator |  |  |  |  |
| 2 | Assistant (Deputy) Local Disaster Management Coordinator |  |  |  |  |
| Local police | 1 | Local police office |  |  |  |  |
| **If lives are at risk call 000 immediately** |
| 2 | 000 |  |  |  |  |
| DSR | 1 | DRDMW Incident Hotline | 1300 596 709  |  |  | damsafety@rdmw.qld.gov.au |
| 2 | Director Dam Safety, RDMW  |  |  |  |  |
| RPEQIf dam has structural damage or advised by DSR | 3 |  |  |  |  |  |
| (Optional)Contractors |  | Dam builder/earth moving |  |  |  |  |
| Material Suppliers |  | Clay/sand/rock/gravel/sandbags |  |  |  |  |
| PAR (nearest to dam) | 1 |  |  |  |  |  |
| PAR | 2 |  |  |  |  |  |
| PAR (furthest from dam) | 3 |  |  |  |  |  |

1. **Abbreviations and Acronyms**

|  |  |
| --- | --- |
| AHD | Australian Height Datum  |
| CEO | Chief Executive Officer |
| DCF | Dam Crest Flood |
| DCFF | Dam Crest Flood Failure |
| DCL | Dam Crest Level |
| DDMG | District Disaster Management Group |
| DDMP | District Disaster Management Plan |
| DDS | Director Dam Safety |
| DRDMW | Department of Regional Development, Manufacturing and Water |
| DSR | Dam Safety Regulator |
| EAP | Emergency Action Plan |
| EER | Emergency Event Report |
| FIA | Failure Impact Assessment |
| FSL | Full Supply Level |
| LDC | Local Disaster Coordinator |
| LDMG | Local Disaster Management Group |
| LDMP | Local Disaster Management Plan |
| PAR | Population at Risk |
| PMF | Probable Maximum Flood |
| RPEQ | Registered Professional Engineer of Queensland |
| QPS | Queensland Police Services |
| SDF | Sunny Day Failure |
| SOP | Standard Operating Procedure |

1. Drawings and Maps

<<The following maps are required to be included in the EAP>>.

* B.1 - Locality plan with access routes and locations of PAR
* B.2 - Flood maps (overtopping)
* B.3 - Flood maps (sunny day)
* B.4 - Technical details of dam (as built drawings, sketches cross-section, dimensions, etc)
* B.5 - Pictures of dam features