

**QFCI**Date: 27/05/11 JMExhibit Number: S10**GLENLYON DAM - EMERGENCY ACTION PLAN****CONTROLLED COPY DISTRIBUTION SHEET**

COPY NUMBER	POSITION	LOCATION
1	Storage Operator	Glenlyon Dam
2	Standby Officer	Glenlyon Dam
3	Service Coordinator	Goondiwindi
4	Operations Manager, SunWater O&M	Ipswich
5	Technical Services Manager, SunWater WSS	Brisbane
6	Director Dam Safety, Department of Natural Resources, Mines and Water	Brisbane
7	Disaster District Coordinator	District Disaster Management Group, Warwick
8	Officer in-charge, Police	Texas
9	Director Operations NSW SES	Wollongong
10	Local Controller, SES	Tenterfield
11	Local Controller, SES	Inverell
12	Region Controller, NSW SES, North West Region	Moree
13	Executive Officer, Local Disaster Management Group	Stanthorpe Shire Council
14	Executive Officer, Local Disaster Management Group	Inglewood Shire Council
15	Executive Officer, Local Disaster Management Group	Waggamba Shire Council
16	Executive Officer, Local Disaster Management Group	Goondiwindi Town Council
17	Director Community Safety & Training, Emergency Management Group	Brisbane
18	The Secretary, Dumaresq Barwon Border Rivers Commission	Toowoomba

# EMERGENCY ACTION PLAN - GLENLYON DAM

## NOTIFICATION & EMERGENCY COMMUNICATION LIST

### Telephone Notification List

&

### List of Equipment Available during an Emergency

AUTHORISATION:

Approved by:

[Redacted]  
(Asset Engineer, Toowoomba)

Date:

[Redacted]

REVISION STATUS:

Revision Number	Revision Description	Revision Date
7	Telephone and Radio Notification List Updated	October 2004
8	Telephone Notification List Updated	September 2006
9	Telephone Notification List Updated	January 2009

# EMERGENCY ACTION PLAN - GLENLYON DAM

## DOCUMENT CONTROL SHEET

CONTROLLED COPY NUMBER: 4

AUTHORISATION:

Approved by:

(Asset Engineer, Toowoomba)

Date:

Revision 8 of this EAP was prepared by SunWater, Engineering Services.

REVISION STATUS:

Issue-Revision Number	Revision Description	Section	Revision Date
Revision 9	Emergency Action Plan, updated contact and notification list.		Jan 2009

Note: Future updates to the Notification and Emergency Communication List shall be compiled and distributed by the local SunWater Business Centre and approved by the Asset Engineer.

AMENDMENTS / SUGGESTIONS:

Suggestion Number	Description	Section	Suggestion Date
	Note: Any suggestion or comment should be forwarded to Asset Engineer (Water Services), Toowoomba.		

TITLE/NAME	PHONE BUSINESS	PHONE A/H	PHONE MOBILE	FAX
CENTRAL OFFICE MANAGEMENT				
Chief Executive Officer, SunWater [REDACTED]	[REDACTED]			
Manager Asset Management. [REDACTED]				
Manager, Dam Safety [REDACTED]				
The Secretary, Dumaresq Barwon Border Rivers Commission [REDACTED]				
BUSINESS CENTRE MANAGEMENT				
Regional Manager [REDACTED]	[REDACTED]			
Asset Engineering Manager. [REDACTED]				
Service Manager [REDACTED]				
Service Coordinator [REDACTED]				
Storage Operator, Glenlyon Dam [REDACTED]				
Storage Operator, Glenlyon Dam Mick Peters				
POLICE				
Warwick (Communication Centre)	[REDACTED]			
Officer in Charge, Texas, QLD [REDACTED]				
Officer in Charge, Inglewood, QLD [REDACTED]				
Officer in Charge, Goondiwindi, QLD [REDACTED]				

TITLE/NAME	PHONE BUSINESS	PHONE A/H	PHONE MOBILE	FAX
Officer in Charge, Ashford, NSW [REDACTED]	[REDACTED]			[REDACTED]
<b>DISASTER MANAGEMENT GROUPS</b>				
Disaster District Coordinator, Warwick Inspector [REDACTED] Operation Support Officer, [REDACTED]	[REDACTED]			
Executive Officer, Stanthorpe Shire [REDACTED]				
Executive Officer, Inglewood Shire [REDACTED]				
Executive Officer, Goondiwindi Regional Council [REDACTED]				
Executive Officer, Goondiwindi Town [REDACTED]				
Duty Officer, State Disaster Management Group, Brisbane				
<b>ENVIRONMENTAL PROTECTION AGENCY</b>				
Emergencies	[REDACTED]	All Hours		
<b>QUEENSLAND FIRE AND RESCUE SERVICE</b> [REDACTED]				
Community Contact Centre (all enquiries)	[REDACTED]			
Assistant Commissioner, Toowoomba [REDACTED]	[REDACTED]		[REDACTED]	[REDACTED]
Warwick [REDACTED]				
Goondiwindi [REDACTED]		[REDACTED]		
Local Fire Services, Chemical Hazards, Toowoomba Communication Centre		[REDACTED]	[REDACTED]	

TITLE/NAME	PHONE BUSINESS	PHONE A/H	PHONE MOBILE	FAX
AMBULANCE SERVICES				
Community Contact Centre (all enquiries)				
Ambulance Station, Goondiwindi				
Ambulance Station, Inglewood				
Ambulance Station, Stanthorpe				
Ambulance Station, Texas				
Ambulance Station, Warwick				
DEPARTMENT OF NATURAL RESOURCES, MINES & WATER				
Director, Dam Safety, Water Industry Regulation, BRISBANE				
WATER QUALITY AND MONITORING, NRW (RE ALGAL INFESTATION)				
Scientist, Brisbane Analytical Laboratory				
STATE EMERGENCY SERVICES				
Emergency Management Queensland Area Director, Toowoomba				
Local Controller, Goondiwindi				
Local Controller, Inglewood Under review				
Local Controller, Stanthorpe				
Local Controller, Warwick Deputy Controller				
Tenterfield HQ Unit				

TITLE/NAME	PHONE BUSINESS	PHONE A/H	PHONE MOBILE	FAX
Local Controller, Tenterfield [REDACTED]	[REDACTED]			
Deputy Controller, Tenterfield [REDACTED]				
Local Controller, Inverell [REDACTED]				
Unit Controller, Inverell as above				
Region Controller for the NSW North West Region, Moree [REDACTED]				
Business Manager, HQ of the NSW North West Division, Moree [REDACTED]				

NAME	PHONE	CALL SIGN	CHANNEL		FREQUENCY
			SIMPLEX	DUPLEX	(MHz)
[REDACTED]	[REDACTED]	Riversdale	25	2	CBRS 477.025
		Mingoola Station	23	2	CBRS 476.975
		Molevale		2	Cell Call
		Sovereignton	20	2	
		Old Mingoola	20		

**RESIDENTS CLOSEST TO GLENLYON DAM**

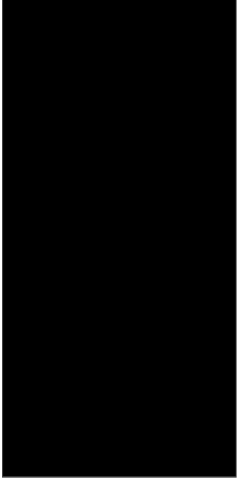
**MINGOOLA SCHOOL**

School hours

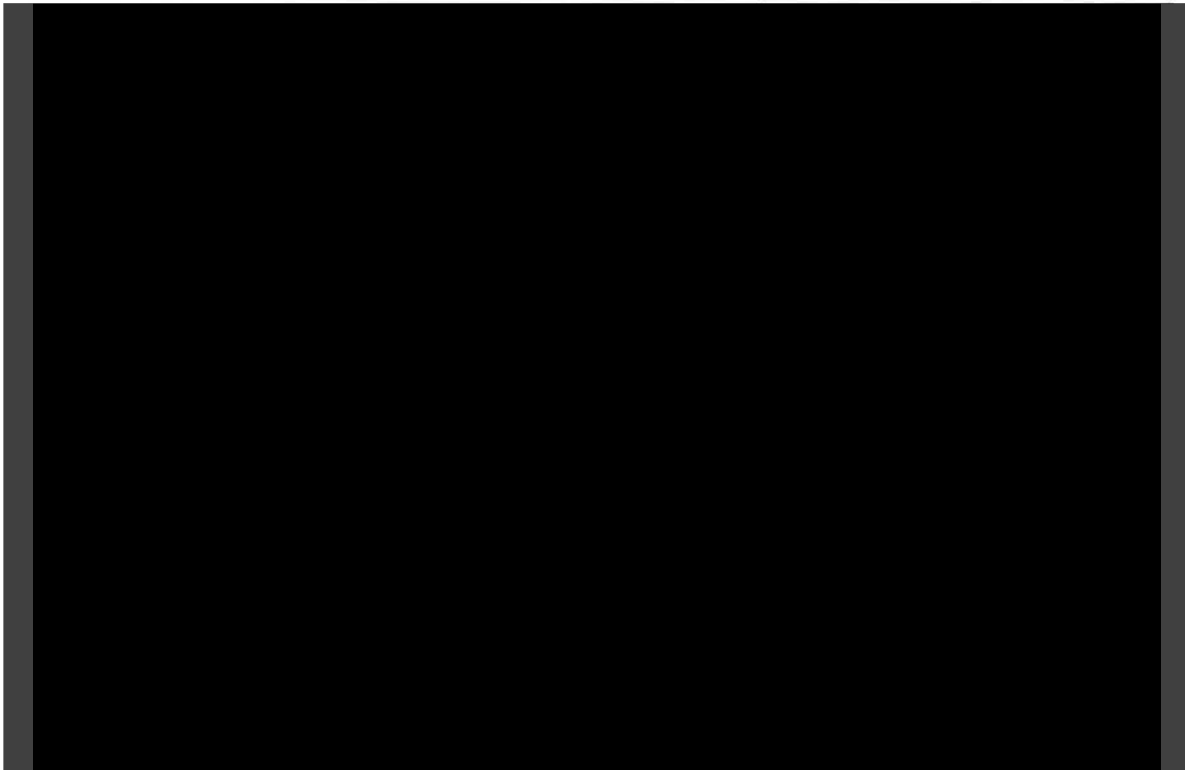


After hours (Tonya Worling, Principal)

**STREAM GAUGING STATIONS**

- |   |   |  |
|---|---|--|
| <ul style="list-style-type: none"><li>• Severn River (QLD)<br/>below dam</li><li>• Tenterfield Ck (NSW)<br/>below dam</li><li>• Mole River (NSW)<br/>below dam</li><li>• Dumaresq River at Roseneath (NSW)<br/>below dam</li><li>• Pike Ck</li><li>• Glenlyon Dam<br/>Headwater</li></ul> |  | <p>Flow</p> <p>Flow</p> <p>Flow</p> <p>Flow</p> <p>Tailwater</p> |
|---|---|--|

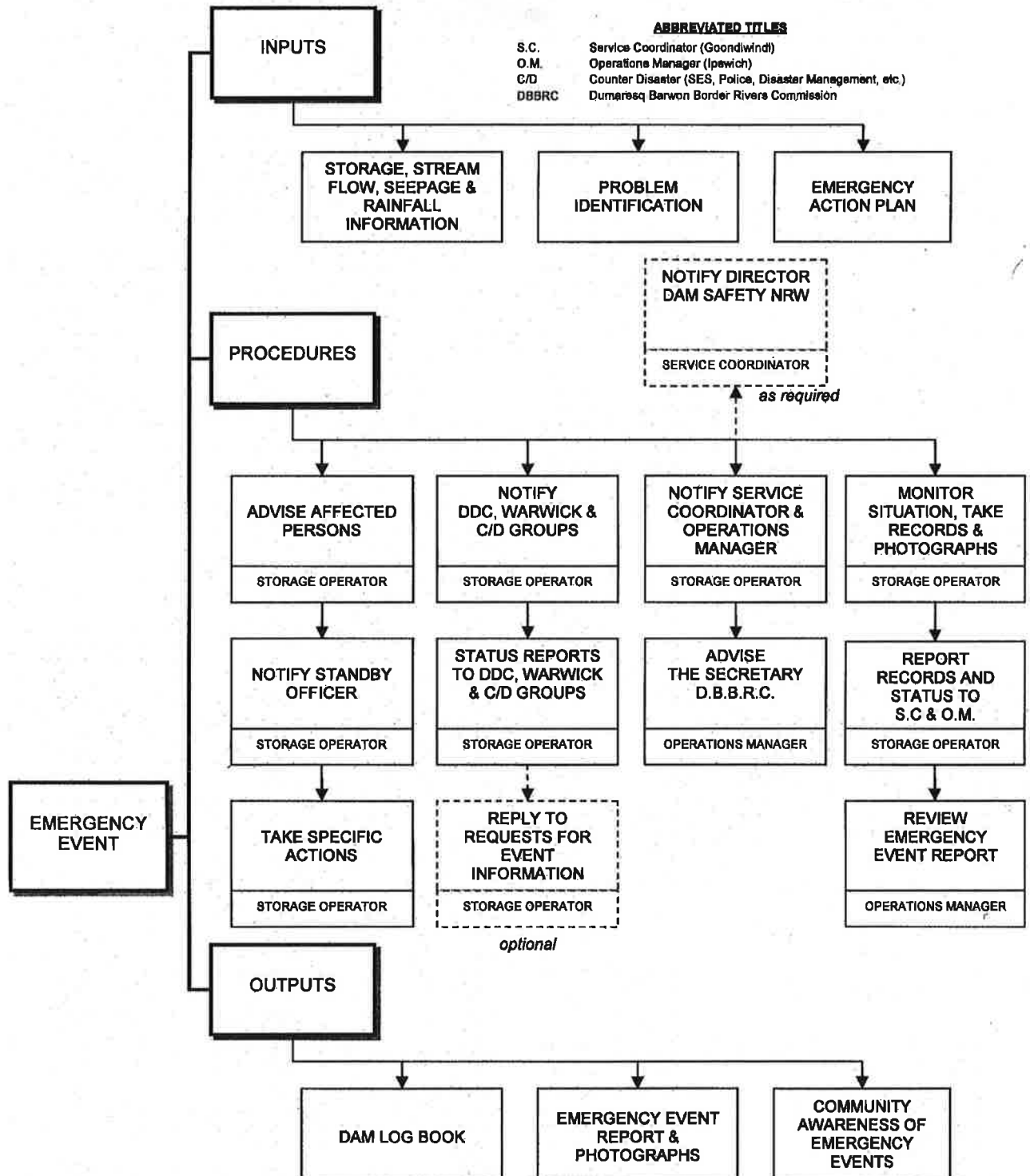
**TWO-WAY RADIO**





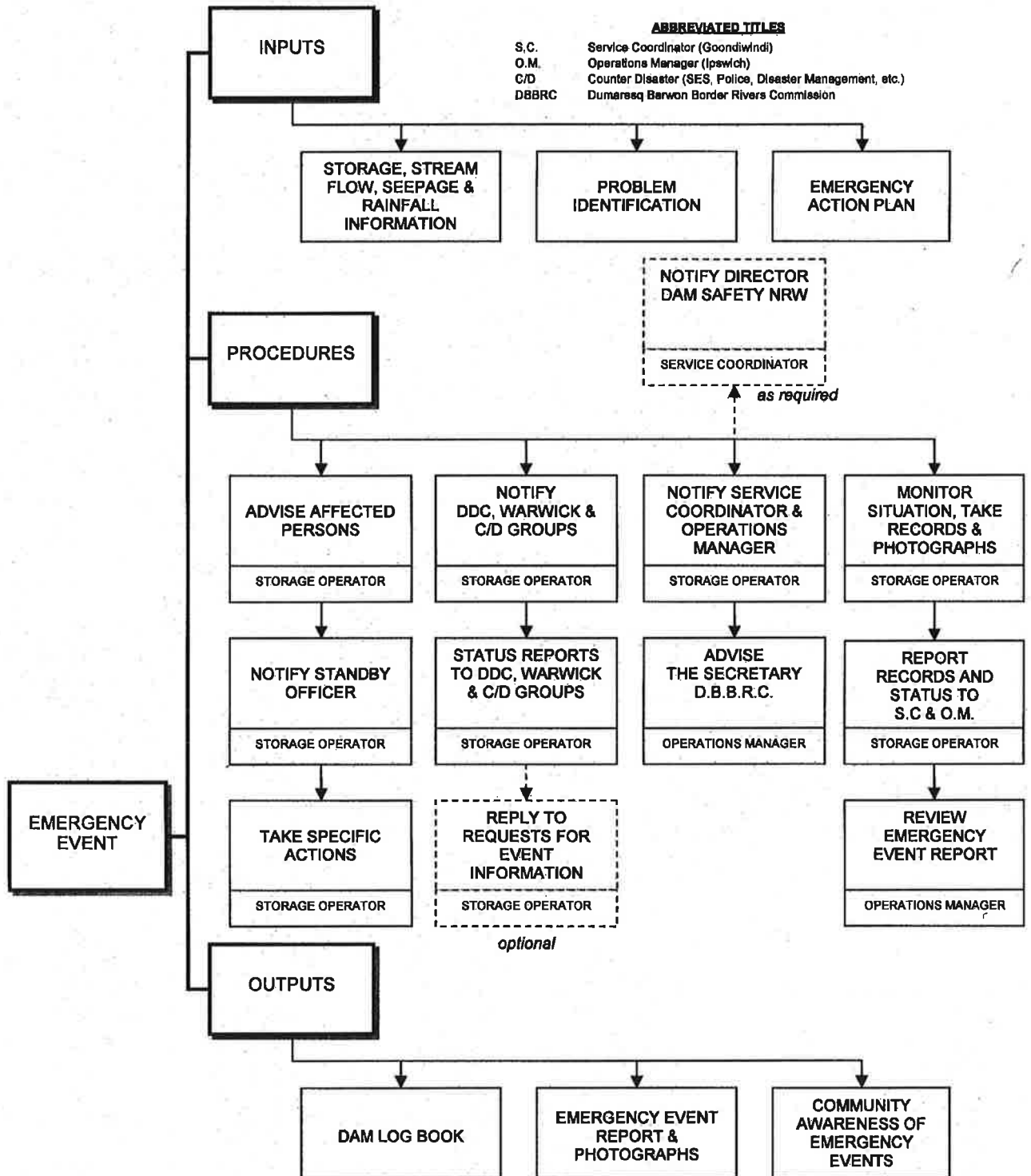
# GLENLYON DAM - EMERGENCY ACTION PLAN

## PROCEDURAL FLOW CHART



# GLENLYON DAM - EMERGENCY ACTION PLAN

## PROCEDURAL FLOW CHART



## **GLENLYON DAM - EMERGENCY ACTION PLAN**

### **EMERGENCY EVENTS AND ACTIONS**

<b>TYPE OF EVENT</b>	<b>PAGE</b>
<b>FLOOD EVENT</b>	
<u>STAGE 1</u> - Spillway discharging < 3 m over the spillway crest	2
<u>STAGE 2</u> - Spillway discharging from $\geq 3$ m to < 6.0 m over the spillway crest	4
<u>STAGE 3</u> - Spillway discharging from $\geq 6$ m to < 10.0 m over the spillway crest	6
<u>STAGE 4</u> - Spillway discharging from $\geq 10.0$ m over the spillway crest	9
<b>SUNNY DAY EVENT</b>	
Seepage	12
Earthquake	15
Toxic Spill	18
Algal Bloom	20
<b>EMERGENCY ACTIONS – PROCEDURAL FLOW CHART</b>	21

<b>Legend:</b>	<b><u>CATEGORY OF EVENT</u></b>
§	Description of event
►	Action to be taken DURING event
→	Action to be taken AFTER event

**NOTE:** High reservoir headwaters resulting from flood events would not endanger any dwellings located upstream of the dam. All Population at Risk is located downstream of the dam.

## ***GLENLYON DAM - EMERGENCY ACTION PLAN***

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### **FLOOD EVENT: Heavy rainfall in the catchment of the dam, Pike Creek in flood**

#### **§ STAGE 1 - Reservoir at level EL 412.09 m SD (discharge beginning through the spillway) and rising to EL 415.00 m SD**

##### **The Storage Operator shall:**

- ▶ Be available for the duration of the emergency event.
- ▶ Notify Standby Officers. Standby officers shall be available for duty for the duration of the Flood Emergency Event.
- ▶ Notify the Disaster District Coordinator in Warwick about the event and keep him updated.
- ▶ Notify SES Local Controllers at Moree, Tenterfield, Inverell, Warwick, Stanthorpe, Inglewood and Goondiwindi.
- ▶ Notify the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich) at each 1 m rise in storage level and at least daily.
- ▶ Notify the Police in Texas, Goondiwindi and Ashford (NSW).
- ▶ Monitor spillway performance twice daily. Photograph the spillway and the discharge area.
- ▶ Monitor and record rainfall and weather reports. Use ***Rainfall Record Sheet*** (Section 5, page 2).
- ▶ Monitor reservoir levels at 4 hourly intervals if the rise in level is rapid. If the rise is gradual, record storage levels at intervals determined by the Service Coordinator (Goondiwindi). Plot all levels on the ***Reservoir Level Graph*** (Section 5, page 3).
- ▶ Record all events and actions taken in the ***Log of Events & Actions Sheet*** (Section 5, page 4).
- ▶ Keep a daily running record of all telephone calls to and from the Storage Operator or Standby Officer, for the duration of a Flood or Emergency Event. Record to and from whom the messages are sent or received, actions requested and carried out, time and date for each communication. Use the ***Record of Communication Sheet*** (Section 5, page 5).
- ▶ Submit records and reports daily to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich).
- ▶ When the reservoir level is falling, advise all Counter-Disaster Groups and SunWater Management involved. Continue recording reservoir levels twice daily while the spillway is discharging.

## **GLENLYON DAM - EMERGENCY ACTION PLAN**

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After the event:

- Compile the Emergency Event Report based on the attached template (Section 5, page 1). Forward unedited copies to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich).

**The Service Coordinator (Goondiwindi) shall:**

- ▶ Review all event logs, records and reports received from the Storage Operator.

After the event:

- Review the Emergency Event Report.
- Transfer emergency action records into the Dam Log Book.
- Arrange for an inspection of the main embankment, spillway, outlet works and seepage monitoring points.

## **GLENLYON DAM - EMERGENCY ACTION PLAN**

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### **FLOOD EVENT**

#### **§ STAGE 2 - Reservoir at level EL 415.00 m SD and rising to EL 418.00 m SD**

##### **The Storage Operator shall:**

- ▶ Notify the Disaster District Coordinator in Warwick about the event and keep him updated.
- ▶ Notify the Disaster Management Groups in Stanthorpe, Inglewood, Waggamba and Goondiwindi.
- ▶ Notify SES Local Controllers at Moree, Tenterfield, Inverell, Warwick, Stanthorpe, Inglewood and Goondiwindi.
- ▶ Notify the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich) at each 1 m rise in storage level and at least daily.
- ▶ Notify the Police in Texas, Goondiwindi and Ashford (NSW).
- ▶ Monitor spillway performance twice daily. Take photographic / video records.
- ▶ Check downstream area of the spillway for signs of rock unravelling (rock falls from side walls, changing patterns of turbulence). Report any unusual findings immediately to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich).
- ▶ Inspect twice daily the main embankment for springs, deformations and signs of erosion. Report any unusual findings immediately to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich). Photograph if damage is observed, then follow the emergency actions for the *Sunny Day Event - Seepage* (Section 4, page 12).
- ▶ Monitor and record seepage at the measurement points every 2 hours until prevented by rising tailwater levels. Check for signs of turbidity and large increases in flow. Report any unusual signs to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich).
- ▶ Monitor and record rainfall and weather reports. Use *Rainfall Record Sheet* (Section 5, page 2).
- ▶ Monitor reservoir levels at 3 hourly intervals if the rise in level is rapid. If the rise is gradual, record storage levels at intervals determined by the Service Coordinator (Goondiwindi). Plot all levels on the *Reservoir Level Graph* (Section 5, page 3).
- ▶ Record all events and actions taken in the *Log of Events & Actions Sheet* (Section 5, page 4).

## **GLENLYON DAM - EMERGENCY ACTION PLAN**

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- ▶ Keep a daily running record of all telephone calls to and from the Storage Operator or Standby Officer, for the duration of a Flood or Emergency Event. Record to and from whom the messages are sent or received, actions requested and carried out, time and date for each communication. Use the ***Record of Communication Sheet*** (Section 5, page 5).
- ▶ Submit records and reports daily to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich).
- ▶ When the reservoir level is falling, advise all Counter-Disaster Groups and SunWater Management involved. Continue recording reservoir levels twice daily while the spillway is discharging.

### **After the event:**

- Compile the Emergency Event Report based on the attached template (Section 5, page 1). Forward unedited copies to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich).

### **The Service Coordinator (Goondiwindi) shall:**

- ▶ Monitor the Bureau of Meteorology (BOM) rainfall information.
- ▶ Notify Director Dam Safety, NRW and relay any findings of the dam and spillway inspections.
- ▶ Provide a daily status report to the Operations Manager (Ipswich).
- ▶ Review all event logs, records and reports received from the Storage Operator.

### **After the event:**

- Review all event logs, records and reports received from the Storage Operator.
- Review the Emergency Event Report.
- Transfer emergency action records into the Dam Log Book.
- Undertake a dam safety inspection and submit the report to the Operations Manager (Ipswich) for review.

### **The Operations Manager (Ipswich) shall:**

- After the event:
  - Review the Emergency Event Report.
  - Review report on dam safety inspection initiated by the Service Coordinator (Goondiwindi).

## **GLENLYON DAM - EMERGENCY ACTION PLAN**

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### **FLOOD EVENT**

**§ STAGE 3 - Reservoir at level EL 418.00 m SD and rising to EL 422.10 m SD (i.e. Design Flood Level)**

#### **NOTES:**

- Sections of Bruxner Highway may be affected by the flood. This would affect the access from Tenterfield and Texas to Glenlyon Dam.
- Access to Glenlyon Dam from Stanthorpe may become flooded at the crossing over Pike Creek.
- Alternative routes to Glenlyon Dam may need to be used.

#### **The Storage Operator shall:**

- ▶ Notify the Disaster District Coordinator in Warwick about the event and keep him updated.
- ▶ Notify the Disaster Management Groups in Stanthorpe, Inglewood, Waggamba and Goondiwindi.
- ▶ Notify SES Local Controllers at Moree, Tenterfield, Inverell, Warwick, Stanthorpe, Inglewood and Goondiwindi.
- ▶ Notify the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich) at each 1 m rise in storage level and at least daily.
- ▶ Notify the Police in Texas, Goondiwindi and Ashford (NSW).
- ▶ Isolate the power to the inlet tower and outlet works.
- ▶ Monitor the performance of the spillway and outlet works every 3 hours. Check downstream area of the spillway for signs of rock unravelling (rock falls from side walls, changing patterns of turbulence). Report any unusual findings immediately to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich). Take photographic / video records.
- ▶ Inspect twice daily the main embankment for springs, deformations and signs of erosion. Report any unusual findings immediately to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich). Photograph if damage is observed, then follow the emergency actions for the *Sunny Day Event - Seepage* (Section 4, page 12).
- ▶ Continue to monitor seepage at the measurement points every 2 hours if the tailwater levels allows it. Check for signs of turbidity and large increases in flow. Report any unusual signs to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich).
- ▶ Monitor and record rainfall and weather reports. Use *Rainfall Record Sheet* (Section 5, page 2).



## **GLENLYON DAM - EMERGENCY ACTION PLAN**

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- ▶ Monitor reservoir levels at 2 hourly intervals. Plot all levels on the **Reservoir Level Graph** (Section 5, page 3). Report a rising or a falling trend of the storage levels to all Authorities and SunWater Management previously notified.
- ▶ Record all events and actions taken in the **Log of Events & Actions Sheet** (Section 5, page 4).
- ▶ Keep a daily running record of all telephone calls to and from the Storage Operator or Standby Officer, for the duration of a Flood or Emergency Event. Record to and from whom the messages are sent or received, actions requested and carried out, time and date for each communication. Use the **Record of Communication Sheet** (Section 5, page 5).
- ▶ Submit records and reports daily to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich).
- ▶ When the reservoir level is falling, advise all Counter-Disaster Groups and SunWater Management involved. Continue recording reservoir levels twice daily while the spillway is discharging.

### **After the event:**

- Compile the Emergency Event Report based on the attached template (Section 5, page 1). Forward unedited copies to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich).

### **The Service Coordinator (Goondiwindi) shall:**

- ▶ Monitor the Bureau of Meteorology (BOM) rainfall information.
- ▶ Notify Director Dam Safety, NRW and relay any findings of the dam and spillway inspections.
- ▶ Provide a daily status report to the Operations Manager (Ipswich).
- ▶ Review all event logs, records and reports received from the Storage Operator.

### **After the event:**

- Review all event logs, records and reports received from the Storage Operator.
- Review the Emergency Event Report.
- Transfer emergency action records into the Dam Log Book.
- Undertake a dam safety inspection and submit the report to the Operations Manager (Ipswich) for review.

## ***GLENLYON DAM - EMERGENCY ACTION PLAN***

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### **The Operations Manager (Ipswich) shall:**

- ▶ Notify the Secretary of the Dumaresq Barwon Border Rivers Commission.
- After the event:
  - Review the Emergency Event Report.
  - Review report on dam safety inspection initiated by the Service Coordinator (Goondiwindi).

### **The Secretary of the Dumaresq Barwon Border Rivers Commission shall:**

- ▶ Reply to public / media requests for event information.

## **GLENLYON DAM - EMERGENCY ACTION PLAN**

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### **FLOOD EVENT**

**§ STAGE 4 - Reservoir at level EL 422.10 m SD and rising.  
Overtopping and possible failure of the dam are imminent.**

#### **NOTES:**

- Access to Glenlyon Dam will be affected by the flood. Alternate routes to be used.
- When the reservoir reaches the Dam Crest Level EL 422.1 m (10.4 m over the spillway), the dam structure is under significant loading and the storage level is approaching the dam crest level.

#### **The Storage Operator shall:**

- ▶ Notify the Disaster District Coordinator in Warwick about the event and keep him updated.
- ▶ Notify residents closest to the dam and Mingoola School during school hours.
- ▶ Notify the Disaster Management Groups in Stanthorpe, Inglewood, Waggamba and Goondiwindi.
- ▶ Notify SES Local Controllers at Moree, Tenterfield, Inverell, Warwick, Stanthorpe, Inglewood and Goondiwindi.
- ▶ Notify the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich) at each 1 m rise in storage level and at least daily.
- ▶ Notify the Police in Texas, Goondiwindi and Ashford (NSW).
- ▶ **IF SAFE**, monitor the performance of the spillway and outlet works every 3 hours. Check downstream area of the spillway for signs of rock unravelling (rock falls from side walls, changing patterns of turbulence). Report any unusual findings immediately to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich). Take photographic / video records.
- ▶ **IF SAFE**, inspect every 3 hours the main embankment for springs, deformations and signs of erosion. Report any unusual findings immediately to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich). Photograph if damage is observed, then follow the emergency actions for the *Sunny Day Event - Seepage* (Section 4, page 12).
- ▶ Erect barricades and "No Entry" signs on both roadway approaches to the dam wall. Warn unauthorised people to stay clear of the main embankment.
- ▶ Monitor and record rainfall and weather reports. Use *Rainfall Record Sheet* (Section 5, page 2).

## **GLENLYON DAM - EMERGENCY ACTION PLAN**

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- ▶ Monitor reservoir levels at hourly intervals. Plot all levels on the **Reservoir Level Graph** (Section 5, page 3). Report a rising or a falling trend of the storage levels to all Authorities and SunWater Management previously notified.
- ▶ Record all events and actions taken in the **Log of Events & Actions Sheet** (Section 5, page 4).
- ▶ Keep a daily running record of all telephone calls to and from the Storage Operator or Standby Officer, for the duration of a Flood or Emergency Event. Record to and from whom the messages are sent or received, actions requested and carried out, time and date for each communication. Use the **Record of Communication Sheet** (Section 5, page 5).
- ▶ Submit records and reports daily to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich).
- ▶ When the reservoir level is falling, advise all Counter-Disaster Groups and SunWater Management involved. Continue recording reservoir levels twice daily while the spillway is discharging.
- ▶ Notify all Counter-Disaster Authorities, Police and SunWater Management if overtopping of the main embankment is imminent and/or failure of the dam is commencing.

### **After the event:**

- Compile the Emergency Event Report based on the attached template (Section 5, page 1). Forward unedited copies to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich).

## **GLENLYON DAM - EMERGENCY ACTION PLAN**

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### **The Service Coordinator (Goondiwindi) shall:**

- ▶ Monitor the Bureau of Meteorology (BOM) rainfall information.
- ▶ Notify the Director Dam Safety, NRW and relay any findings of the dam and spillway inspections.
- ▶ Provide a daily status report to the Operations Manager (Ipswich).
- ▶ Review all event logs, records and reports received from the Storage Operator.

### **After the event:**

- Review all event logs, records and reports received from the Storage Operator.
- Review the Emergency Event Report.
- Transfer emergency action records into the Dam Log Book.
- Undertake a dam safety inspection and submit the report to the Operations Manager (Ipswich) for review.

### **The Operations Manager (Ipswich) shall:**

- ▶ Notify the Secretary of the Dumaresq Barwon Border Rivers Commission.

### **After the event:**

- Review the Emergency Event Report.
- Review report on dam safety inspection initiated by the Service Coordinator (Goondiwindi).

### **The Secretary of the Dumaresq Barwon Border Rivers Commission shall:**

- ▶ Reply to public / media requests for event information.

## **GLENLYON DAM - EMERGENCY ACTION PLAN**

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### **SUNNY DAY EVENT**

#### **§ SEEPAGE – Increase in seepage or new area of seepage through embankment**

##### **The Storage Operator shall:**

- ▶ Report immediately to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich) of any sudden increases or changes in seepage (rate, colour, etc.) from the downstream face, toe and groin of the dam or slumps, slips or bulging in the embankment.
- ▶ Monitor flows hourly until a decreasing trend is observable or directed otherwise by the Operations Manager (Ipswich). Plot flow records versus time to determine trends.
- ▶ Monitor water levels regularly. Plot all levels on the *Reservoir Level Graph* (Section 5, page 3).
- ▶ If it is deemed that there are no immediate concerns to the safety of the dam and immediate repairs are not needed then continue to monitor the seepage regularly and record the event details in the Dam Log Book.
- ▶ Record all events and actions taken in the *Log of Events & Actions Sheet* (Section 5, page 4).
- ▶ Keep a daily running record of all telephone calls to and from the Storage Operator or Standby Officer, for the duration of a Flood or Emergency Event. Record to and from whom the messages are sent or received, actions requested and carried out, time and date for each communication. Use the *Record of Communication Sheet* (Section 5, page 5).
- ▶ Submit records and reports daily to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich).
- ▶ When the event is over, advise all Counter-Disaster Groups and SunWater Management involved.

##### **If seepage has increased significantly and may lead to piping failure of the embankment:**

- ▶ Notify the Disaster District Coordinator in Warwick and Disaster Management Groups in Stanthorpe, Inglewood, Waggamba and Goondiwindi. Keep them informed with new developments at the site.
- ▶ Notify residents closest to the dam and Mingoola School during school hours.
- ▶ Notify SES Local Controllers at Moree, Tenterfield, Inverell, Warwick, Stanthorpe, Inglewood and Goondiwindi. Keep them informed with new developments at the site.

## **GLENLYON DAM - EMERGENCY ACTION PLAN**

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- ▶ Notify the Police in Texas, Goondiwindi and Ashford (NSW). Keep them informed with new developments at the site.
- ▶ If piping failure or embankment slips occur, immediately report to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich) and photograph / video tape the event **IF SAFE**.

After the event:

- Compile the Emergency Event Report based on the attached template (Section 5, page 1). Forward unedited copies to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich).

### **The Service Coordinator (Goondiwindi) shall:**

- ▶ Review seepage records or alarms and where data indicates sudden unexplained increases, inspect the dam and structures for signs of damage. Look especially for boggy ground, "evergreen" spots or pools of water and try to identify the seepage emission point. If necessary, obtain specialist technical advice.
- ▶ If seepage is not critical, provide the Operations Manager (Ipswich) with a status report.

### **If seepage has increased significantly and may lead to piping failure of the embankment:**

- ▶ Notify the Operations Manager (Ipswich) and keep him informed on the progress of the emergency event.
- ▶ Arrange for dam safety inspection by a dam engineer.
- ▶ If necessary, arrange to carry out emergency repairs to prevent the rate of seepage leading to failure of the dam.
- ▶ Obtain the likelihood of adverse weather conditions from the Bureau of Meteorology that may affect the repair works.

### **If piping failure has initiated and rate of leakage cannot be reduced by remedial action:**

- ▶ Notify the Operations Manager (Ipswich).
- ▶ The road providing access from Bruxener Highway to Glenlyon Dam may be flooded and should be signed for possible closure or closed as appropriate.

## **GLENLYON DAM - EMERGENCY ACTION PLAN**

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### **After the event:**

- Review all event logs, records and reports received from the Storage Operator.
- Review the Emergency Event Report.
- Transfer emergency action records into the Dam Log Book.
- If significant seepage was detected and emergency repairs were undertaken, arrange for a dam safety inspection by a dam engineer. All construction details related to the emergency repairs performed should be recorded.

### **The Operations Manager (Ipswich) shall:**

**If reports from the Storage Operator and Service Coordinator (Goondiwindi) confirm that significant damage has occurred or an emergency situation is developing:**

- ▶ Notify the Director Dam Safety, NRW and keep him updated.
- ▶ Notify the Secretary of the Dumaresq Barwon Border Rivers Commission.
- ▶ Arrange for additional steps to be taken as required to mitigate the effects of any damage.
- ▶ Take steps to address the problem including the use of specialised technical advisors.

### **After the event:**

- Review the Emergency Event Report.
- Review report on dam safety inspection initiated by the Service Coordinator (Goondiwindi).
- Submit the Emergency Event Report to the Director Dam Safety, NRW if an emergency situation had occurred.
- Submit the Emergency Event Report to the Secretary of the Dumaresq Barwon Border Rivers Commission if an emergency situation had occurred.
- Arrange for a detailed inspection and investigation of the dam by qualified dam engineers.
- If dam failure has occurred, make all records of the event available for future investigations.

### **The Secretary of the Dumaresq Barwon Border Rivers Commission shall:**

- ▶ Reply to public / media requests for event information.



## **GLENLYON DAM - EMERGENCY ACTION PLAN**

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### **SUNNY DAY EVENT**

#### **§ EARTHQUAKE – Seismic activity felt in the area**

##### **The Storage Operator shall:**

- ▶ Inform the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich) of the seismic activity detected at the dam.
- ▶ Immediately inspect the main embankment, spillway, spillway channel and abutments for leakage, springs, deformation, slides, slumps and cracking.
- ▶ Report any observed damage immediately to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich) for evaluation.
- ▶ Measure seepage and compare it with previously recorded data.
- ▶ On detection of leakage and/or springs implement the Emergency Action Plan for *Sunny Day Event - Seepage* (Section 4, page 12).
- ▶ Record all events and actions taken in the *Log of Events & Actions Sheet* (Section 5, page 4).
- ▶ Keep a daily running record of all telephone calls to and from the Storage Operator or Standby Officer, for the duration of a Flood or Emergency Event. Record to and from whom the messages are sent or received, actions requested and carried out, time and date for each communication. Use the *Record of Communication Sheet* (Section 5, page 5).

##### **After the event:**

- Compile the Emergency Event Report based on the attached template (Section 5, page 1). Forward unedited copies to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich).

## **GLENLYON DAM - EMERGENCY ACTION PLAN**

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### **The Service Coordinator (Goondiwindi) shall:**

- ▶ Respond to any information of an earthquake in the area from the Storage Operator or local residents.
- ▶ Ensure that a thorough inspection of the dam is immediately undertaken by the Storage Operator.
- ▶ On receipt of damage report, carry out field inspection if damage was identified. If necessary, obtain specialist technical advice and if necessary arrange for a dam safety inspection.
- ▶ If reports from the Storage Operator confirm that significant damage has occurred or emergency situation is developing follow the Emergency Actions for *Sunny Day Event - Seepage* (Section 4, page 12).
- ▶ If no damage is identified or the damage is unlikely to lead to dam failure, submit damage report to Operations Manager (Ipswich) for action.

### **After the event:**

- Review all event logs, records and reports received from the Storage Operator.
- Review the Emergency Event Report.
- Transfer emergency action records into the Dam Log Book.

### **The Operations Manager (Ipswich) shall:**

#### **If reports from the Storage Operator and Service Coordinator (Goondiwindi) confirm that significant damage has occurred or an emergency situation is developing:**

- ▶ Notify the Director Dam Safety, NRW and keep him updated.
- ▶ Notify the Secretary of the Dumaresq Barwon Border Rivers Commission.
- ▶ Arrange for additional steps to be taken as required to mitigate the effects of any damage.
- ▶ Take steps to address the problem including the use of specialised technical advisors.

## **GLENLYON DAM - EMERGENCY ACTION PLAN**

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### **After the event:**

- Review the Emergency Event Report.
- Review report on dam safety inspection initiated by the Service Coordinator (Goondiwindi).
- Submit the Emergency Event Report to the Director Dam Safety, NRW if an emergency situation had occurred.
- Submit the Emergency Event Report to the Secretary of the Dumaresq Barwon Border Rivers Commission if an emergency situation had occurred.
- Arrange for a detailed inspection and investigation of the dam by qualified dam engineers.
- If repairs are required, take steps to address the problem including the use of specialised technical advisors.
- Where emergency repairs have been carried out, arrange for construction details to be recorded.
- If dam failure has occurred, make all records of the event available for future investigations.

### **The Secretary of the Dumaresq Barwon Border Rivers Commission shall:**

- ▶ Reply to public / media requests for event information.

## ***GLENLYON DAM - EMERGENCY ACTION PLAN***

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### **SUNNY DAY EVENT**

#### **§ TOXIC SPILL – Toxic spill within the catchment area**

##### **The Storage Operator shall:**

- ▶ Identify the hazardous chemical or substance if possible and attempt to define the source and extent of contamination.
- ▶ Notify the Police and the local Fire Service.
- ▶ Seek advice from the Fire Service on the nature of the hazard.
- ▶ Notify the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich).
- ▶ Notify affected people (campers, tourists, irrigators) if the Police have not already done so.
- ▶ Take reasonable steps to isolate the spill or contaminant from entering the storage (containment embankment) and/or prevent further contamination.
- ▶ If the spill reaches the storage put up signs to alert people of contamination and shut off all releases from the reservoir.
- ▶ Monitor status of contamination and keep the Service Coordinator (Goondiwindi) and the Operations Manager (Ipswich) informed.
- ▶ Record all events and actions taken in the *Log of Events & Actions Sheet* (Section 5, page 4).
- ▶ Keep a daily running record of all telephone calls to and from the Storage Operator or Standby Officer, for the duration of a Flood or Emergency Event.  
Record to and from whom the messages are sent or received, actions requested and carried out, time and date for each communication. Use the *Record of Communication Sheet* (Section 5, page 5).

##### **If the contamination is likely to spread to the downstream area:**

- ▶ Take measures to prevent access of general public to the contaminated area. Advise the general public to avoid using contaminated water.
- ▶ Notify the Disaster District Coordinator in Warwick about the event and keep him updated.
- ▶ Notify the Disaster Management Groups in Stanthorpe, Inglewood, Waggamba and Goondiwindi.
- ▶ Notify the Police in Texas, Goondiwindi and Ashford (NSW).

## **GLENLYON DAM - EMERGENCY ACTION PLAN**

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After the event:

- Compile the Emergency Event Report based on the attached template (Section 5, page 1). Forward unedited copies to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich).

**The Service Coordinator (Goondiwindi) shall:**

- ▶ If the spill or contamination cannot be removed or isolated, arrange for specialist advice to address the problem in order to neutralise the effect of the contaminant.
- ▶ Contact the Environmental Protection Agency (EPA) for advice on containment and clean-up.

After the event:

- Review all event logs, records and reports received from the Storage Operator.
- Review the Emergency Event Report.
- Transfer emergency action records into the Dam Log Book.

**The Operations Manager (Ipswich) shall:**

- ▶ Notify the Secretary of the Dumaresq Barwon Border Rivers Commission.

After the event:

- Review the Emergency Event Report.
- If downstream contamination has occurred, make all records of the event available for future investigations.

**The Secretary of the Dumaresq Barwon Border Rivers Commission shall:**

- ▶ Reply to public / media requests for event information.

## GLENLYON DAM - EMERGENCY ACTION PLAN

### SUNNY DAY EVENT

#### § ALGAL BLOOM – Bloom of blue-green algae

##### The Storage Operator shall:

- ▶ Notify the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich) of status and monitor.
  - ▶ Notify the Disaster Management Groups in Stanthorpe, Inglewood, Waggamba and Goondiwindi.
  - ▶ Put up signs around the storage to alert people of the algal contamination.
  - ▶ Take reasonable steps to prevent the spread of contaminated water downstream.
  - ▶ Refer and follow the guidelines outlined in the Blue Green Algae Monitoring Manual and SOP 02 "Water Quality Monitoring".
  - ▶ Record all events and actions taken in the *Log of Events & Actions Sheet* (Section 5, page 4).
  - ▶ Keep a daily running record of all telephone calls to and from the Storage Operator or Standby Officer, for the duration of a Flood or Emergency Event.
- Record to and from whom the messages are sent or received, actions requested and carried out, time and date for each communication. Use the *Record of Communication Sheet* (Section 5, page 5).

##### After the event:

- Compile the Emergency Event Report based on the attached template (Section 5, page 1). Forward unedited copies to the Service Coordinator (Goondiwindi) and Operations Manager (Ipswich).
- Transfer EAP records into the Dam Log Book.

##### The Service Coordinator (Goondiwindi) shall:

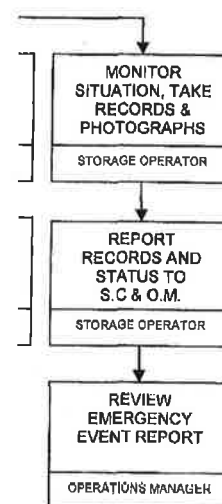
##### After the event:

- Take appropriate steps to control the algal outburst. Request advice from the NR&M, Water Quality and Monitoring Group.
- Review all event logs, records and reports received from the Storage Operator.
- Review the Emergency Event Report.
- If downstream contamination has occurred, make all records of the event available for future investigations.

Management, etc.)  
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# **GLENLYON DAM - EMERGENCY ACTION PLAN**

## **EMERGENCY EVENT REPORTS**

Following an emergency, an Emergency Event Report should be completed which contains:

### **DESCRIPTION OF THE INCIDENT**

#### **Nature of Event**

- Type of emergency event (e.g. Flood, Spillway discharge, Earthquake, Chemical spill, etc.)
- Date and Time the incident started and ended

#### **Event Progress**

Describe the lead up to and progress of the event. Include pertinent information. For example, in the case of a flood event include:

- Weather conditions and rainfall in the catchment – use the *Rainfall Record Sheet* (Section 5, pg. 2)
- The rate of rise of the storage. Measure storage level at the spillway – use the *Reservoir Level Graph* (Section 5, pg. 3)
- Time when the spillway was overtopped
- Date and time of highest storage level
- Discharges made from the reservoir

### **DAMAGE REPORT**

Describe any observed damage caused to the dam and immediate downstream. Attach photos.

### **ACTIONS & COMMUNICATIONS**

- Record stages of the event and actions taken – use *Log of Events and Actions Sheet* (Section 5, pg. 4)
- Include details of communications which took place during the emergency – use the *Record of Communication Sheet* (Section 5, pg. 5)

### **GENERAL COMMENTS**

Include any observations or comments regarding the event, such as:

- Equipment Malfunctions
- Recommendations and suggested changes to the EAP
- Comment on the adequacy of the EAP
- Safety issues
- Suggestions for improved reporting and monitoring of an emergency event

### **ATTACHMENTS**

- Photos and/or video recordings of the event
- Reservoir Level Graph
- Communications Record Sheet
- Log of Events & Action Sheet

### **STATISTICS**

Record the following statistics for the event:

- Storage capacity prior to inflow .....%
- Volume prior to event .....Megalitres
- Total discharge .....Megalitres
- Maximum discharge .....Megalitres per day

### **SIGN-OFF**

The emergency event report should be appropriately signed off and dated by the originator.

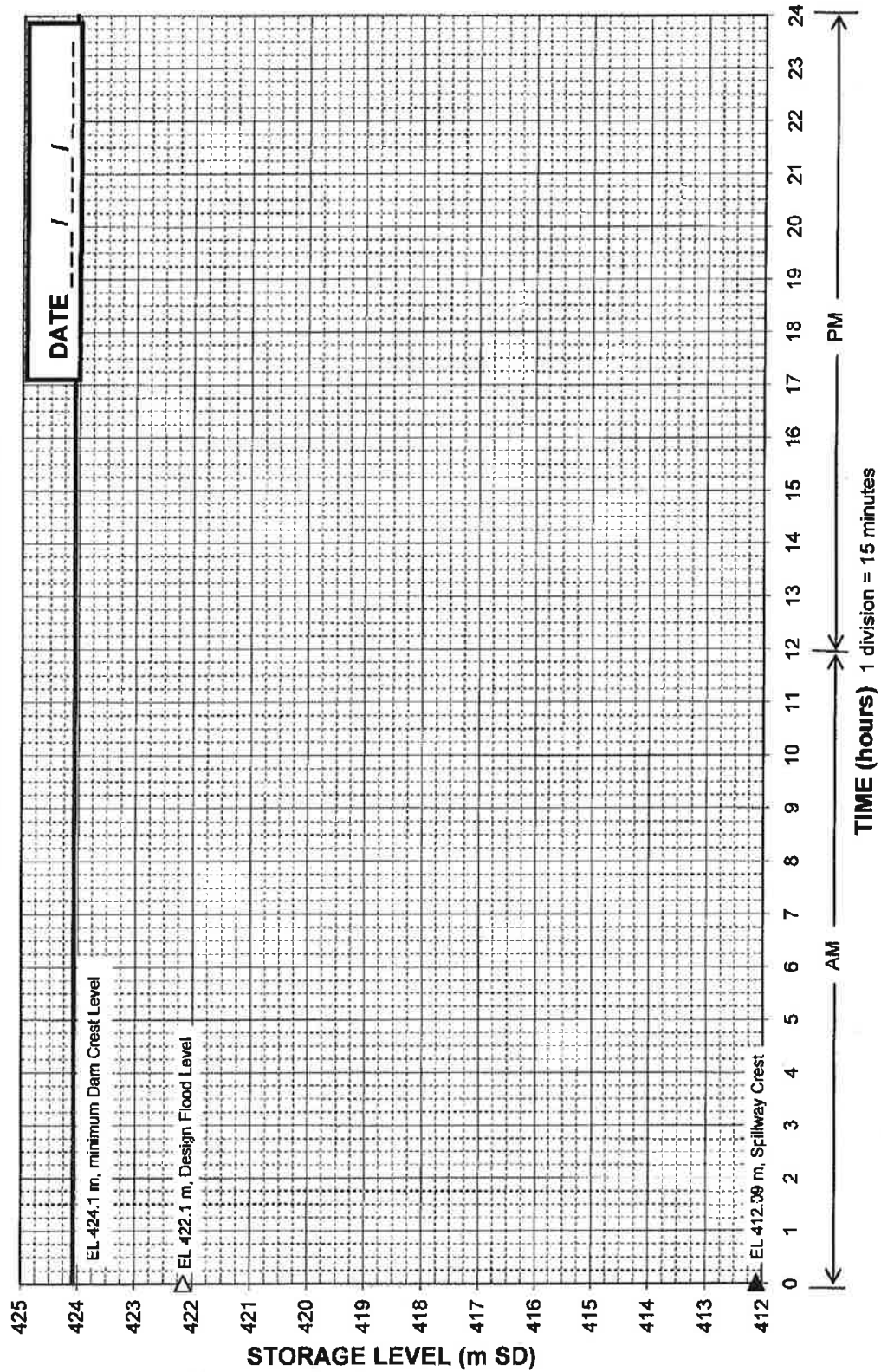
# RAINFALL RECORD SHEET

[illegible]



# GLENLYON DAM - EMERGENCY ACTION PLAN

## RESERVOIR LEVEL GRAPH



NOTE: Storage level measured at the spillway.

## **GLENLYON DAM - EMERGENCY ACTION PLAN**

### **LOG OF EVENTS & ACTIONS SHEET**

<b>Date</b>	<b>Time</b>	<b>Event description / Action carried out</b>	<b>Record entered by</b>

## **GLENLYON DAM - EMERGENCY ACTION PLAN**

### **RECORD OF COMMUNICATIONS SHEET**

<b>Date</b>	<b>Time</b>	<b>Phone No.</b>	<b>Contact Person</b>	<b>Message sent / received</b>	<b>Calls made / received by</b>



## GLENLYON DAM - EMERGENCY ACTION PLAN

### FLOOD EMERGENCY TRIGGER LEVELS

TRIGGER LEVEL	ELEVATION	STAGE	SPILLWAY DEPTH OF FLOW	SPILLWAY OUTFLOWS
<b>Trigger Level 1</b> Full Supply Level (FSL) / Spillway Crest Level	EL 412.09 m		-	-
<b>Trigger Level 2</b>	EL 415.00 m		2.91 m	799 m <sup>3</sup> /s
<b>Trigger Level 3</b>	EL 418.0 m		5.91 m	2,025 m <sup>3</sup> /s
<b>Trigger Level 4</b> Design Flood Level	EL 421.1 m		9.01 m	4,683 m <sup>3</sup> /s
<b>Dam Crest Level (DCL)</b>	EL 424.1		12.01 m	6,125 m <sup>3</sup> /s

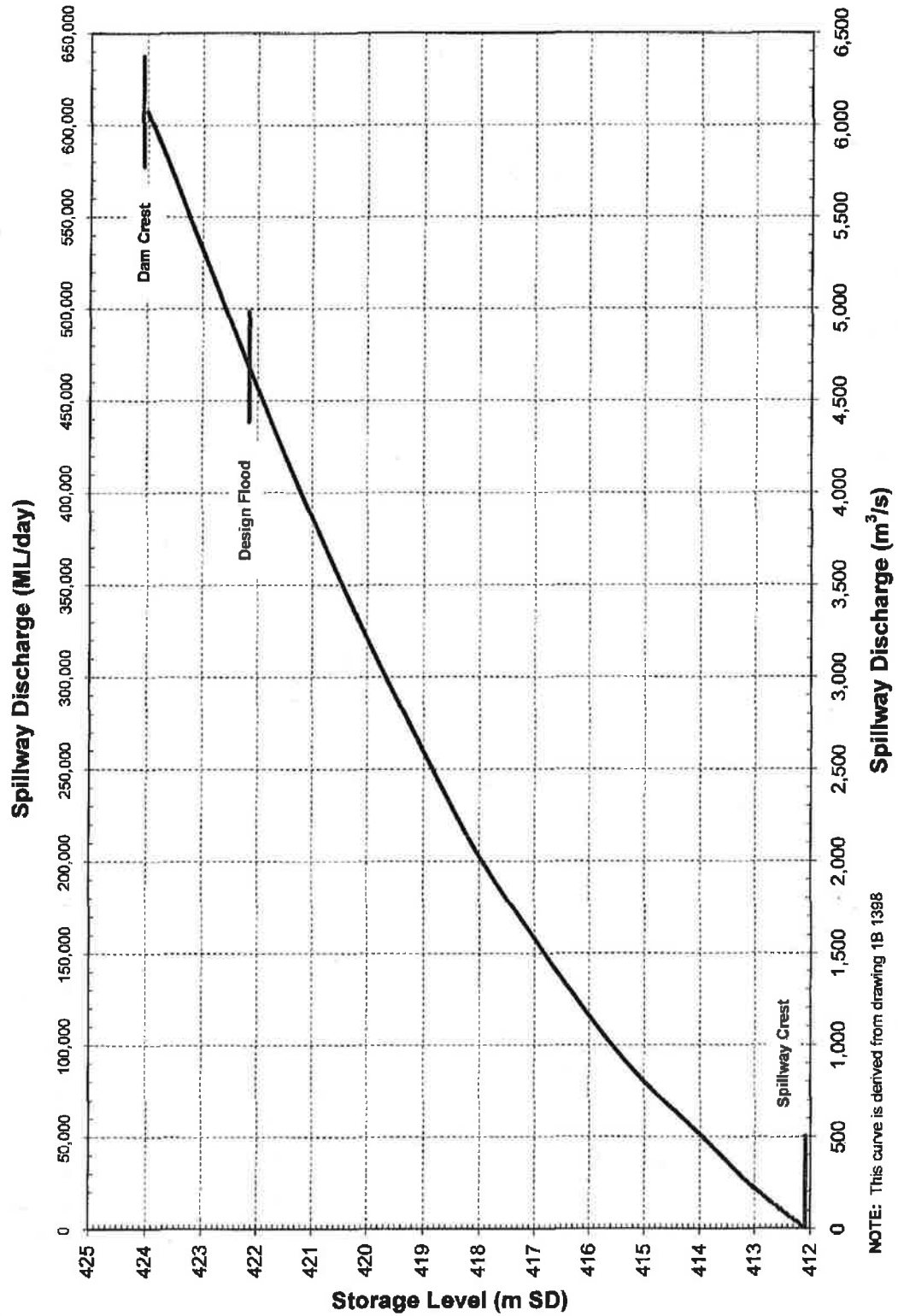
## ***GLENLYON DAM - EMERGENCY ACTION PLAN***

### **STORAGE AND DISCHARGE CHARACTERISTICS**

	STORAGE LEVEL (SD)	HEIGHT ABOVE FSL	SPILLWAY DISCHARGE	STORAGE CAPACITY
spillway crest	412.1 m	0.0 m		
	413.0 m	0.9 m		
	414.0 m	1.9 m		
	415.0 m	2.9 m		
	416.0 m	3.9 m		
	417.0 m	4.9 m		
	418.0 m	5.9 m		
	419.0 m	6.9 m		
	420.0 m	7.9 m		
	421.0 m	8.9 m		
	422.0 m	9.9 m		
design flood	422.1 m	10.1 m		
	423.0 m	10.9 m		
	424.0 m	11.9 m		
dam crest	424.1 m	12.0 m		

# GLENLYON DAM - EMERGENCY ACTION PLAN

## SPILLWAY RATING CURVES







## ***GLENLYON DAM - EMERGENCY ACTION PLAN***

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### **FLOODING EVENT DEFINITIONS**

- **Annual Exceedance Probability (AEP)**

The probability of a specified magnitude of a natural event being exceeded in a year.

- **Catchment**

The land surface area which drains to a specific point, such as a reservoir.

- **Controlled Document**

A document subject to a managerial control over its content, distribution and storage. It may have legal or contractual implications.

- **Dam Crest Flood (DCF) (formerly IFF or Imminent Failure Flood).**

The flood event which when routed through the reservoir, results in a still water reservoir level at the lowest crest level of the dam. The reservoir is assumed to be initially at Full Supply Level (FSL).

- **Emergency**

An emergency in terms of dam operation is any condition which develops unexpectedly, endangers the integrity of the dam or downstream property and life and requires immediate action.

- **Full Supply Level (FSL)**

The maximum normal operating water surface level of a reservoir when not affected by floods.

- **Incident**

An event which could deteriorate to a very serious situation or endanger the dam.

- **Probable Maximum Flood (PMF)**

The flood resulting from the Probable Maximum Precipitation, coupled with the worst flood producing catchment conditions that can be realistically expected in the prevailing meteorological conditions.

- **Probable Maximum Precipitation (PMP)**

The greatest theoretical depth of precipitation for a given duration that is physically possible over a particular drainage system.

- **Sunny Day Failure**

Unexpected failure of a dam not associated with flooding.

