## Brooke Foxover

**From:** DutyEngineer [dutysec[redacted]
**Sent:** Thursday, 27 January 2011 1:12 PM
**To:** John Tibaldi
**Subject:** Report Introduction - 01.doc
**Attachments:** @



**Attachments:**

Report Introduction - 01.doc (785 KB)

# 1 INTRODUCTION

## 1.1 Preface

Given their potential significant impact on downstream populations, it is imperative that Wivenhoe and Somerset Dams are operated during flood events in accordance with clearly defined and pre-determined procedures to minimise impacts to life and property. The current procedures used for this purpose are contained in Revision 7 of the Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam that was gazetted in January 2010. This manual is an approved Flood Mitigation Manual under the Queensland Water Supply (Safety and Reliability) Act 2008.

The Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam requires the owner of Wivenhoe and Somerset Dams (currently Seqwater) to prepare a report after each Flood Event impacting on the dams. A Flood Event is defined as a situation where either of the dams exceeds the dam's full supply level. The report must contain details of the procedures used during the Flood Event, the reasons therefore and other pertinent information. Seqwater must forward the report to the Director General of the Department of Environment and Resource Management within six weeks of the completion of the Flood Event. This document and its associated volumes comprises the required report relating to the Flood Event impacting on both Wivenhoe and Somerset dams that commenced on 6 January 2011 and concluded on 19 January 2011.

## 1.2 Meaning of Terms

In this Manual, save where a contrary definition appears -

**"Act"** means the *Water Supply (Safety and Reliability) Act 2008*;

**"AEP"** means annual exceedance probability, the probability of a specified event being exceeded in any year.

**"Agency"** includes a person, a local government and a department of state government within the meaning of the Acts Interpretation Act 1954;

**"AHD"** means Australian Height Datum;

**"Chairperson"** means the Chairperson of Seqwater;

**"Chief Executive"** means the Director General of the Department of Environment and Resource Management or nominated delegate;

**"Controlled Document"** means a document subject to managerial control over its contents, distribution and storage. It may have legal and contractual implications;

**"Dams"** means Wivenhoe Dam and Somerset Dam;

**"Dam Supervisor"** means the senior on-site officer at Wivenhoe or Somerset Dam as the case may be;

**"Duty Flood Operations Engineer"** means the Senior Flood Operations Engineer or Flood Operations Engineer rostered on duty to be in charge of Flood Operations at the dams;

**"EL"** means elevation in metres Australian Height Datum;

**"Flood Event"** is a situation where the Duty Flood Operations Engineer expects the water level in either of the Dams to exceed the Full Supply Level;

**"Flood Operations Centre"** means the Centre used during by Flood Operations Engineers to manage Flood Events;

**"Flood Operations Engineer"** means a person designated to direct flood operations at the dams in accordance with Section 2.4 of this Manual;

**"FSL" or "Full Supply Level"** means the level of the water surface when the reservoir is at maximum operating level, excluding periods of flood discharge;

**"Gauge"** when referred to in (m) means river level referenced to AHD, and when referred to in ($m^3/s$) means flow rate in cubic metres per second;

**"Manual" or "Manual of Operational Procedures for Flood Events at Wivenhoe Dam and Somerset Dam"** means the current version (Revision 7) of this Manual;

**"Power Station"** means the Wivenhoe pumped storage hydro-electric power station associated with Wivenhoe Dam and Split-Yard Creek Dam;

**"Senior Flood Operations Engineer"** means a person designated in accordance with Section 2.3 of this Manual under whose general direction the procedures in this Manual must be carried out;

**"Seqwater"** means the Queensland Bulk Water Supply Authority trading as Seqwater.

## 1.3 Background

The primary objectives of the procedures contained in the Manual in order of importance are:

- Ensure the structural safety of the dams;
- Provide optimum protection of urbanised areas from inundation;
- Minimise disruption to rural life in the valleys of the Brisbane and Stanley Rivers;
- Retain the storage at Full Supply Level at the conclusion of the Flood Event.
- Minimise impacts to riparian flora and fauna during the drain down phase of the Flood Event.

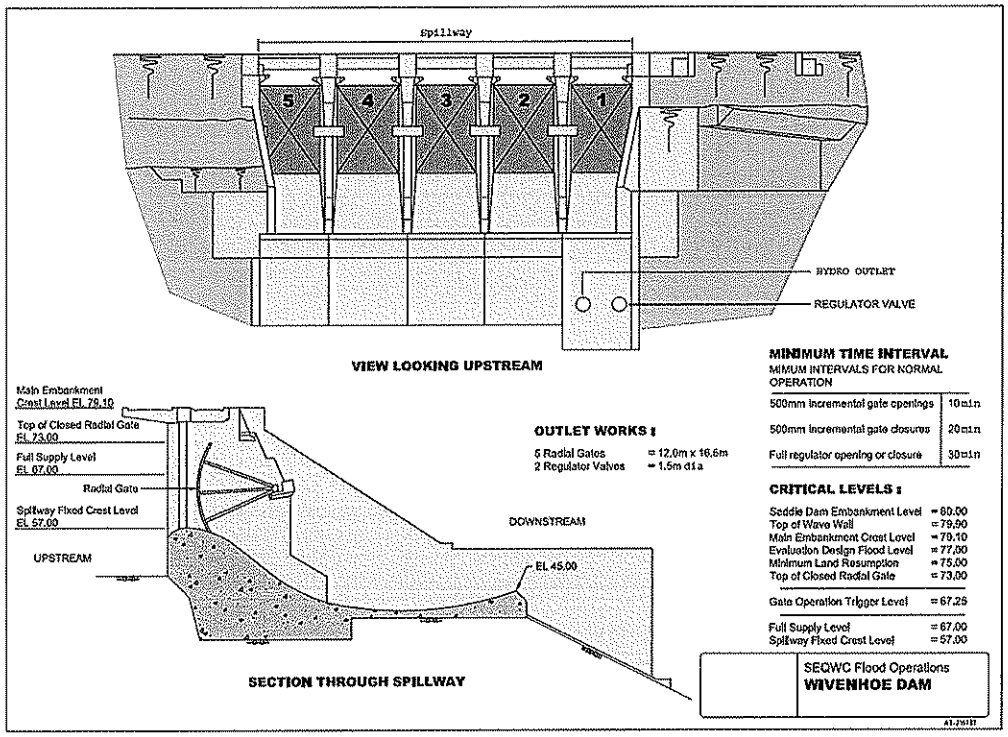
In meeting these objectives, the dams must be operated to account for the potential effects of closely spaced Flood Events. Accordingly, normal procedures require stored floodwaters to be emptied from the dams within seven days of the flood event peak passing through the dams. During Flood Events, Wivenhoe Dam and Somerset Dam are operated in conjunction so as to maximise the overall flood mitigation capabilities of the two dams.

## 1.4 Wivenhoe Dam

Wivenhoe Dam is capable of being operated in a number of ways to reduce flooding in the Brisbane River downstream of the dam, depending on the origin, magnitude and spatial extent of the flood. Maximum overall flood mitigation effect will be achieved by operating Wivenhoe Dam in conjunction with Somerset Dam.

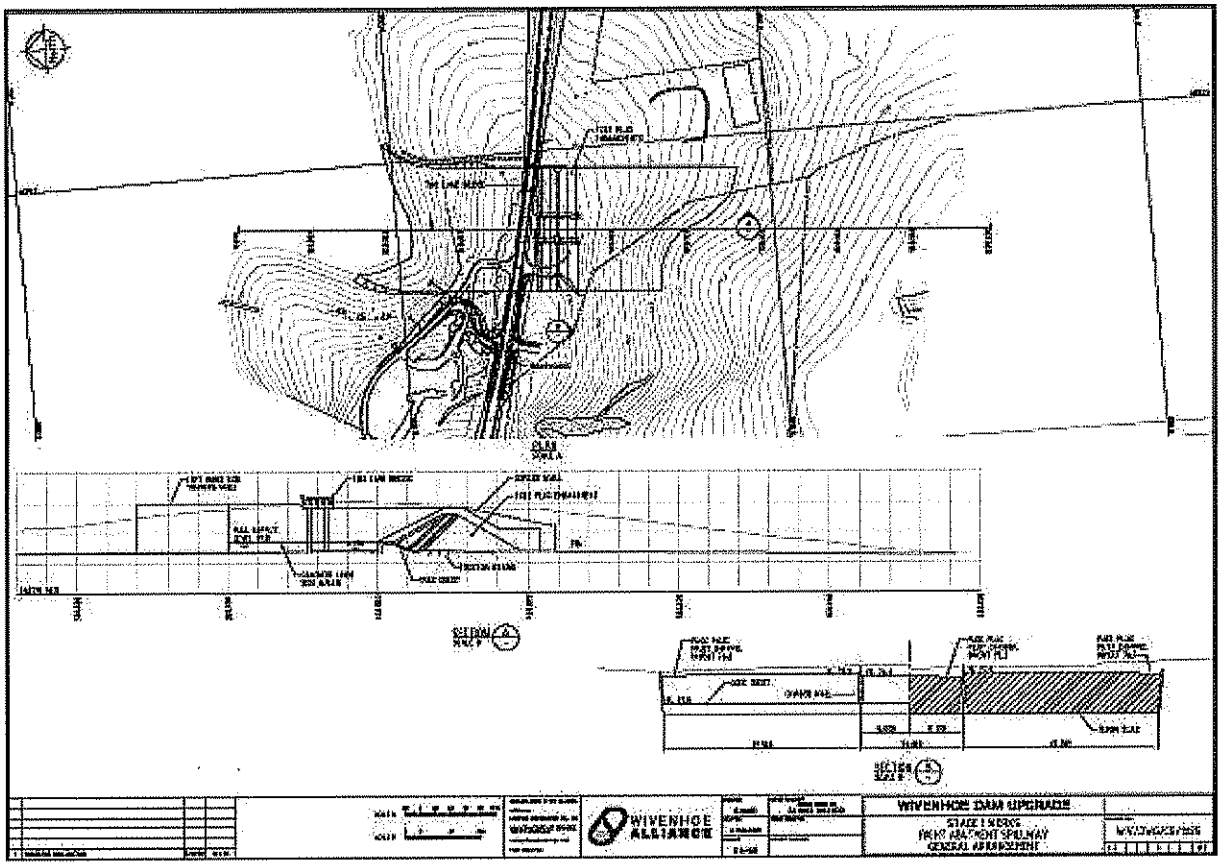
The reservoir volume above FSL of EL 67.0 is available as temporary flood storage. How much of the available flood storage compartment is utilised, will depend on the initial reservoir level below FSL, the magnitude of the flood being regulated and the procedures adopted.

Radial Gates and an Auxiliary Spillway are the primary infrastructure used to release water during flood events at Wivenhoe Dam. The arrangement of the Radial Gates is shown in the diagram below:




In addition to the five radial gates, the auxiliary spillway was constructed in 2005 as part of an upgrade to improve flood adequacy of this storage. The auxiliary spillway consists

of a three bay fuse plug spillway at the right abutment. In association with other works constructed at the dam, this gives the dam crest flood an AEP of approximately 1 in 100,000. The arrangement of the Auxiliary Spillway is shown in the diagram below.



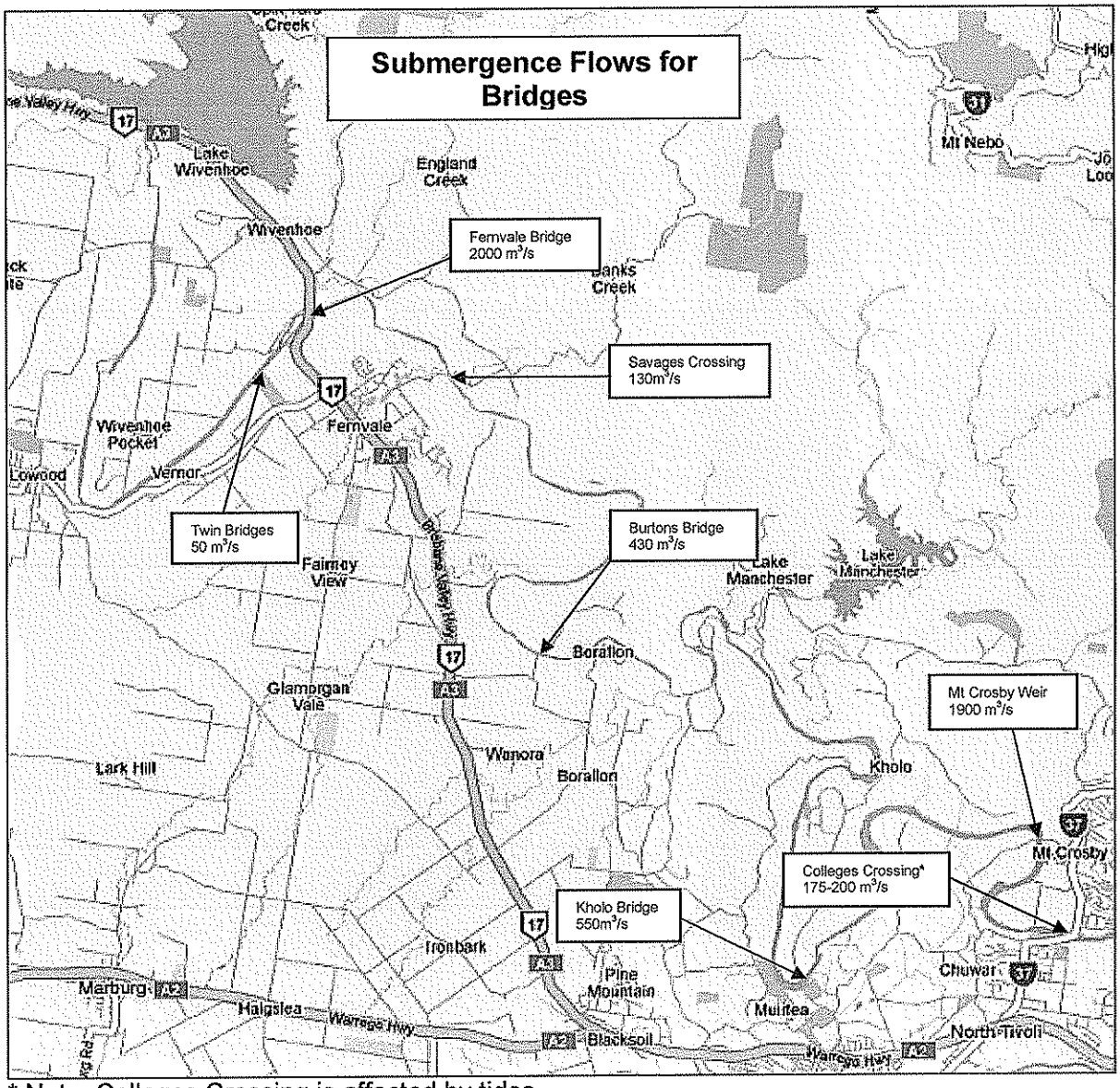

Once a Flood Event is declared, an assessment is to be made of the magnitude of the Flood Event, including:

- A prediction of the maximum storage levels in Wivenhoe and Somerset Dams.
- A prediction of the peak flow rate at the Lowood Gauge excluding Wivenhoe Dam releases.
- A prediction of the peak flow rate at the Moggill Gauge excluding Wivenhoe Dam releases.

The spillway gates are not to be opened for flood control purposes prior to the reservoir level exceeding EL 67.25.

The strategies contained in the Manual for operating Wivenhoe Dam during Flood Events require a great deal of control over releases and knowledge of discharges into the Brisbane River from both Lockyer Creek and the Bremer River. When giving consideration to minimising disruption to rural life in the valleys of the Brisbane and Stanley Rivers, in general the releases from Wivenhoe Dam are controlled such that the combined flow from Lockyer Creek and Wivenhoe Dam is less than the limiting values to delay the submergence of particular bridges. The diagram below shows the location of

the impacted bridges and the approximate river flow rate at which they are closed to traffic.



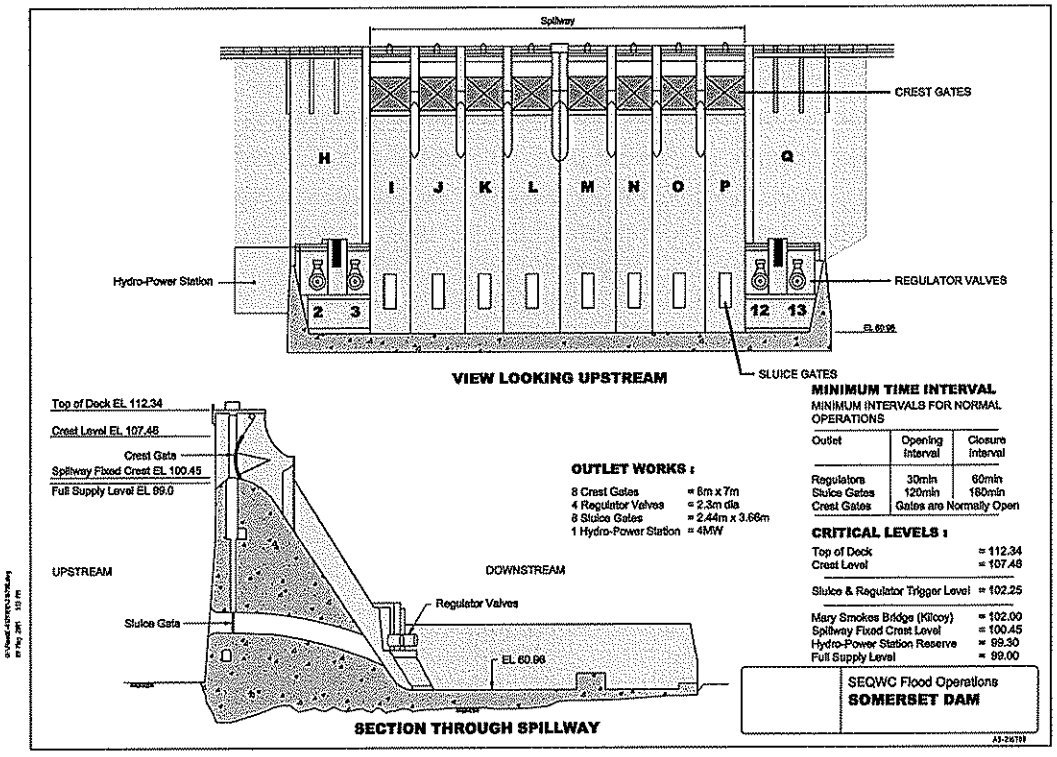

* Note: Colleges Crossing is affected by tides

When giving consideration to providing optimum protection of urbanised areas from inundation, in general the releases from Wivenhoe Dam are controlled such that the combined flow from Lockyer Creek, Wivenhoe Dam and the Bremer River is either minimised or kept below the threshold level for urban damage.

When giving consideration to ensuring the structural safety of the dam, the releases from Wivenhoe Dam are controlled to ensure that the dam is not put at risk of failure.

## 1.5 Somerset Dam

Somerset Dam is capable of being operated in a number of ways to regulate Stanley River floods. Somerset Dam and Wivenhoe Dam are to be operated in conjunction to optimise the flood mitigation benefits downstream of Wivenhoe Dam. Radial Gates, Sluice Gates and Regulator Valves Radial Gates are the primary infrastructure used to release water during flood events at Somerset Dam. The arrangement of this infrastructure is shown in the diagram below:

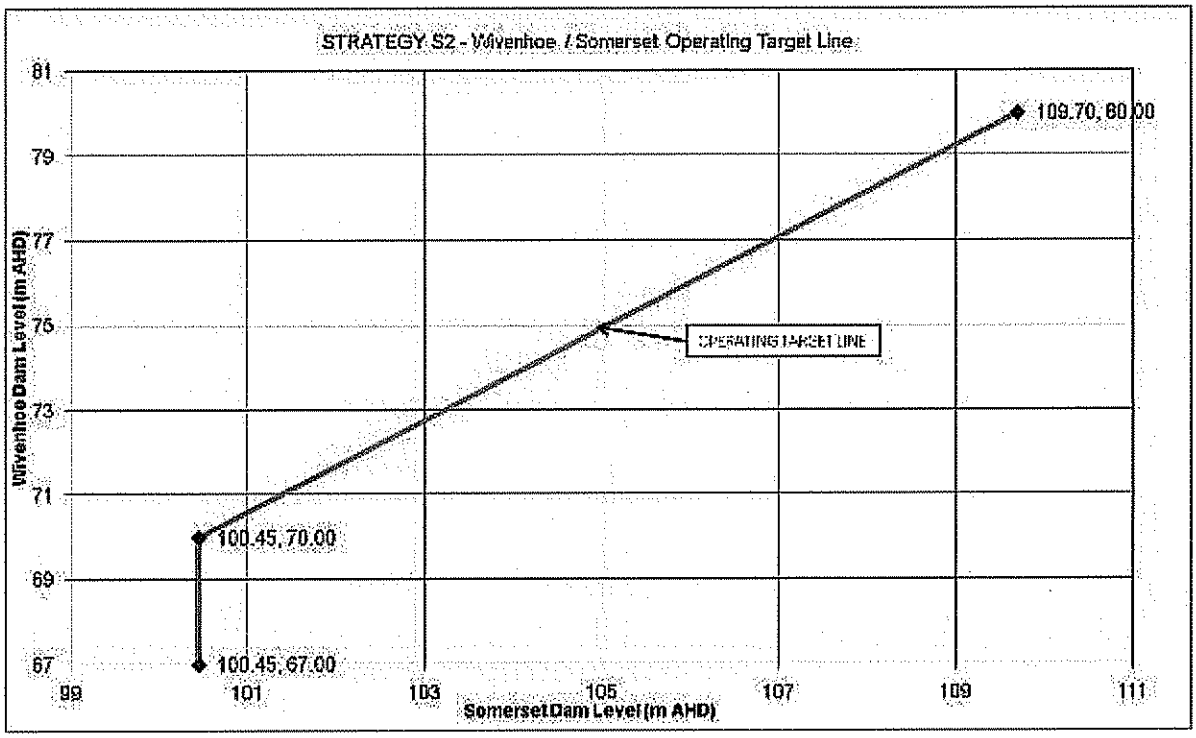



The intent of the strategies used when operating Somerset Dam during a flood event is to maximise the benefits of the flood storage capabilities of the dam while protecting the structural safety of both dams. To achieve this, a Wivenhoe/Somerset Operating Target Line is used to set a goal for balancing the use of the flood storage in each Dam.

The Wivenhoe/Somerset Operating Target Line was selected based on the following factors:

- Equal minimisation of flood level peaks in both dams in relation to their associated dam failure levels.
- Minimisation of flows in the Brisbane River downstream of Wivenhoe Dam.
- Consideration of the time needed at the onset of a Flood Event to properly assess the magnitude of the event and the likely impacts, so that the likely optimal strategy to maximise the Flood Mitigation benefits of the storages can be selected.

A diagram showing the operating target line is as follows.


STRATEGY S2 - Wivenhoe / Somerset Operating Target Line
Wivenhoe Dam Level (m AHD)
Somerset Dam Level (m AHD)
81
79
77
75
73
71
69
67
99
101
103
105
107
109
111
109.70, 80.00
OPERATING TARGET LINE
100.45, 70.00
100.45, 67.00

## Brooke Foxover

**From:** DutyEngineer [dutyseq[redacted]
**Sent:** Thursday, 27 January 2011 1:14 PM
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**Subject:** Flood Event Summary - 01.doc
**Attachments:** @



**Attachments:**

Flood Event Summary - 01.doc (269 KB)

## SUMMARY OF JANUARY 2011 FLOOD EVENT

The following series of tables provides a detailed summary of the operation of Wivenhoe and Somerset Dams during the January 2011 Flood Event that impacted on Brisbane. Each table covers a period of the event during which one of the following occurred:

- There was a transition or change to the flood operation strategy used as defined by the Manual.
- There was a period of stability during which no gate operations from either Wivenhoe Dam or Somerset Dam were directed.
- There was a period of sustained gate operations (either opening of closing) at either Wivenhoe Dam or Somerset Dam.

Each table also provides a summary of both relevant background information and a summary of the information that was used in decision making during the period covered by the table. This information includes:

- Details of the time period covered by the table.
- Relevant background information from the period leading up to and during the time period covered by the table.
- Changes in dam levels during the period.
- Rainfall information (including forecast rainfall) and model results available during the period.
- The Strategy used and/or adopted during the period.

Further reports and appendices are available to explain in detail the derivation of the technical information presented in the tables. Much of the background detail in the reports is taken from the event log.

In summary, the event was extreme, with some relevant statistics that demonstrate this fact as follows:

- Catchment average rainfalls recorded for the catchment area above Wivenhoe Dam indicate rainfall intensities for the 72 hour and 120 hour periods to Tuesday 11 January 2011 at 19:00 had an annual exceedance probability of between 1 in 500 years and 1 in 1000 years.

- Point rainfalls experienced in the Wivenhoe Dam storage area experienced between 05:00 and 13:00 on Tuesday 11 January 2011 have been calculated to have an annual exceedance probability of between 1 in 500 years and 1 in 1000 years. Although this rainfall was not recorded at a single station, it is calculated to have occurred based on the extreme storage level rises experienced at Wivenhoe Dam during this period.

- The volume of total inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 40% more that the comparable volume of inflow calculated from the January 1974 event.

- The peak inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 50% more that the comparable peak inflow calculated from the January 1974 event

| JANUARY 2011 FLOOD EVENT - PERIOD 1 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Thursday 06 Jan 2011 07:42<br><br>Completed Friday 07 Jan 2011 02:00 | **Strategy W1A**<br><br>• No significant rainfall occurred in the 24 hours to 0900 on 5 January 2011.<br><br>• Catchment average rainfalls in the 24 hours to 0800 on 6 January 2011were:<br>o Wivenhoe 28mm;<br>o Somerset 21mm;<br>o Lockyer 23mm;<br>o Bremer 23mm.<br><br>• Event Mobilisation occurred at 7:42 on Thursday 6 January 2011, using Strategies W1A and S2.<br><br>• Once mobilisation occurs, 24/7 staffing of the Flood Operations Centre and dams continues until official de-mobilisation is announced. For this event, this occurred at 12:00 on Wednesday 19 January 2011.<br><br>• Duty Engineer called back early from annual Christmas holidays to assist with the management of the event. | Wivenhoe Dam level rises from 67.31 to 67.52 over the 18 hour period.<br><br>Somerset Dam level rises from 99.34 to 99.55 over the 18 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 29mm;<br>o Somerset 22mm;<br>o Lockyer 32mm;<br>o Bremer 32mm.<br><br>• Forecast rainfall is 25mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 99.8 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Lake level not expected to reach 67.50 (Strategy W1B) until 07 January 2011.<br><br>• Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows will not inundate Colleges Crossing for more than 24 hours. | **Strategy W1A**<br>**(Lake Level greater than 67.25, maximum release 110 cumecs)**<br><br>• Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 cumecs.<br><br>• Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A. |

| JANUARY 2011 FLOOD EVENT - PERIOD 2 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Friday 07 Jan 2011 02:00<br><br>Completed Friday 07 Jan 2011 07:00 | **Strategy W1B**<br><br>• Transition from Strategy W1A to W1B. | Wivenhoe Dam level rises from 67.52 to 67.68 over the 5 hour period.<br><br>Somerset Dam level rises from 99.55 to 99.60 over the 5 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 6mm;<br>o Somerset 10mm;<br>o Lockyer 2mm;<br>o Bremer 4mm.<br>• Forecast rainfall is 25mm in the next 24 hours.<br>• Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) ??.?? (including forecast).<br>• Somerset Lake level forecast to peak at 99.8 (excluding forecast) ??.?? (including forecast).<br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast).<br>• Lake level not expected to reach 67.75 (Strategy W1C) for at least 6 hours.<br>• Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge. | **Strategy W1B**<br>**(Lake Level greater than 67.50, maximum release 110 cumecs)**<br><br>• Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 cumecs.<br><br>• Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B. |

| JANUARY 2011 FLOOD EVENT - PERIOD 3 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Friday 07 Jan 2011 07:00<br><br>Completed Friday 07 Jan 2011 09:00 | **Strategy W1C**<br><br>• Transition from Strategy W1B to W1C. | Wivenhoe Dam level rises from 67.68 to 67.75 over the 2 hour period.<br><br>Somerset Dam level rises from 99.60 to 99.65 over the 2 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 6mm;<br>o Somerset 5mm;<br>o Lockyer 2mm;<br>o Bremer 1mm.<br><br>• Forecast rainfall is 25mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 99.8 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge or Kholo Bridge. | **Strategy W1C**<br>**(Lake Level greater than 67.75, maximum release 500 cumecs)**<br><br>• Endeavour to maintain Kholo Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 550 cumecs.<br><br>• Water held in Wivenhoe in an attempt to maintain Kholo Bridge trafficable in accordance with Strategy W1C. |

| JANUARY 2011 FLOOD EVENT - PERIOD 4 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W1E** | | | **Strategy W1E**<br>**(Lake Level greater than 68.25, maximum release 1900 cumecs)** |
| Commenced<br>Friday<br>07 Jan 2011<br>09:00<br><br>Completed<br>Friday<br>07 Jan 2011<br>15:00 | • Transition from Strategy W1C to W1E. Based on rainfall on the ground, it becomes apparent that all bridges apart from the Mt Crosby Weir Bridge and Fernvale Bridge will be flooded by Lockyer Creek flows alone.<br><br>• All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Releases were delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another extended period of isolation.<br><br>• Rainfall on the ground and rainfall forecasts did not suggest that the event was likely to approach the use of Strategy W4. | Wivenhoe Dam level rises from 67.75 to 68.03 over the 6 hour period.<br><br>Somerset Dam level rises from 99.65 to 99.94 over the 6 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 24mm;<br>o Somerset 30mm;<br>o Lockyer 14mm;<br>o Bremer 12mm.<br><br>• Forecast rainfall is 25mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.1 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Due to the further rain experienced and observed stream rises, it has become apparent that inflows from Lockyer Creek into the Brisbane River will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge. | • Endeavour to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.<br><br>• Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategy W1E. |

| JANUARY 2011 FLOOD EVENT - PERIOD 5 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Transition from Strategy W1E to Strategy W2**<br>**Wivenhoe Directives #1 to #4.**<br>**Somerset Directives #1 to #3.** | | | **Strategy W2**<br>**(Lake Level greater than 68.50, maximum release 3500 cumecs)** |
| Commenced Friday 07 Jan 2011 15:00<br><br>Completed Saturday 08 Jan 2011 14:00 | • Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate or 0.5 metres of opening per hour.<br><br>• At 14:00 on 08 January 2011, Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.<br><br>• Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2. | Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.<br><br>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 3mm;<br>o Somerset 5mm;<br>o Lockyer 1mm;<br>o Bremer 1mm.<br><br>• Forecast rainfall is 40mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.5 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Inflows from Lockyer Creek into the Brisbane River have been sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge. | • Consideration currently on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced. |

| JANUARY 2011 FLOOD EVENT - PERIOD 6 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Saturday 08 Jan 2011 14:00<br><br>Completed Sunday 09 Jan 2011 01:00 | **Strategy W2**<br><br>• Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.<br><br>• No change to gate settings over this period. Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded. | Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.<br><br>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 8mm;<br>o Somerset 16mm;<br>o Lockyer 3mm;<br>o Bremer 2mm.<br><br>• Forecast rainfall is 40mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.8 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.5 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | **Strategy W2**<br>**(Lake Level greater than 68.50, maximum release 3500 cumecs)**<br><br>• With lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced. |

| JANUARY 2011 FLOOD EVENT - PERIOD 7 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced<br>Sunday<br>09 Jan 2011<br>01:00<br><br>Completed<br>Sunday<br>09 Jan 2011<br>08:00 | **Strategy W2**<br>**Wivenhoe Directives #5 to #7.**<br><br>• Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.<br><br>• Wivenhoe discharge is increased from 1271 cumecs to 1367 cumecs.<br><br>• No change to Somerset Dam gate settings over this period.<br><br>• All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded. | Wivenhoe Dam level falls from 68.63 to 68.57 over the 7 hour period.<br><br>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 12mm;<br>o Somerset 36mm;<br>o Lockyer 1mm;<br>o Bremer 0mm.<br><br>• Forecast rainfall is 40mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.5 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | **Strategy W2**<br>**(Lake Level greater than 68.50, maximum release 3500 cumecs)**<br><br>• With lake levels falling at both dams consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced. |

| JANUARY 2011 FLOOD EVENT - PERIOD 8 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Sunday 09 Jan 2011 08:00<br><br>Completed Sunday 09 Jan 2011 14:00 | **Strategy W2**<br>**Wivenhoe Directives #7.**<br>**Somerset Directives #4 to #5.**<br><br>• Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.<br><br>• Wivenhoe discharge is increased from 1367 cumecs to 1420 cumecs.<br><br>• Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.<br><br>• All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded. | Wivenhoe Dam level rises very slightly from 68.57 to 68.58 over the 6 hour period.<br><br>Somerset Dam level rises from 100.28 to 100.47 over the 4 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 34mm;<br>o Somerset 53mm;<br>o Lockyer 18mm;<br>o Bremer 15mm.<br><br>• Forecast rainfall is 50mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 69.9 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.6 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | **Strategy W2**<br>**(Lake Level greater than 68.50, maximum release 3500 cumecs)**<br><br>• With lake levels rising at both dams consideration was given to transitioning the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.<br><br>• Model results showing rapid rises in water level in Somerset Dam provide justification to consider transitioning to Strategy W3 within the next 6 hours. |

| JANUARY 2011 FLOOD EVENT - PERIOD 9 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Sunday 09 Jan 2011 14:00<br><br>Completed Sunday 09 Jan 2011 19:00 | **Transition from Strategy W2 to Strategy W3**<br><br>• Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.<br><br>• No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded:<br><br>• Due to rainfall on the ground and the rapid lake level rises, a decision is made to transition to Strategy W3 at 19:00. | Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.<br><br>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 62mm;<br>o Somerset 106mm;<br>o Lockyer 22mm;<br>o Bremer 6mm.<br><br>• Forecast rainfall is 65mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 71.7 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 102.3 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | **Strategy W2**<br>**(Lake Level greater than 68.50, maximum release 3500 cumecs)**<br><br>• With lake levels continuing to rise at both dams the decision was made to transition the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.<br><br>• Decision is made to transition to Strategy W3 at 19:00. |

| JANUARY 2011 FLOOD EVENT - PERIOD 10 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Sunday 09 Jan 2011 19:00<br><br>Completed Monday 10 Jan 2011 01:00 | **Strategy W3**<br><br>• Council and Agency notifications commenced at 7:00pm.<br><br>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increases releases from Wivenhoe Dam.<br><br>• No change to gate settings over this period due to the potential danger to the public associated with inundating Fernvale Bridge from Wivenhoe Dam outflows prior to the bridge being closed to traffic. Councils also required some time to prepare for the isolation of rural communities and to undertake evacuations. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded. | Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.<br><br>Somerset Dam level rises from 101.43 to 102.51 over the 6 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 24mm;<br>o Somerset 38mm;<br>o Lockyer 15mm;<br>o Bremer 6mm.<br><br>• Forecast rainfall is 65mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 73.3 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.0 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | **Strategy W3**<br>**(Lake Level greater than 68.50, maximum release 4000 cumecs)**<br><br>• Consideration on protecting urban areas from inundation.<br><br>• Before releases are increased towards the limit of non-damaging floods at Moggill, Councils and other impacted agencies must be notified so that appropriate actions can be taken including any necessary evacuations and the closure of both the Mt Crosby Weir Bridge and Fernvale Bridge. The increased releases will result in the isolation of significant rural communities and result in the closure of both the Brisbane Valley Highway and the D'Aguilar Highway.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 11 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W3**<br>**Wivenhoe Directives #8 to #10.** | | | **Strategy W3**<br>**(Lake Level greater than 68.50, maximum release 4000 cumecs)** |
| Commenced Monday 10 Jan 2011 01:00<br><br>Completed Monday 10 Jan 2011 09:00 | • Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate or 0.5 metres of opening per hour.<br><br>• Wivenhoe discharge is increased from 1484 cumecs to 2030 cumecs. All rural bridges below the dam are flooded.<br><br>• Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 3500 cumecs. This was done following advice from the Brisbane City Council that 3500 cumecs at Moggill will submerge 322 properties and impact on 7000 properties.<br><br>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe. | Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.<br><br>Somerset Dam level rises from 102.51 to 103.08 over the 8 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 12mm;<br>o Somerset 30mm;<br>o Lockyer 12mm;<br>o Bremer 18mm.<br><br>• Forecast rainfall is 65mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 73.3 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.2 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | • Consideration on protecting urban areas from inundation.<br><br>• Due to advice received from the Brisbane City Council that the limit of non-damaging floods is a flow of 3500 cumecs at Moggill, an attempt is made to remain within this flow.<br><br>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 12 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Monday 10 Jan 2011 09:00<br><br>Completed Monday 10 Jan 2011 15:00 | **Strategy W3**<br><br>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2099 cumecs. All rural bridges below the dam are flooded.<br><br>• At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 cumecs was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 cumecs was set in accordance with the Manual.<br><br>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe. | Wivenhoe Dam level rises from 71.56 to 72.53 over the 6 hour period.<br><br>Somerset Dam level rises from 103.08 to 103.43 over the 6 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 34mm;<br>o Somerset 31mm;<br>o Lockyer 27mm;<br>o Bremer 30mm.<br><br>• Forecast rainfall is 75mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 73.7 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.7 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | **Strategy W3**<br>**(Lake Level greater than 68.50, maximum release 4000 cumecs)**<br><br>• Consideration on protecting urban areas from inundation.<br><br>• A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.<br><br>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 13 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W3**<br>**Wivenhoe Directive #11.** | | | **Strategy W3**<br>**(Lake Level greater than 68.50, maximum release 4000 cumecs)** |
| Commenced Monday 10 Jan 2011 15:00<br><br>Completed Monday 10 Jan 2011 20:00 | • Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate or 1.0 metres of opening per hour.<br><br>• Wivenhoe discharge is increased from 2099 cumecs to 2707 cumecs. All rural bridges below the dam are flooded.<br><br>• Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.<br><br>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe. | Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.<br><br>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 4mm;<br>o Somerset 8mm;<br>o Lockyer 5mm;<br>o Bremer 4mm.<br><br>• Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.<br><br>• Wivenhoe Lake level forecast to peak at 73.8 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.7 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | • Consideration on protecting urban areas from inundation.<br><br>• A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.<br><br>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 14 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W3** | | | **Strategy W3**<br>**(Lake Level greater than 68.50, maximum release 4000 cumecs)** |
| Commenced Monday 10 Jan 2011 20:00<br><br>Completed Tuesday 11 Jan 2011 04:00 | • Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.<br><br>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2752 cumecs. All rural bridges below the dam are flooded.<br><br>• Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the initial Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.<br><br>• Initial advice on a flash flood originating in Lockyer headwaters received at 20:00 and considerations undertaken during this period to develop a strategy to manage these potential flows.<br><br>• During this period the plotted dam levels drifted just above the Wivenhoe/Somerset Operations Target Line. This lead to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe. This decision is consistent with Strategy S2. | Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.<br><br>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period. | • Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.<br><br>• Catchment average rainfalls over this period were:<br>o Wivenhoe 44mm;<br>o Somerset 22mm;<br>o Lockyer 12mm;<br>o Bremer 14mm.<br><br>• Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.<br><br>• Wivenhoe Lake level forecast to peak at 74.00 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.5 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | • Consideration on protecting urban areas from inundation.<br><br>• The target was to maintain a flow of 4000 cumecs at Moggill.<br><br>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>• Model results show that a peak level in the dam close to 74.0 remains possible, but is appearing increasing unlikely.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 15 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Transition from Strategy W3 to Strategy W4**<br>**Wivenhoe Directive #12.**<br>**Somerset Directive #6.** | | | **Strategy W3**<br>**(Lake Level greater than 68.50, maximum release 4000 cumecs)** |
| Commenced Tuesday 11 Jan 2011 04:00<br><br>Completed Tuesday 11 Jan 2011 08:00 | ◦ The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.<br><br>◦ Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) is experienced in relatively small areas of the Wivenhoe catchment during this period. Much more words here). If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.<br><br>◦ No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2832 cumecs. All rural bridges below the dam are flooded.<br><br>◦ During this period sluice gate openings at Somerset Dam are reduced from 5 to 2 as the plotted dam levels had drifted just above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2. | Wivenhoe Dam level rises from 73.40 to 73.70 over the 4 hour period.<br><br>Somerset Dam level rises from 103.23 to 103.46 over the 4 hour period. | ◦ The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.<br><br>• Catchment average rainfalls over this period were:<br>o Wivenhoe 33mm;<br>o Wivenhoe Local 78mm;<br>o Somerset 46mm;<br>o Lockyer 54mm;<br>o Bremer 16mm.<br><br>• Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.<br><br>• Wivenhoe Lake level forecast to peak at 74.6 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.8 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | • Consideration on protecting urban areas from inundation.<br><br>• The target was to maintain a flow of 4000 cumecs at Moggill.<br><br>◦ This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>◦ Model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced over this period.<br><br>◦ At 08:00 a decision is made to transition to Strategy W4 and the Dam Safety Regulator (DERM) is advised of this decision. It is now apparent that significant urban damage resulting from releases from Wivenhoe Dam cannot be avoided. |

| JANUARY 2011 FLOOD EVENT - PERIOD 16 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced<br>Tuesday<br>11 Jan 2011<br>08:00<br><br>Completed<br>Tuesday<br>11 Jan 2011<br>13:00 | **Strategy W4**<br>**Wivenhoe Directive #12 to #14.**<br>**Somerset Directive #7.**<br><br>• Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) continues in relatively small areas of the Wivenhoe catchment during this period. Much more words here) ). If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.<br><br>• Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres of opening per hour.<br><br>• Wivenhoe discharge is increased from 2832 cumecs to 3992 cumecs. All rural bridges below the dam are flooded.<br><br>• During this period sluice gate openings at Somerset Dam are closed off as the plotted dam levels remain above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2. | Wivenhoe Dam level rises from 73.70 to 74.39 over the 5 hour period.<br><br>Somerset Dam level rises from 103.46 to 103.91 over the 5 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 27mm;<br>o Wivenhoe Local 85mm;<br>o Somerset 86mm;<br>o Lockyer 47mm;<br>o Bremer 55mm.<br><br>• Forecast rainfall is 100mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 105.0 (excluding forecast) ??.?? (including forecast).<br><br>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam. | **Strategy W4**<br>**(Lake Level predicted to exceed 74.00, no maximum release rate)**<br><br>• The target was to protect the structural safety of the dam.<br><br>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.<br><br>• The dam level continued to rise at 01:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received. |

| JANUARY 2011 FLOOD EVENT - PERIOD 17 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Tuesday 11 Jan 2011 13:00<br><br>Completed Tuesday 11 Jan 2011 19:00 | **Strategy W4**<br>**Wivenhoe Directive #12 to #14.**<br><br>• Extreme lake level rises in Wivenhoe Dam continue during this period and a severe weather warning for intense rainfall remains current.<br><br>• Gates opened continuously at Wivenhoe Dam for 6 hours in accordance with the standard gate opening sequence at an average rate of 4.5 metres of opening per hour.<br><br>• Wivenhoe discharge is increased from 3992 cumecs to 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.<br><br>• No releases are made from Somerset Dam in accordance with Strategy S2. | Wivenhoe Dam level rises from 74.39 to 74.97 over the 6 hour period.<br><br>Somerset Dam level rises from 103.91 to 104.57 over the 6 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 15mm;<br>o Wivenhoe Local 35mm;<br>o Somerset 40mm;<br>o Lockyer 38mm;<br>o Bremer 40mm.<br><br>• Forecast rainfall is 75mm in the next 24 hours (issued at 16:00; actual rain recorded after this time was minimal as shown below) and a severe weather warning for potential intense rainfall in the dam catchments remains current.<br><br>• Catchment average rainfalls for the 24 hour period commencing at 16:00 during this period were:<br>o Wivenhoe 8mm;<br>o Wivenhoe Local 13mm;<br>o Somerset 19mm;<br>o Lockyer 9mm;<br>o Bremer 8mm.<br><br>• Wivenhoe Lake level forecast to peak at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam. | **Strategy W4**<br>**(Lake Level predicted to exceed 74.00, no maximum release rate)**<br><br>• The target was to protect the structural safety of the dam.<br><br>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.<br><br>• The dam level continued to rise at during this period. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.<br><br>• The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011. |

| JANUARY 2011 FLOOD EVENT - PERIOD 18 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Tuesday 11 Jan 2011 19:00<br><br>Completed Tuesday 11 Jan 2011 21:00 | **Strategy W4**<br>**Wivenhoe Directive #15 to #24.**<br><br>• The lake level in Wivenhoe dam stabilizes and then falls slightly at 21:00. A severe weather warning for intense rainfall remains current, but it appears from the BOM radar that the rainfall may have dissipated. On this basis a decision to commence closing down the gates to reduce urban flood impacts is taken at 21:00. This decision is potentially in contravention with the minimum gate opening settings required under Strategy W4.<br><br>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.<br><br>• No releases are made from Somerset Dam in accordance with Strategy S2. | During this 2 hours period, the lake level in Wivenhoe Dam stabilizes at 74.97 and then falls slightly to 74.95 at 21:00.<br><br>Somerset Dam level rises from 104.45 to 104.78 over the 2 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 1mm;<br>o Somerset 1mm;<br>o Lockyer 1mm;<br>o Bremer 1mm.<br><br>• Forecast rainfall is 75mm in the next 24 hours and a severe weather warning for possible intense rainfall in the catchments remains current.<br><br>• Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).<br><br>• Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).<br><br>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam. | **Strategy W4**<br>**(Lake Level predicted to exceed 74.00, no maximum release rate)**<br><br>• The target was to protect the structural safety of the dam.<br><br>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.<br><br>• The dam level stabilized during this period and then fell slightly at 21:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.<br><br>• The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011. |

| JANUARY 2011 FLOOD EVENT - PERIOD 19 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Tuesday 11 Jan 2011 21:00<br><br>Completed Wednesday 12 Jan 2011 08:00 | **Strategy W4**<br>**Wivenhoe Directive #25 to #34.**<br><br>• During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level. These actions are taken to reduce urban flood impacts downstream. The severe weather warning for intense rainfall is cancelled at 22:00 and it appears from the BOM radar that the rainfall may have dissipated. The decision to close off the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.<br><br>• Gates closed continuously at Wivenhoe Dam for 11 hours in accordance with the standard gate closing sequence at an average rate of just over 3.6 metres of opening per hour.<br><br>• Wivenhoe discharge is decreased from 7464 cumecs to 2547 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.<br><br>• No releases are made from Somerset Dam in accordance with Strategy S2. | Wivenhoe Dam level falls from 74.97 to 74.78 over the 11 hour period.<br><br>Somerset Dam level rises from 104.78 to 105.11 over the 11 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 1mm<br>o Somerset 3mm;<br>o Lockyer 3m;<br>o Bremer 1m.<br><br>• Forecast rainfall is 75mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).<br><br>• Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).<br><br>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam. | **Strategy W4**<br>**(Lake Level predicted to exceed 74.00, no maximum release rate)**<br><br>• The target was to protect the structural safety of the dam.<br><br>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.<br><br>• During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level.<br><br>• It was calculated that reducing to a discharge of 2547 cumecs from Wivenhoe Dam will:<br>o Not increase the downstream flood peak;<br>o Not cause the water level in Wivenhoe Dam to rise and;<br>o Allow the dam to be drained back to FSL in 7 days in accordance with the Manual. |

| JANUARY 2011 FLOOD EVENT - PERIOD 20 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Wednesday 12 Jan 2011 08:00<br><br>Completed Thursday 13 Jan 2011 12:00 | **Transition from Strategy W4 to the Drain Down Phase Somerset Directives #8 to #9.**<br><br>• During this period releases from Wivenhoe Dam are kept constant. These actions are taken to reduce urban flood impacts downstream. The decision to maintain the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.<br><br>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2546 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane has not been avoided.<br><br>• Releases commenced from Somerset Dam during this period as the plotted dam levels fell below the Wivenhoe/Somerset Operations Target Line. These actions were undertaken in accordance with Strategy S2 and to allow the D'Aguilar Highway to be opened as soon as possible. Even though plotted dam levels later rose above the Wivenhoe/Somerset Operations Target Line during this period, releases from Somerset dam continued to allow the dam to be drained back to FSL in 7 days in accordance with the Manual. | Wivenhoe Dam level falls from 74.78 to 74.61 over the 28 hour period.<br><br>Somerset Dam level falls from 105.11 to 103.96 over the 28 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 2mm;<br>o Somerset 6mm;<br>o Lockyer 6mm;<br>o Bremer 6mm.<br><br>• Forecast rainfall is 10mm in the next 24 hours. | **Drain Down Phase (Stored floodwaters emptied from the dam in seven days)**<br><br>• During this period the strategy transitioned from Strategy W4, during which the target is to protect the structural safety of the dam, to the Drain Down Phase of the event.<br><br>• Once the Drain Down Phase commenced, the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included:<br><br>o Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;<br>o Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);<br>o Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;<br>o Achieving full supply levels in the dams at the conclusion of the event. |

| JANUARY 2011 FLOOD EVENT - PERIOD 21 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Thursday 13 Jan 2011 12:00<br><br>Completed Wednesday 19 Jan 2011 12:00 | **Drain Down Phase**<br>**Wivenhoe Directives #35 to #62**<br>**Somerset Directives #10 to #13.**<br><br>• During this period releases from Wivenhoe Dam are increased to as the peaks from the Lockyer and Bremer subside. Downstream impacts are controlled and and no time during this phase do downstream water levels rise except if impacted by tidal influences.<br><br>• During this period, stored flood water in Somerset Dam is drained into Wivenhoe Dam in accordance with the drain down target of seven days. Importance is placed on opening the D'Aguilar Highway as soon as possible. | Wivenhoe Dam level falls from 74.61 to 66.89 over the 6 day period.<br><br>Somerset Dam level falls from 103.96 to 99.00 over the 6 day period. | • Catchment average rainfalls over this six day period were:<br>o Wivenhoe 14mm;<br>o Somerset 7mm;<br>o Lockyer 7mm;<br>o Bremer 8mm. | **Drain Down Phase**<br><br>• During this period the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included:<br><br>o Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;<br>o Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);<br>o Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;<br>o Achieving full supply levels in the dams at the conclusion of the event. |

## Brooke Foxover

**From:** DutyEngineer [dutyseq[redacted]
**Sent:** Thursday, 27 January 2011 4:24 PM
**To:** John Tibaldi
**Subject:** Flood Event Summary - 02.doc
**Attachments:** @



**Attachments:**

Flood Event Summary - 02.doc (274 KB)

## SUMMARY OF JANUARY 2011 FLOOD EVENT

The following series of tables provides a detailed summary of the operation of Wivenhoe and Somerset Dams during the January 2011 Flood Event that impacted on Brisbane. Each table covers a period of the event during which one of the following occurred:

- There was a transition or change to the flood operation strategy used as defined by the Manual.
- There was a period of stability during which no gate operations from either Wivenhoe Dam or Somerset Dam were directed.
- There was a period of sustained gate operations (either opening of closing) at either Wivenhoe Dam or Somerset Dam.

Each table also provides a summary of both relevant background information and a summary of the information that was used in decision making during the period covered by the table. This information includes:

- Details of the time period covered by the table.
- Relevant background information from the period leading up to and during the time period covered by the table.
- Changes in dam levels during the period.
- Rainfall information (including forecast rainfall) and model results available during the period.
- The Strategy used and/or adopted during the period.

Further reports and appendices are available to explain in detail the derivation of the technical information presented in the tables. Much of the background detail in the reports is taken from the event log.

In summary, the event was extreme, with some relevant statistics that demonstrate this fact as follows:

- Catchment average rainfalls recorded for the catchment area above Wivenhoe Dam indicate rainfall intensities for the 72 hour and 120 hour periods to Tuesday 11 January 2011 at 19:00 had an annual exceedance probability of between 1 in 500 years and 1 in 1000 years.

- Point rainfalls experienced in the Wivenhoe Dam storage area experienced between 05:00 and 13:00 on Tuesday 11 January 2011 have been calculated to have an annual exceedance probability of between 1 in 500 years and 1 in 1000 years. Although this rainfall was not recorded at a single station, it is calculated to have occurred based on the extreme storage level rises experienced at Wivenhoe Dam during this period.

- The volume of total inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 40% more that the comparable volume of inflow calculated from the January 1974 event.

- The peak inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 50% more that the comparable peak inflow calculated from the January 1974 event

| JANUARY 2011 FLOOD EVENT - PERIOD 1 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W1A and Strategy S2** | | | **Strategy W1A and Strategy S2 (Lake Level greater than 67.25, maximum release 110 cumecs)** |
| Commenced Thursday 06 Jan 2011 07:42<br><br>Completed Friday 07 Jan 2011 02:00 | • No significant rainfall occurred in the 24 hours to 0900 on 5 January 2011.<br><br>• Catchment average rainfalls in the 24 hours to 0800 on 6 January 2011were:<br>o Wivenhoe 28mm;<br>o Somerset 21mm;<br>o Lockyer 23mm;<br>o Bremer 23mm.<br><br>• Event Mobilisation occurred at 7:42 on Thursday 6 January 2011, using Strategies W1A and S2.<br><br>• Once mobilisation occurs, 24/7 staffing of the Flood Operations Centre and dams continues until official de-mobilisation is announced. For this event, this occurred at 12:00 on Wednesday 19 January 2011.<br><br>• Duty Engineer called back early from annual Christmas holidays to assist with the management of the event. | Wivenhoe Dam level rises from 67.31 to 67.52 over the 18 hour period.<br><br>Somerset Dam level rises from 99.34 to 99.55 over the 18 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 29mm;<br>o Somerset 22mm;<br>o Lockyer 32mm;<br>o Bremer 32mm.<br><br>• Forecast rainfall is 25mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) 68.4 (including forecast).<br><br>• Somerset Lake level forecast to peak at 99.7 (excluding forecast) 100.0 (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 380 cumecs (excluding forecast) 490 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 490 cumecs (excluding forecast) 640 cumecs (including forecast).<br><br>• Lake level not expected to reach 67.50 (Strategy W1B) until 07 January 2011.<br><br>• Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows will not inundate Colleges Crossing for more than 24 hours. | • Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 cumecs.<br><br>• Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A.<br><br>• In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed. |

| JANUARY 2011 FLOOD EVENT - PERIOD 2 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W1B and Strategy S2** | | | **Strategy W1B and Strategy S2 (Lake Level greater than 67.50, maximum release 110 cumecs)** |
| Commenced Friday 07 Jan 2011 02:00<br><br>Completed Friday 07 Jan 2011 07:00 | • Transition from Strategy W1A to W1B due to the Wivenhoe Lake Level exceeding 67.50. | Wivenhoe Dam level rises from 67.52 to 67.68 over the 5 hour period.<br><br>Somerset Dam level rises from 99.55 to 99.60 over the 5 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 6mm;<br>o Somerset 10mm;<br>o Lockyer 2mm;<br>o Bremer 4mm.<br>• Forecast rainfall is 25mm in the next 24 hours.<br>• Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) 68.9 (including forecast).<br>• Somerset Lake level forecast to peak at 99.9 (excluding forecast) 100.3 (including forecast).<br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 470 cumecs (excluding forecast) 680 cumecs (including forecast).<br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 600 cumecs (excluding forecast) 1050 cumecs (including forecast).<br>• Lake level not expected to reach 67.75 (Strategy W1C) for at least 6 hours.<br>• Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge. | • Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 cumecs.<br>• Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.<br>• In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed. |

| JANUARY 2011 FLOOD EVENT - PERIOD 3 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W1C and Strategy S2** | | | **Strategy W1C and Strategy S2 (Lake Level greater than 67.75, maximum release 500 cumecs)** |
| Commenced Friday 07 Jan 2011 07:00<br><br>Completed Friday 07 Jan 2011 09:00 | • Transition from Strategy W1B to W1C due to Wivenhoe Lake Level exceeding 67.75. | Wivenhoe Dam level rises from 67.68 to 67.75 over the 2 hour period.<br><br>Somerset Dam level rises from 99.60 to 99.65 over the 2 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 6mm;<br>o Somerset 5mm;<br>o Lockyer 2mm;<br>o Bremer 1mm.<br>• Forecast rainfall is 25mm in the next 24 hours.<br>• Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) 68.9 (including forecast).<br>• Somerset Lake level forecast to peak at 99.9 (excluding forecast) 100.3 (including forecast).<br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 470 cumecs (excluding forecast) 680 cumecs (including forecast).<br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 600 cumecs (excluding forecast) 1050 cumecs (including forecast).<br>• Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge or Kholo Bridge. | • Endeavour to maintain Kholo Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 550 cumecs.<br>• Water held in Wivenhoe in an attempt to maintain Kholo Bridge trafficable in accordance with Strategy W1C.<br>• In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed. |

| JANUARY 2011 FLOOD EVENT - PERIOD 4 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W1E and Strategy S2** | | | **Strategy W1E and Strategy S2 (Lake Level greater than 68.25, maximum release 1900 cumecs)** |
| Commenced Friday 07 Jan 2011 09:00<br><br>Completed Friday 07 Jan 2011 15:00 | • Transition from Strategy W1C to W1E. Based on rainfall on the ground, it becomes apparent that all bridges apart from the Mt Crosby Weir Bridge and Fernvale Bridge will be flooded by combined Lockyer Creek flows and local Brisbane River inflows downstream of Wivenhoe Dam alone.<br><br>• All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Releases were delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another potentially extended period of isolation.<br><br>• Rainfall on the ground and rainfall forecasts did not suggest that the event was likely to approach the use of Strategy W4. | Wivenhoe Dam level rises from 67.75 to 68.03 over the 6 hour period.<br><br>Somerset Dam level rises from 99.65 to 99.94 over the 6 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 24mm;<br>o Somerset 30mm;<br>o Lockyer 14mm;<br>o Bremer 12mm.<br><br>• Forecast rainfall is 25mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.6 (excluding forecast) 69.1 (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.4 (excluding forecast) 100.8 (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 720 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 670 cumecs (excluding forecast) 1080 cumecs (including forecast).<br><br>• Due to the further rain experienced and observed stream rises, it has become apparent that inflows from Lockyer Creek into the Brisbane River combined with local Brisbane River inflows downstream of Wivenhoe Dam will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge. | • Endeavour to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.<br><br>• Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategy W1E.<br><br>• In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed. |

| JANUARY 2011 FLOOD EVENT - PERIOD 5 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Transition from Strategy W1E to Strategy W2; and Strategy S2 Wivenhoe Directives #1 to #4. Somerset Directives #1 to #3.** | | | **Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)** |
| Commenced Friday 07 Jan 2011 15:00<br><br>Completed Saturday 08 Jan 2011 14:00 | • Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate or 0.5 metres of opening per hour.<br><br>• At 14:00 on 08 January 2011, Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.<br><br>• Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2. | Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.<br><br>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 3mm;<br>o Somerset 5mm;<br>o Lockyer 1mm;<br>o Bremer 1mm.<br><br>• Forecast rainfall is 40mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.8 (excluding forecast) 69.1 (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.6 (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 940 cumecs (including forecast).<br><br>• Inflows from Lockyer Creek into the Brisbane River have been sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge. | • Consideration currently on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.<br><br>• Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2. |

| JANUARY 2011 FLOOD EVENT - PERIOD 6 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W2 and Strategy S2** | | | **Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)** |
| Commenced Saturday 08 Jan 2011 14:00<br><br>Completed Sunday 09 Jan 2011 01:00 | • Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.<br><br>• No change to gate settings over this period. Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded. | Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.<br><br>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 8mm;<br>o Somerset 16mm;<br>o Lockyer 3mm;<br>o Bremer 2mm.<br><br>• Forecast rainfall is 40mm in the next 24 hours.<br><br>o Wivenhoe Lake level forecast to peak at 69.2 (excluding forecast) 70.4 (including forecast).<br><br>o Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.8 (including forecast).<br><br>o Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).<br><br>o Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 940 cumecs (including forecast). | • With lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.<br><br>• With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe remaining relatively static, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a very short period. |

| JANUARY 2011 FLOOD EVENT - PERIOD 7 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Sunday 09 Jan 2011 01:00<br><br>Completed Sunday 09 Jan 2011 08:00 | **Strategy W2**<br>**Wivenhoe Directives #5 to #7.**<br><br>• Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.<br><br>• Wivenhoe discharge is increased from 1271 cumecs to 1367 cumecs.<br><br>• No change to Somerset Dam gate settings over this period.<br><br>• All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded. | Wivenhoe Dam level falls from 68.63 to 68.57 over the 7 hour period.<br><br>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 12mm;<br>o Somerset 36mm;<br>o Lockyer 1mm;<br>o Bremer 0mm.<br><br>• Forecast rainfall is 40mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.5 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | **Strategy W2**<br>**(Lake Level greater than 68.50, maximum release 3500 cumecs)**<br><br>• With lake levels falling at both dams consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.<br><br>• With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe Dam falling, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a very short period, particularly given the rainfall that occurred in the Somerset Dam catchment during this period. |

| JANUARY 2011 FLOOD EVENT - PERIOD 8 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Sunday 09 Jan 2011 08:00<br><br>Completed Sunday 09 Jan 2011 14:00 | **Strategy W2**<br>**Wivenhoe Directives #7.**<br>**Somerset Directives #4 to #5.**<br><br>• Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.<br><br>• Wivenhoe discharge is increased from 1367 cumecs to 1420 cumecs.<br><br>• Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.<br><br>• All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded. | Wivenhoe Dam level rises very slightly from 68.57 to 68.58 over the 6 hour period.<br><br>Somerset Dam level rises from 100.28 to 100.47 over the 4 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 34mm;<br>o Somerset 53mm;<br>o Lockyer 18mm;<br>o Bremer 15mm.<br><br>• Forecast rainfall is 50mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 69.9 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.6 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | **Strategy W2**<br>**(Lake Level greater than 68.50, maximum release 3500 cumecs)**<br><br>• With lake levels rising at both dams consideration was given to transitioning the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.<br><br>• Model results showing rapid rises in water level in Somerset Dam provide justification to consider transitioning to Strategy W3 within the next 6 hours. |

| JANUARY 2011 FLOOD EVENT - PERIOD 9 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Transition from Strategy W2 to Strategy W3** | | | **Strategy W2 (Lake Level greater than 68.50, maximum release 3500 cumecs)** |
| Commenced Sunday 09 Jan 2011 14:00<br><br>Completed Sunday 09 Jan 2011 19:00 | • Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.<br><br>• No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.<br><br>• Due to rainfall on the ground and the rapid lake level rises, a decision is made to transition to Strategy W3 at 19:00. | Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.<br><br>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 62mm;<br>o Somerset 106mm;<br>o Lockyer 22mm;<br>o Bremer 6mm.<br><br>• Forecast rainfall is 65mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 71.7 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 102.3 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | • With lake levels continuing to rise at both dams the decision was made to transition the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.<br><br>• Decision is made to transition to Strategy W3 at 19:00. |

| JANUARY 2011 FLOOD EVENT - PERIOD 10 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Sunday 09 Jan 2011 19:00<br><br>Completed Monday 10 Jan 2011 01:00 | **Strategy W3**<br><br>• Council and Agency notifications commenced at 7:00pm.<br><br>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increases releases from Wivenhoe Dam.<br><br>• No change to gate settings over this period due to the potential danger to the public associated with inundating Fernvale Bridge from Wivenhoe Dam outflows prior to the bridge being closed to traffic. Councils also required some time to prepare for the isolation of rural communities and to undertake evacuations. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded. | Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.<br><br>Somerset Dam level rises from 101.43 to 102.51 over the 6 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 24mm;<br>o Somerset 38mm;<br>o Lockyer 15mm;<br>o Bremer 6mm.<br><br>• Forecast rainfall is 65mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 73.3 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.0 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | **Strategy W3**<br>**(Lake Level greater than 68.50, maximum release 4000 cumecs)**<br><br>• Consideration on protecting urban areas from inundation.<br><br>• Before releases are increased towards the limit of non-damaging floods at Moggill, Councils and other impacted agencies must be notified so that appropriate actions can be taken including any necessary evacuations and the closure of both the Mt Crosby Weir Bridge and Fernvale Bridge. The increased releases will result in the isolation of significant rural communities and result in the closure of both the Brisbane Valley Highway and the D'Aguilar Highway.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 11 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W3**<br>**Wivenhoe Directives #8 to #10.** | | | **Strategy W3**<br>**(Lake Level greater than 68.50, maximum release 4000 cumecs)** |
| Commenced Monday 10 Jan 2011 01:00<br><br>Completed Monday 10 Jan 2011 09:00 | • Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate or 0.5 metres of opening per hour.<br><br>• Wivenhoe discharge is increased from 1484 cumecs to 2030 cumecs. All rural bridges below the dam are flooded.<br><br>• Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 3500 cumecs. This was done following advice from the Brisbane City Council that 3500 cumecs at Moggill will submerge 322 properties and impact on 7000 properties.<br><br>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe. | Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.<br><br>Somerset Dam level rises from 102.51 to 103.08 over the 8 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 12mm;<br>o Somerset 30mm;<br>o Lockyer 12mm;<br>o Bremer 18mm.<br><br>• Forecast rainfall is 65mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 73.3 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.2 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | • Consideration on protecting urban areas from inundation.<br><br>• Due to advice received from the Brisbane City Council that the limit of non-damaging floods is a flow of 3500 cumecs at Moggill, an attempt is made to remain within this flow.<br><br>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 12 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Monday 10 Jan 2011 09:00<br><br>Completed Monday 10 Jan 2011 15:00 | **Strategy W3**<br><br>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2099 cumecs. All rural bridges below the dam are flooded.<br><br>• At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 cumecs was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 cumecs was set in accordance with the Manual.<br><br>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe. | Wivenhoe Dam level rises from 71.56 to 72.53 over the 6 hour period.<br><br>Somerset Dam level rises from 103.08 to 103.43 over the 6 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 34mm;<br>o Somerset 31mm;<br>o Lockyer 27mm;<br>o Bremer 30mm.<br><br>• Forecast rainfall is 75mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 73.7 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.7 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | **Strategy W3**<br>**(Lake Level greater than 68.50, maximum release 4000 cumecs)**<br><br>• Consideration on protecting urban areas from inundation.<br><br>• A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.<br><br>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 13 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Monday 10 Jan 2011 15:00<br><br>Completed Monday 10 Jan 2011 20:00 | **Strategy W3**<br>**Wivenhoe Directive #11.**<br><br>• Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate or 1.0 metres of opening per hour.<br><br>• Wivenhoe discharge is increased from 2099 cumecs to 2707 cumecs. All rural bridges below the dam are flooded.<br><br>• Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.<br><br>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe. | Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.<br><br>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 4mm;<br>o Somerset 8mm;<br>o Lockyer 5mm;<br>o Bremer 4mm.<br><br>• Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.<br><br>• Wivenhoe Lake level forecast to peak at 73.8 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.7 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | **Strategy W3**<br>**(Lake Level greater than 68.50, maximum release 4000 cumecs)**<br><br>• Consideration on protecting urban areas from inundation.<br><br>• A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.<br><br>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 14 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Monday 10 Jan 2011 20:00<br><br>Completed Tuesday 11 Jan 2011 04:00 | **Strategy W3**<br><br>• Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.<br><br>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2752 cumecs. All rural bridges below the dam are flooded.<br><br>• Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the initial Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.<br><br>• Initial advice on a flash flood originating in Lockyer headwaters received at 20:00 and considerations undertaken during this period to develop a strategy to manage these potential flows.<br><br>• During this period the plotted dam levels drifted just above the Wivenhoe/Somerset Operations Target Line. This lead to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe. This decision is consistent with Strategy S2. | Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.<br><br>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period. | • Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.<br><br>• Catchment average rainfalls over this period were:<br>o Wivenhoe 44mm;<br>o Somerset 22mm;<br>o Lockyer 12mm;<br>o Bremer 14mm.<br><br>• Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.<br><br>• Wivenhoe Lake level forecast to peak at 74.00 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.5 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | **Strategy W3**<br>**(Lake Level greater than 68.50, maximum release 4000 cumecs)**<br><br>• Consideration on protecting urban areas from inundation.<br><br>• The target was to maintain a flow of 4000 cumecs at Moggill.<br><br>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>• Model results show that a peak level in the dam close to 74.0 remains possible, but is appearing increasing unlikely.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 15 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Transition from Strategy W3 to Strategy W4**<br>**Wivenhoe Directive #12.**<br>**Somerset Directive #6.** | | | **Strategy W3**<br>**(Lake Level greater than 68.50, maximum release 4000 cumecs)** |
| Commenced Tuesday 11 Jan 2011 04:00<br><br>Completed Tuesday 11 Jan 2011 08:00 | • The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.<br><br>• Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) is experienced in relatively small areas of the Wivenhoe catchment during this period. Much more words here). If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.<br><br>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2832 cumecs. All rural bridges below the dam are flooded.<br><br>• During this period sluice gate openings at Somerset Dam are reduced from 5 to 2 as the plotted dam levels had drifted just above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2. | Wivenhoe Dam level rises from 73.40 to 73.70 over the 4 hour period.<br><br>Somerset Dam level rises from 103.23 to 103.46 over the 4 hour period. | • The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.<br><br>• Catchment average rainfalls over this period were:<br>o Wivenhoe 33mm;<br>o Wivenhoe Local 78mm;<br>o Somerset 46mm;<br>o Lockyer 54mm;<br>o Bremer 16mm.<br><br>• Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.<br><br>• Wivenhoe Lake level forecast to peak at 74.6 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.8 (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | • Consideration on protecting urban areas from inundation.<br><br>• The target was to maintain a flow of 4000 cumecs at Moggill.<br><br>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>• Model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced over this period.<br><br>• At 08:00 a decision is made to transition to Strategy W4 and the Dam Safety Regulator (DERM) is advised of this decision. It is now apparent that significant urban damage resulting from releases from Wivenhoe Dam cannot be avoided.<br><br>• Note here about minimized response time because where the rainfall is falling, normally 24 hours, now only a few hours. |

| JANUARY 2011 FLOOD EVENT - PERIOD 16 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Tuesday 11 Jan 2011 08:00<br><br>Completed Tuesday 11 Jan 2011 13:00 | **Strategy W4**<br>**Wivenhoe Directive #12 to #14.**<br>**Somerset Directive #7.**<br><br>• Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) continues in relatively small areas of the Wivenhoe catchment during this period. Much more words here) ). If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.<br><br>• Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres of opening per hour.<br><br>• Wivenhoe discharge is increased from 2832 cumecs to 3992 cumecs. All rural bridges below the dam are flooded.<br><br>• During this period sluice gate openings at Somerset Dam are closed off as the plotted dam levels remain above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2. | Wivenhoe Dam level rises from 73.70 to 74.39 over the 5 hour period.<br><br>Somerset Dam level rises from 103.46 to 103.91 over the 5 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 27mm;<br>o Wivenhoe Local 85mm;<br>o Somerset 86mm;<br>o Lockyer 47mm;<br>o Bremer 55mm.<br><br>• Forecast rainfall is 100mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 105.0 (excluding forecast) ??.?? (including forecast).<br><br>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam. | **Strategy W4**<br>**(Lake Level predicted to exceed 74.00, no maximum release rate)**<br><br>• The target was to protect the structural safety of the dam.<br><br>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.<br><br>• The dam level continued to rise at 01:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received. |

| JANUARY 2011 FLOOD EVENT - PERIOD 17 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W4**<br>**Wivenhoe Directive #12 to #14.** | | | **Strategy W4**<br>**(Lake Level predicted to exceed 74.00, no maximum release rate)** |
| Commenced Tuesday 11 Jan 2011 13:00<br><br>Completed Tuesday 11 Jan 2011 19:00 | • Extreme lake level rises in Wivenhoe Dam continue during this period and a severe weather warning for intense rainfall remains current.<br><br>• Gates opened continuously at Wivenhoe Dam for 6 hours in accordance with the standard gate opening sequence at an average rate of 4.5 metres of opening per hour.<br><br>• Wivenhoe discharge is increased from 3992 cumecs to 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.<br><br>• No releases are made from Somerset Dam in accordance with Strategy S2. | Wivenhoe Dam level rises from 74.39 to 74.97 over the 6 hour period.<br><br>Somerset Dam level rises from 103.91 to 104.57 over the 6 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 15mm;<br>o Wivenhoe Local 35mm;<br>o Somerset 40mm;<br>o Lockyer 38mm;<br>o Bremer 40mm.<br><br>• Forecast rainfall is 75mm in the next 24 hours (issued at 16:00; actual rain recorded after this time was minimal as shown below) and a severe weather warning for potential intense rainfall in the dam catchments remains current.<br><br>• Catchment average rainfalls for the 24 hour period commencing at 16:00 during this period were:<br>o Wivenhoe 8mm;<br>o Wivenhoe Local 13mm;<br>o Somerset 19mm;<br>o Lockyer 9mm;<br>o Bremer 8mm.<br><br>• Wivenhoe Lake level forecast to peak at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam. | • The target was to protect the structural safety of the dam.<br><br>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.<br><br>• The dam level continued to rise at during this period. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.<br><br>• The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011. |

| JANUARY 2011 FLOOD EVENT - PERIOD 18 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Tuesday 11 Jan 2011 19:00<br><br>Completed Tuesday 11 Jan 2011 21:00 | **Strategy W4**<br>**Wivenhoe Directive #15 to #24.**<br><br>• The lake level in Wivenhoe dam stabilizes and then falls slightly at 21:00. A severe weather warning for intense rainfall remains current, but it appears from the BOM radar that the rainfall may have dissipated. On this basis a decision to commence closing down the gates to reduce urban flood impacts is taken at 21:00. This decision is potentially in contravention with the minimum gate opening settings required under Strategy W4.<br><br>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.<br><br>• No releases are made from Somerset Dam in accordance with Strategy S2. | During this 2 hours period, the lake level in Wivenhoe Dam stabilizes at 74.97 and then falls slightly to 74.95 at 21:00.<br><br>Somerset Dam level rises from 104.45 to 104.78 over the 2 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 1mm;<br>o Somerset 1mm;<br>o Lockyer 1mm;<br>o Bremer 1mm.<br><br>• Forecast rainfall is 75mm in the next 24 hours and a severe weather warning for possible intense rainfall in the catchments remains current.<br><br>• Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).<br><br>• Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).<br><br>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam. | **Strategy W4**<br>**(Lake Level predicted to exceed 74.00, no maximum release rate)**<br><br>• The target was to protect the structural safety of the dam.<br><br>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.<br><br>• The dam level stabilized during this period and then fell slightly at 21:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.<br><br>• The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011. |

| JANUARY 2011 FLOOD EVENT - PERIOD 19 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Tuesday 11 Jan 2011 21:00<br><br>Completed Wednesday 12 Jan 2011 08:00 | **Strategy W4**<br>**Wivenhoe Directive #25 to #34.**<br><br>• During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level. These actions are taken to reduce urban flood impacts downstream. The severe weather warning for intense rainfall is cancelled at 22:00 and it appears from the BOM radar that the rainfall may have dissipated. The decision to close off the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.<br><br>• Gates closed continuously at Wivenhoe Dam for 11 hours in accordance with the standard gate closing sequence at an average rate of just over 3.6 metres of opening per hour.<br><br>• Wivenhoe discharge is decreased from 7464 cumecs to 2547 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.<br><br>• No releases are made from Somerset Dam in accordance with Strategy S2. | Wivenhoe Dam level falls from 74.97 to 74.78 over the 11 hour period.<br><br>Somerset Dam level rises from 104.78 to 105.11 over the 11 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 1mm<br>o Somerset 3mm;<br>o Lockyer 3m;<br>o Bremer 1m.<br><br>• Forecast rainfall is 75mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).<br><br>• Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).<br><br>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations at Wivenhoe Dam. | **Strategy W4**<br>**(Lake Level predicted to exceed 74.00, no maximum release rate)**<br><br>• The target was to protect the structural safety of the dam.<br><br>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.<br><br>• During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level.<br><br>• It was calculated that reducing to a discharge of 2547 cumecs from Wivenhoe Dam will:<br>o Not increase the downstream flood peak;<br>o Not cause the water level in Wivenhoe Dam to rise and;<br>o Allow the dam to be drained back to FSL in 7 days in accordance with the Manual. |

| JANUARY 2011 FLOOD EVENT - PERIOD 20 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Wednesday 12 Jan 2011 08:00<br><br>Completed Thursday 13 Jan 2011 12:00 | **Transition from Strategy W4 to the Drain Down Phase**<br>**Somerset Directives #8 to #9.**<br><br>• During this period releases from Wivenhoe Dam are kept constant. These actions are taken to reduce urban flood impacts downstream. The decision to maintain the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.<br><br>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2546 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane has not been avoided.<br><br>• Releases commenced from Somerset Dam during this period as the plotted dam levels fell below the Wivenhoe/Somerset Operations Target Line. These actions were undertaken in accordance with Strategy S2 and to allow the D'Aguilar Highway to be opened as soon as possible. Even though plotted dam levels later rose above the Wivenhoe/Somerset Operations Target Line during this period, releases from Somerset dam continued to allow the dam to be drained back to FSL in 7 days in accordance with the Manual. | Wivenhoe Dam level falls from 74.78 to 74.61 over the 28 hour period.<br><br>Somerset Dam level falls from 105.11 to 103.96 over the 28 hour period. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 2mm;<br>o Somerset 6mm;<br>o Lockyer 6mm;<br>o Bremer 6mm.<br><br>• Forecast rainfall is 10mm in the next 24 hours. | **Drain Down Phase**<br>**(Stored floodwaters emptied from the dam in seven days)**<br><br>• During this period the strategy transitioned from Strategy W4, during which the target is to protect the structural safety of the dam, to the Drain Down Phase of the event.<br><br>• Once the Drain Down Phase commenced, the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included:<br><br>o Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;<br>o Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);<br>o Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;<br>o Achieving full supply levels in the dams at the conclusion of the event. |

| JANUARY 2011 FLOOD EVENT - PERIOD 21 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Thursday 13 Jan 2011 12:00<br><br>Completed Wednesday 19 Jan 2011 12:00 | **Drain Down Phase**<br>**Wivenhoe Directives #35 to #62**<br>**Somerset Directives #10 to #13.**<br><br>• During this period releases from Wivenhoe Dam are increased to as the peaks from the Lockyer and Bremer subside. Downstream impacts are controlled and and no time during this phase do downstream water levels rise except if impacted by tidal influences.<br><br>• During this period, stored flood water in Somerset Dam is drained into Wivenhoe Dam in accordance with the drain down target of seven days. Importance is placed on opening the D'Aguilar Highway as soon as possible. | Wivenhoe Dam level falls from 74.61 to 66.89 over the 6 day period.<br><br>Somerset Dam level falls from 103.96 to 99.00 over the 6 day period. | • Catchment average rainfalls over this six day period were:<br>o Wivenhoe 14mm;<br>o Somerset 7mm;<br>o Lockyer 7mm;<br>o Bremer 8mm. | **Drain Down Phase**<br><br>• During this period the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included:<br><br>o Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;<br>o Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);<br>o Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;<br>o Achieving full supply levels in the dams at the conclusion of the event. |

## Brooke Foxover

**From:** DutyEngineer [dutyse[redacted]
**Sent:** Friday, 28 January 2011 8:29 AM
**To:** John Tibaldi
**Subject:** Flood Event Summary - 02.doc
**Attachments:** @



**Attachments:**

Flood Event Summary - 02.doc (316 KB)

## SUMMARY OF JANUARY 2011 FLOOD EVENT

The following series of tables provides a detailed summary of the operation of Wivenhoe and Somerset Dams during the January 2011 Flood Event that impacted on Brisbane. Each table covers a period of the event during which one of the following occurred:

- There was a transition or change to the flood operation strategy used as defined by the Manual.
- There was a period of stability during which no gate operations from either Wivenhoe Dam or Somerset Dam were directed.
- There was a period of sustained gate operations (either opening of closing) at either Wivenhoe Dam or Somerset Dam.

Each table also provides a summary of both relevant background information and a summary of the information that was used in decision making during the period covered by the table. This information includes:

- Details of the time period covered by the table.
- Relevant background information from the period leading up to and during the time period covered by the table.
- Changes in dam levels during the period.
- Rainfall information (including forecast rainfall) and model results available during the period.
- The Strategy used and/or adopted during the period.

Further reports and appendices are available to explain in detail the derivation of the technical information presented in the tables. Much of the background detail in the reports is taken from the event log.

In summary, the event was extreme, with some relevant statistics that demonstrate this fact as follows:

- Catchment average rainfalls recorded for the catchment area above Wivenhoe Dam indicate rainfall intensities for the 72 hour and 120 hour periods to Tuesday 11 January 2011 at 19:00 had an annual exceedance probability of between 1 in 500 years and 1 in 1000 years.

- Point rainfalls experienced in the Wivenhoe Dam storage area experienced between 05:00 and 13:00 on Tuesday 11 January 2011 have been calculated to have an annual exceedance probability of between 1 in 500 years and 1 in 1000 years. Although this rainfall was not recorded at a single station, it is calculated to have occurred based on the extreme storage level rises experienced at Wivenhoe Dam during this period.

- The volume of total inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 40% more that the comparable volume of inflow calculated from the January 1974 event.

- The peak inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 50% more that the comparable peak inflow calculated from the January 1974 event

| JANUARY 2011 FLOOD EVENT - PERIOD 1 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W1A and Strategy S2** | | | **Strategy W1A and Strategy S2 (Lake Level greater than 67.25, maximum release 110 cumecs)** |
| Commenced Thursday 06 Jan 2011 07:42<br><br>Completed Friday 07 Jan 2011 02:00 | • No significant rainfall occurred in the 24 hours to 0900 on 5 January 2011.<br><br>• Catchment average rainfalls in the 24 hours to 0800 on 6 January 2011were:<br>o Wivenhoe 28mm;<br>o Somerset 21mm;<br>o Lockyer 23mm;<br>o Bremer 23mm.<br><br>• Event Mobilisation occurred at 7:42 on Thursday 6 January 2011, using Strategies W1A and S2.<br><br>• Once mobilisation occurs, 24/7 staffing of the Flood Operations Centre and dams continues until official de-mobilisation is announced. For this event, this occurred at 12:00 on Wednesday 19 January 2011.<br><br>• Duty Engineer called back early from annual Christmas holidays to assist with the management of the event. | Wivenhoe Dam level rises from 67.31 to 67.52 over the 18 hour period.<br><br>Somerset Dam level rises from 99.34 to 99.55 over the 18 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm;<br>Somerset 22mm;<br>Lockyer 32mm;<br>Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 29mm;<br>o Somerset 22mm;<br>o Lockyer 32mm;<br>o Bremer 32mm.<br><br>• Forecast rainfall is 25mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) 68.4 (including forecast).<br><br>• Somerset Lake level forecast to peak at 99.7 (excluding forecast) 100.0 (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 380 cumecs (excluding forecast) 490 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 490 cumecs (excluding forecast) 640 cumecs (including forecast). | • Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows will not inundate Colleges Crossing for more than 24 hours.<br><br>• Lake level not expected to reach 67.50 (Strategy W1B) until 07 January 2011.<br><br>• Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 cumecs.<br><br>• Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A.<br><br>• In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed. |

| JANUARY 2011 FLOOD EVENT - PERIOD 2 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W1B and Strategy S2** | | | **Strategy W1B and Strategy S2 (Lake Level greater than 67.50, maximum release 110 cumecs)** |
| Commenced Friday 07 Jan 2011 02:00<br><br>Completed Friday 07 Jan 2011 07:00 | • Transition from Strategy W1A to W1B due to the Wivenhoe Lake Level exceeding 67.50. | Wivenhoe Dam level rises from 67.52 to 67.68 over the 5 hour period.<br><br>Somerset Dam level rises from 99.55 to 99.60 over the 5 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 6mm;<br>o Somerset 10mm;<br>o Lockyer 2mm;<br>o Bremer 4mm.<br><br>• Forecast rainfall is 25mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) 68.9 (including forecast).<br><br>• Somerset Lake level forecast to peak at 99.9 (excluding forecast) 100.3 (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 470 cumecs (excluding forecast) 680 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 600 cumecs (excluding forecast) 1050 cumecs (including forecast). | • Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge.<br><br>• Lake level not expected to reach 67.75 (Strategy W1C) for at least 6 hours.<br><br>• Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 cumecs.<br><br>• Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.<br><br>• In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed. |

| JANUARY 2011 FLOOD EVENT - PERIOD 3 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W1C and Strategy S2** | | | **Strategy W1C and Strategy S2 (Lake Level greater than 67.75, maximum release 500 cumecs)** |
| Commenced Friday 07 Jan 2011 07:00<br><br>Completed Friday 07 Jan 2011 09:00 | • Transition from Strategy W1B to W1C due to Wivenhoe Lake Level exceeding 67.75. | Wivenhoe Dam level rises from 67.68 to 67.75 over the 2 hour period.<br><br>Somerset Dam level rises from 99.60 to 99.65 over the 2 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 6mm;<br>o Somerset 5mm;<br>o Lockyer 2mm;<br>o Bremer 1mm.<br><br>• Forecast rainfall is 25mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) 68.9 (including forecast).<br><br>• Somerset Lake level forecast to peak at 99.9 (excluding forecast) 100.3 (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 470 cumecs (excluding forecast) 680 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 600 cumecs (excluding forecast) 1050 cumecs (including forecast). | • Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge or Kholo Bridge.<br><br>• Endeavour to maintain Kholo Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 550 cumecs.<br><br>• Water held in Wivenhoe in an attempt to maintain Kholo Bridge trafficable in accordance with Strategy W1C.<br><br>• In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed. |

| JANUARY 2011 FLOOD EVENT - PERIOD 4 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W1E and Strategy S2** | | | **Strategy W1E and Strategy S2 (Lake Level greater than 68.25, maximum release 1900 cumecs)** |
| Commenced Friday 07 Jan 2011 09:00<br><br>Completed Friday 07 Jan 2011 15:00 | • Transition from Strategy W1C to W1E. Based on rainfall on the ground, it becomes apparent that all bridges apart from the Mt Crosby Weir Bridge and Fernvale Bridge will be flooded by combined Lockyer Creek flows and local Brisbane River inflows downstream of Wivenhoe Dam alone.<br><br>• All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Releases were delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another potentially extended period of isolation.<br><br>• Rainfall on the ground and rainfall forecasts did not suggest that the event was likely to approach the use of Strategy W4. | Wivenhoe Dam level rises from 67.75 to 68.03 over the 6 hour period.<br><br>Somerset Dam level rises from 99.65 to 99.94 over the 6 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 24mm;<br>o Somerset 30mm;<br>o Lockyer 14mm;<br>o Bremer 12mm.<br><br>• Forecast rainfall is 25mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.6 (excluding forecast) 69.1 (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.4 (excluding forecast) 100.8 (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 720 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 670 cumecs (excluding forecast) 1080 cumecs (including forecast). | • Due to the further rain experienced and observed stream rises, it has become apparent that inflows from Lockyer Creek into the Brisbane River combined with local Brisbane River inflows downstream of Wivenhoe Dam will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.<br><br>• Strategy is tp endeavour to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.<br><br>• Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategy W1E.<br><br>• In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed. |

| JANUARY 2011 FLOOD EVENT - PERIOD 5 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Transition from Strategy W1E to Strategy W2; and Strategy S2 Wivenhoe Directives #1 to #4. Somerset Directives #1 to #3.** | | | **Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)** |
| Commenced Friday 07 Jan 2011 15:00<br><br>Completed Saturday 08 Jan 2011 14:00 | • Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate or 0.5 metres of opening per hour.<br><br>• At 14:00 on 08 January 2011, Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.<br><br>• Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2. | Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.<br><br>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 3mm;<br>o Somerset 5mm;<br>o Lockyer 1mm;<br>o Bremer 1mm.<br><br>• Forecast rainfall is 40mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.8 (excluding forecast) 69.1 (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.6 (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 940 cumecs (including forecast). | • Inflows from Lockyer Creek into the Brisbane River have been sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.<br><br>• Consideration currently on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.<br><br>• Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2. |

| JANUARY 2011 FLOOD EVENT - PERIOD 6 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W2 and Strategy S2** | | | **Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)** |
| Commenced Saturday 08 Jan 2011 14:00<br><br>Completed Sunday 09 Jan 2011 01:00 | • Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.<br><br>• No change to gate settings over this period. Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded. | Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.<br><br>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 8mm;<br>o Somerset 16mm;<br>o Lockyer 3mm;<br>o Bremer 2mm.<br><br>• Forecast rainfall is 40mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.8 (excluding forecast) 68.9 (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.6 (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 850 cumecs (including forecast). | • With lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.<br><br>• With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe remaining relatively static, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a short period. |

| JANUARY 2011 FLOOD EVENT - PERIOD 7 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W2 and Strategy S2 Wivenhoe Directives #5 to #7.** | | | **Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)** |
| Commenced Sunday 09 Jan 2011 01:00<br><br>Completed Sunday 09 Jan 2011 08:00 | • Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.<br><br>• Wivenhoe discharge is increased from 1271 cumecs to 1367 cumecs.<br><br>• No change to Somerset Dam gate settings over this period.<br><br>• All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded. | Wivenhoe Dam level falls from 68.63 to 68.57 over the 7 hour period.<br><br>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 12mm;<br>o Somerset 36mm;<br>o Lockyer 1mm;<br>o Bremer 0mm.<br><br>• Forecast rainfall is 40mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.8 (excluding forecast) 69.2 (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.5 (excluding forecast) 101.0 (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 800 cumecs (including forecast). | • With lake levels falling at both dams consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This may be changed if further significant rainfall is experienced.<br><br>• With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe Dam falling, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a short period, particularly given the rainfall that occurred in the Somerset Dam catchment during this period. |

| JANUARY 2011 FLOOD EVENT - PERIOD 8 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Sunday 09 Jan 2011 08:00<br><br>Completed Sunday 09 Jan 2011 14:00 | **Strategy W2 and Strategy S2 Wivenhoe Directives #7. Somerset Directives #4 to #5.**<br><br>• Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.<br><br>• Wivenhoe discharge is increased from 1367 cumecs to 1420 cumecs.<br><br>• Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.<br><br>• All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded. | Wivenhoe Dam level rises very slightly from 68.57 to 68.58 over the 6 hour period.<br><br>Somerset Dam level rises from 100.28 to 100.47 over the 4 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 34mm;<br>o Somerset 53mm;<br>o Lockyer 18mm;<br>o Bremer 15mm.<br><br>• Forecast rainfall is 50mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 69.2 (excluding forecast) 70.4 (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.8 (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 800 cumecs (including forecast). | **Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)**<br><br>• With lake levels rising at both dams and heavy rain being experienced in the dam catchments, consideration was given to transitioning the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.<br><br>• With dam levels under the Wivenhoe/Somerset Operations Target Line at the end of this period, releases continued from Somerset Dam.<br><br>• Model results showing rapid rises in water level in Somerset Dam provide justification to consider transitioning to Strategy W3 within the next 6 hours. |

| JANUARY 2011 FLOOD EVENT - PERIOD 9 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Sunday 09 Jan 2011 14:00<br><br>Completed Sunday 09 Jan 2011 19:00 | **Transition from Strategy W2 to Strategy W3; and Strategy S2**<br><br>• Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.<br><br>• No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.<br><br>• Due to rainfall on the ground and the rapid lake level rises, a decision is made to transition to Strategy W3 at 19:00. | Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.<br><br>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 62mm;<br>o Somerset 106mm;<br>o Lockyer 22mm;<br>o Bremer 6mm.<br><br>• Forecast rainfall is 65mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 72.1 (excluding forecast) 73.9 (including forecast).<br><br>• Somerset Lake level forecast to peak at 102.3 (excluding forecast) 103.0 (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 1250 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 1970 cumecs (including forecast). | **Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)**<br><br>• With lake levels continuing to rise at both dams combined with heavy rain in the dam catchments during this period, the decision was made to transition the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.<br><br>• With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.<br><br>• Decision is made to transition to Strategy W3 at 19:00. |

| JANUARY 2011 FLOOD EVENT - PERIOD 10 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W3 and Strategy S2** | | | **Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)** |
| Commenced Sunday 09 Jan 2011 19:00<br><br>Completed Monday 10 Jan 2011 01:00 | • Council and Agency notifications commenced at 7:00pm.<br><br>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increases releases from Wivenhoe Dam.<br><br>• No change to gate settings over this period due to the potential danger to the public associated with inundating Fernvale Bridge from Wivenhoe Dam outflows prior to the bridge being closed to traffic. Councils also required some time to prepare for the isolation of rural communities and to undertake evacuations. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded. | Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.<br><br>Somerset Dam level rises from 101.43 to 102.51 over the 6 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 24mm;<br>o Somerset 38mm;<br>o Lockyer 15mm;<br>o Bremer 6mm.<br><br>• Forecast rainfall is 65mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 72.9 (excluding forecast) 74.7 (including forecast).<br><br>• Somerset Lake level forecast to peak at 102.9 (excluding forecast) 103.4 (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 620 cumecs (excluding forecast) 1290 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 840 cumecs (excluding forecast) 2030 cumecs (including forecast). | • Consideration on protecting urban areas from inundation.<br><br>• Before releases are increased towards the limit of non-damaging floods at Moggill, Councils and other impacted agencies are notified so that appropriate actions can be taken including any necessary evacuations and the closure of both the Mt Crosby Weir Bridge and Fernvale Bridge. The increased releases will result in the isolation of significant rural communities and result in the closure of both the Brisbane Valley Highway and the D'Aguilar Highway.<br><br>• With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 11 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W3 and Strategy S2 Wivenhoe Directives #8 to #10.** | | | **Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)** |
| Commenced Monday 10 Jan 2011 01:00<br><br>Completed Monday 10 Jan 2011 09:00 | • Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate or 0.5 metres of opening per hour.<br><br>• Wivenhoe discharge is increased from 1484 cumecs to 2030 cumecs. All rural bridges below the dam are flooded.<br><br>• Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 3500 cumecs. This was done following advice from the Brisbane City Council that 3500 cumecs at Moggill will submerge 322 properties and impact on 7000 properties.<br><br>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe. | Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.<br><br>Somerset Dam level rises from 102.51 to 103.08 over the 8 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 12mm;<br>o Somerset 30mm;<br>o Lockyer 12mm;<br>o Bremer 18mm.<br><br>• Forecast rainfall is 65mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 73.3 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.2 (excluding forecast) ??.?? (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | • Consideration on protecting urban areas from inundation.<br><br>• Due to advice received from the Brisbane City Council that the limit of non-damaging floods is a flow of 3500 cumecs at Moggill, an attempt is made to remain within this flow.<br><br>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>• With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 12 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W3 and Strategy S2** | | | **Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)** |
| Commenced Monday 10 Jan 2011 09:00<br><br>Completed Monday 10 Jan 2011 15:00 | • No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2099 cumecs. All rural bridges below the dam are flooded.<br><br>• At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 cumecs was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 cumecs was set in accordance with the Manual.<br><br>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe. | Wivenhoe Dam level rises from 71.56 to 72.53 over the 6 hour period.<br><br>Somerset Dam level rises from 103.08 to 103.43 over the 6 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 34mm;<br>o Somerset 31mm;<br>o Lockyer 27mm;<br>o Bremer 30mm.<br><br>• Forecast rainfall is 75mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 73.7 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.7 (excluding forecast) ??.?? (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | • Consideration on protecting urban areas from inundation.<br><br>• A decision is made at 15:00 to attempt to remain within a target flow of 4000 cumecs at Moggill.<br><br>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>• With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 13 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W3 and Strategy S2 Wivenhoe Directive #11.** | | | **Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)** |
| Commenced Monday 10 Jan 2011 15:00<br><br>Completed Monday 10 Jan 2011 20:00 | • Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate or 1.0 metres of opening per hour.<br><br>• Wivenhoe discharge is increased from 2099 cumecs to 2707 cumecs. All rural bridges below the dam are flooded.<br><br>• Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.<br><br>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe. | Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.<br><br>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 4mm;<br>o Somerset 8mm;<br>o Lockyer 5mm;<br>o Bremer 4mm.<br><br>• Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.<br><br>• Wivenhoe Lake level forecast to peak at 73.8 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.7 (excluding forecast) ??.?? (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | • Consideration on protecting urban areas from inundation.<br><br>• A decision is made at 15:00 to attempt to remain within a target maximum flow of 4000 cumecs at Moggill.<br><br>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>• With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 14 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W3 and Strategy S2** | | | **Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)** |
| Commenced Monday 10 Jan 2011 20:00<br><br>Completed Tuesday 11 Jan 2011 04:00 | • Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.<br><br>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2752 cumecs. All rural bridges below the dam are flooded.<br><br>• Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the initial Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.<br><br>• Initial advice on a flash flood originating in Lockyer headwaters received at 20:00 and considerations undertaken during this period to develop a strategy to manage these potential flows.<br><br>• During this period the plotted dam levels drifted just above the Wivenhoe/Somerset Operations Target Line. This lead to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe. This decision is consistent with Strategy S2. | Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.<br><br>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.<br><br>• Catchment average rainfalls over this period were:<br>o Wivenhoe 44mm;<br>o Somerset 22mm;<br>o Lockyer 12mm;<br>o Bremer 14mm.<br><br>• Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.<br><br>• Wivenhoe Lake level forecast to peak at 74.00 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.5 (excluding forecast) ??.?? (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | • Consideration on protecting urban areas from inundation, with the target being a maximum flow of 4000 cumecs at Moggill.<br><br>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>• Model results show that a peak level in the dam close to 74.0 remains possible, but is appearing increasing unlikely.<br><br>• With dam levels moving above the Wivenhoe/Somerset Operations Target Line during this period, a decision is made commence closing down releases from Somerset Dam to limit further rises in Wivenhoe.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 15 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Transition from Strategy W3 to Strategy W4; and Strategy S2 Wivenhoe Directive #12. Somerset Directive #6.** | | | **Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)** |
| Commenced Tuesday 11 Jan 2011 04:00<br><br>Completed Tuesday 11 Jan 2011 08:00 | • The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.<br><br>• Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) are experienced on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.<br><br>• Because the extreme rainfall is occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to protect the safety of the dam.<br><br>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2832 cumecs. All rural bridges below the dam are flooded.<br><br>• During this period sluice gate openings at Somerset Dam are reduced from 5 to 2 as the plotted dam levels had drifted just above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2. | Wivenhoe Dam level rises from 73.40 to 73.70 over the 4 hour period.<br><br>Somerset Dam level rises from 103.23 to 103.46 over the 4 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.<br><br>• Catchment average rainfalls over this period were:<br>o Wivenhoe 33mm;<br>o Wivenhoe Local 78mm;<br>o Somerset 46mm;<br>o Lockyer 54mm;<br>o Bremer 16mm.<br><br>• Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.<br><br>• Wivenhoe Lake level forecast to peak at 74.6 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.8 (excluding forecast) ??.?? (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | • Consideration on protecting urban areas from inundation, with the target being a maximum flow of 4000 cumecs at Moggill.<br><br>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>• Model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced over this period.<br><br>• With dam levels moving above the Wivenhoe/Somerset Operations Target Line during this period releases from Somerset Dam are closed down to limit further rises in Wivenhoe.<br><br>• At 08:00 a decision is made to transition to Strategy W4 and the Dam Safety Regulator (DERM) is advised of this decision. It is now apparent that significant urban damage resulting from releases from Wivenhoe Dam cannot be avoided.<br><br>• Note here about minimized response time because where the rainfall is falling, normally 24 hours, now only a few hours. |

| JANUARY 2011 FLOOD EVENT - PERIOD 16 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Tuesday 11 Jan 2011 08:00<br><br>Completed Tuesday 11 Jan 2011 13:00 | **Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14. Somerset Directive #7.**<br><br>• Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) continues on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.<br><br>• Because the extreme rainfall is occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to protect the safety of the dam.<br><br>• Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres of opening per hour.<br><br>• Wivenhoe discharge is increased from 2832 cumecs to 3992 cumecs. All rural bridges below the dam are flooded.<br><br>• During this period sluice gate openings at Somerset Dam are closed off as the plotted dam levels remain above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2. | Wivenhoe Dam level rises from 73.70 to 74.39 over the 5 hour period.<br><br>Somerset Dam level rises from 103.46 to 103.91 over the 5 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 27mm;<br>o Wivenhoe Local 85mm;<br>o Somerset 86mm;<br>o Lockyer 47mm;<br>o Bremer 55mm.<br><br>• Forecast rainfall is 100mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 105.0 (excluding forecast) ??.?? (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations. | **Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)**<br><br>• The target was to protect the structural safety of the dam.<br><br>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.<br><br>• The dam level continued to rise at 01:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.<br><br>• With dam levels above the Wivenhoe/Somerset Operations Target Line during this period releases from Somerset Dam are stopped to limit further rises in Wivenhoe. |

| JANUARY 2011 FLOOD EVENT - PERIOD 17 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14.** | | | **Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)** |
| Commenced Tuesday 11 Jan 2011 13:00<br><br>Completed Tuesday 11 Jan 2011 19:00 | • Extreme lake level rises in Wivenhoe Dam continue during this period and a severe weather warning for intense rainfall remains current.<br><br>• Gates opened continuously at Wivenhoe Dam for 6 hours in accordance with the standard gate opening sequence at an average rate of 4.5 metres of opening per hour.<br><br>• Wivenhoe discharge is increased from 3992 cumecs to 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.<br><br>• No releases are made from Somerset Dam in accordance with Strategy S2. | Wivenhoe Dam level rises from 74.39 to 74.97 over the 6 hour period.<br><br>Somerset Dam level rises from 103.91 to 104.57 over the 6 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 15mm;<br>o Wivenhoe Local 35mm;<br>o Somerset 40mm;<br>o Lockyer 38mm;<br>o Bremer 40mm.<br><br>• Forecast rainfall is 75mm in the next 24 hours (issued at 16:00; actual rain recorded after this time was minimal as shown below) and a severe weather warning for potential intense rainfall in the dam catchments remains current. Catchment average rainfalls for the 24 hour period commencing at 16:00 during this period were:<br>o Wivenhoe 8mm;<br>o Wivenhoe Local 13mm;<br>o Somerset 19mm;<br>o Lockyer 9mm;<br>o Bremer 8mm.<br><br>• Wivenhoe Lake level forecast to peak at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations. | • The target was to protect the structural safety of the dam.<br><br>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.<br><br>• The dam level continued to rise at during this period. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.<br><br>• With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.<br><br>• The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011. |

| JANUARY 2011 FLOOD EVENT - PERIOD 18 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W4 and Strategy S2 Wivenhoe Directive #15 to #24.** | | | **Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)** |
| Commenced Tuesday 11 Jan 2011 19:00<br><br>Completed Tuesday 11 Jan 2011 21:00 | • The lake level in Wivenhoe dam stabilizes and then falls slightly at 21:00. A severe weather warning for intense rainfall remains current, but it appears from the BOM radar that the rainfall may have dissipated. On this basis a decision to commence closing down the gates to reduce urban flood impacts is taken at 21:00. This decision is potentially in contravention with the minimum gate opening settings required under Strategy W4.<br><br>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.<br><br>• No releases are made from Somerset Dam in accordance with Strategy S2. | During this 2 hours period, the lake level in Wivenhoe Dam stabilizes at 74.97 and then falls slightly to 74.95 at 21:00.<br><br>Somerset Dam level rises from 104.45 to 104.78 over the 2 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 1mm;<br>o Somerset 1mm;<br>o Lockyer 1mm;<br>o Bremer 1mm.<br><br>• Forecast rainfall is 75mm in the next 24 hours and a severe weather warning for possible intense rainfall in the catchments remains current.<br><br>• Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).<br><br>• Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations. | • The target was to protect the structural safety of the dam.<br><br>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.<br><br>• The dam level stabilized during this period and then fell slightly at 21:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.<br><br>• With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.<br><br>• The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011. |

| JANUARY 2011 FLOOD EVENT - PERIOD 19 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Tuesday 11 Jan 2011 21:00<br><br>Completed Wednesday 12 Jan 2011 08:00 | **Strategy W4 and Strategy S2 Wivenhoe Directive #25 to #34.**<br><br>• During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level. These actions are taken to reduce urban flood impacts downstream. The severe weather warning for intense rainfall is cancelled at 22:00 and it appears from the BOM radar that the rainfall may have dissipated. The decision to close off the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.<br><br>• Gates closed continuously at Wivenhoe Dam for 11 hours in accordance with the standard gate closing sequence at an average rate of just over 3.6 metres of opening per hour.<br><br>• Wivenhoe discharge is decreased from 7464 cumecs to 2547 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.<br><br>• No releases are made from Somerset Dam in accordance with Strategy S2. | Wivenhoe Dam level falls from 74.97 to 74.78 over the 11 hour period.<br><br>Somerset Dam level rises from 104.78 to 105.11 over the 11 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 1mm<br>o Somerset 3mm;<br>o Lockyer 3m;<br>o Bremer 1m.<br><br>• Forecast rainfall is 75mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).<br><br>• Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations. | **Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)**<br><br>• The target was to protect the structural safety of the dam.<br><br>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.<br><br>• During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level.<br><br>• It was calculated that reducing to a discharge of 2547 cumecs from Wivenhoe Dam will:<br>o Not increase the downstream flood peak;<br>o Not cause the water level in Wivenhoe Dam to rise and;<br>o Allow the dam to be drained back to FSL in 7 days in accordance with the Manual.<br><br>• With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.. |

| JANUARY 2011 FLOOD EVENT - PERIOD 20 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Wednesday 12 Jan 2011 08:00<br><br>Completed Thursday 13 Jan 2011 12:00 | **Transition from Strategy W4 to the Drain Down Phase**<br>**Somerset Directives #8 to #9.**<br><br>• During this period releases from Wivenhoe Dam are kept constant. These actions are taken to reduce urban flood impacts downstream. The decision to maintain the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.<br><br>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2546 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane has not been avoided.<br><br>• Releases commenced from Somerset Dam during this period as the plotted dam levels fell below the Wivenhoe/Somerset Operations Target Line. These actions were undertaken in accordance with Strategy S2 and to allow the D'Aguilar Highway to be opened as soon as possible. Even though plotted dam levels later rose above the Wivenhoe/Somerset Operations Target Line during this period, releases from Somerset dam continued to allow the dam to be drained back to FSL in 7 days in accordance with the Manual. | Wivenhoe Dam level falls from 74.78 to 74.61 over the 28 hour period.<br><br>Somerset Dam level falls from 105.11 to 103.96 over the 28 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm;<br>Somerset 22mm;<br>Lockyer 32mm;<br>Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 2mm;<br>o Somerset 6mm;<br>o Lockyer 6mm;<br>o Bremer 6mm.<br><br>• Forecast rainfall is 10mm in the next 24 hours. | **Drain Down Phase**<br>**(Stored floodwaters emptied from the dam in seven days)**<br><br>• During this period the strategy transitioned from Strategy W4, during which the target is to protect the structural safety of the dam, to the Drain Down Phase of the event.<br><br>• Once the Drain Down Phase commenced, the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included:<br><br>o Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;<br>o Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);<br>o Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;<br>o Achieving full supply levels in the dams at the conclusion of the event. |

| JANUARY 2011 FLOOD EVENT - PERIOD 21 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Thursday 13 Jan 2011 12:00<br><br>Completed Wednesday 19 Jan 2011 12:00 | **Drain Down Phase**<br>**Wivenhoe Directives #35 to #62**<br>**Somerset Directives #10 to #13.**<br><br>• During this period releases from Wivenhoe Dam are increased to as the peaks from the Lockyer and Bremer subside. Downstream impacts are controlled and and no time during this phase do downstream water levels rise except if impacted by tidal influences.<br><br>• During this period, stored flood water in Somerset Dam is drained into Wivenhoe Dam in accordance with the drain down target of seven days. Importance is placed on opening the D'Aguilar Highway as soon as possible. | Wivenhoe Dam level falls from 74.61 to 66.89 over the 6 day period.<br><br>Somerset Dam level falls from 103.96 to 99.00 over the 6 day period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm;<br>Somerset 22mm;<br>Lockyer 32mm;<br>Bremer 32mm. | • Catchment average rainfalls over this six day period were:<br>o Wivenhoe 14mm;<br>o Somerset 7mm;<br>o Lockyer 7mm;<br>o Bremer 8mm. | **Drain Down Phase**<br><br>• During this period the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included:<br><br>o Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;<br>o Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);<br>o Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;<br>o Achieving full supply levels in the dams at the conclusion of the event. |

## Brooke Foxover

**From:** DutyEngineer [dutyseq[redacted]
**Sent:** Friday, 28 January 2011 12:17 PM
**To:** John Tibaldi
**Subject:** Event Mobilisation and Staffing - 02.doc
**Attachments:** @

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**Attachments:**

Event Mobilisation and Staffing - 02.doc (177 KB)

## 2. EVENT MOBILISATION AND STAFFING

### 2.1 Catchment Conditions at Event Commencement

In the 25 days leading up to the current event, three flood events impacting on Wivenhoe and Somerset dams were experienced, with flood releases being made from Wivenhoe Dam on all but five of those days. The total outflow from these events was around 700,000ML. The details of these events are as follows:

| EVENT | EVENT START DATE | EVENT END DATE | VOLUME RELEASED (ML) |
|---|---|---|---|
| 1 | 13/12/2010 | 16/12/2010 | 70,000 |
| 2 | 17/12/2010 | 24/12/2010 | 150,000 |
| 3 | 26/12/2010 | 02/01/2010 | 470,000 |

During these events, requests were received from Councils and residents either isolated or adversely impacted by bridge closures downstream of the dam to curtail releases as soon and as quickly as possible. This was a significant issue at the time due to the bridge closures that had occurred over the traditional Christmas/New Year holiday period, including the bridges closures on Christmas Day and New Year's Day.

The 2 January 2011 end date of the flood event prior to the event considered by this report (commenced on 6 January 2011), meant that any significant drain down of Wivenhoe and Somerset dams prior to the onset of this event was not possible without both major bridge inundation downstream of the dam and without exceeding minor flood levels in the lower Brisbane River. These actions could also not be justified by the Manual, particularly as Section 8.3 states the following in relation to Wivenhoe Dam:

> **" The spillway gates are not to be opened for flood control purposes prior to the reservoir level exceeding EL 67.25."**

Additionally, a flood event had been experienced in October 2010 that had resulted in a release of 750,000ML from Wivenhoe Dam. Accordingly drain down of the Dams below the dam full supply levels prior to the start of the first December event would also not have been possible without significant bridge inundation and without exceeding minor flood levels in the lower Brisbane River. Again, these actions could not be justified by the Manual, particularly when considering Section 8.3.

Due to the rainfall that had occurred in the dam catchments throughout December, the catchment conditions at the commencement of the event were close to saturated. The catchment was highly responsive, with Initial Losses estimated to be in the order of ??mm and continuing losses estimated to be in the order of ??mm/hour. The API at the commencement of the event was calculated at ??.

## 2.2 Event Mobilisation

No significant rainfall occurred in the 24 hours to 0900 on 5 January 2011, however in the 24 hours to 0800 on 6 January 2011, catchment average rainfalls totals were:

- Wivenhoe 28mm;
- Somerset 21mm;
- Lockyer 23mm;
- Bremer 23mm.

This rainfall was sufficient to trigger event mobilisation, and this occurred at 7:42 on Thursday 6 January 2011, using Strategies W1A and S2. Based on the rainfall occurring at that time and subsequent Model runs, the Wivenhoe Lake level was forecast to peak at EL 68.3m (excluding forecast) and EL 68.4m (including forecast); and the Somerset Lake level was forecast to peak at EL 99.7m (excluding forecast) EL 100.0m (including forecast).

Once mobilisation occurred the following actions were undertaken:

- Commencement of 24/7 staffing of the Flood Operations Centre by at least one Duty Flood Operations Engineer and at least one trained Technical Assistant (minimum two persons).
- Commencement of 24/7staffing of the dams by at least two trained dam operators.
- The one absent Flood Operations Engineer was called back early from annual Christmas holidays to assist with the management of the event.

Staffing of both the Flood Operations Centre and the dams continued on this basis until event de-mobilisation occurred at 12:00 on Wednesday 19 January 2011. During critical periods all four Flood Operations Engineers were present in the Flood Operations Centre and actively involved in flood event decision making processes. These Engineers generally lived in the Flood Operations Centre building during the critical 96 hours of the event as did a number of the trained technical assistants.

## 2.3 Flood Centre Staffing

Staffing of the Flood Operations Centre over the duration of the event was undertaken in accordance with the tables shown below. These tables are in accordance with the confirmed Event Roster, but do not reflect exactly the Flood Event Sign-On Sheets. This is because staff occasionally did not officially sign in and out when undertaking duties in the Centre, particularly those staff who were living in the building during the event and assisted in event management when not asleep or eating meals. Additionally, when staff entered the Centre during critical periods, the priority was with assisting in event management rather than administrative activities. However, this aspect of Flood Event administration requires some attention in future events and in future the presence of all staff in the Flood Operations Centre during an event will be accurately recorded.

| SHIFT START TIME | SHIFT FINISH TIME | DUTY ENGINEER/S | NOTES |
|---|---|---|---|
| Thu 06/01/2011 07:00 | Thu 06/01/2011 19:00 | Terry Malone | |
| Thu 06/01/2011 19:00 | Fri 07/01/2011 07:00 | Rob Ayre | |
| Fri 07/01/2011 07:00 | Fri 07/01/2011 19:00 | Terry Malone | |
| Fri 07/01/2011 19:00 | Sat 08/01/2011 07:00 | John Ruffini | |
| Sat 08/01/2011 07:00 | Sat 08/01/2011 19:00 | Rob Ayre | |
| Sat 08/01/2011 19:00 | Sun 09/01/2011 07:00 | John Tibaldi | |
| Sun 09/01/2011 07:00 | Sun 09/01/2011 19:00 | Terry Malone | A meeting of all four Duty Engineers was held at 15:30 to discuss strategy and the developing situation. |
| Sun 09/01/2011 19:00 | Mon 10/01/2011 07:00 | John Ruffini<br>Rob Ayre | Terry Malone assisted until 22:00 on 09/01/2011. |
| Mon 10/01/2011 07:00 | Mon 10/01/2011 19:00 | Terry Malone<br>John Tibaldi | Duty Engineer handovers at either end of this shift were composed of discussions involving all four Duty Engineers to discuss strategy and the developing situation. |
| Mon 10/01/2011 19:00 | Tue 11/01/2011 07:00 | John Ruffini<br>Rob Ayre | Duty Engineer handovers at either end of this shift were composed of discussions involving all four Duty Engineers to discuss strategy and the developing situation. |
| Tue 11/01/2011 07:00 | Tue 11/01/2011 19:00 | Terry Malone<br>John Tibaldi | Rob Ayre and John Ruffini assisted from 13:00 on 11/01/2011. |
| Tue 11/01/2011 19:00 | Wed 12/01/2011 07:00 | John Ruffini<br>Rob Ayre | John Tibaldi and Terry Malone assisted until 23:00 on 09/01/2011. |
| Wed 12/01/2011 07:00 | Wed 12/01/2011 19:00 | Terry Malone<br>John Tibaldi | Duty Engineer handovers at either end of this shift were composed of discussions involving all four Duty Engineers to discuss strategy. |
| Wed 12/01/2011 19:00 | Thu 13/01/2011 07:00 | John Ruffini<br>Rob Ayre | |
| Thu 13/01/2011 07:00 | Thu 13/01/2011 19:00 | Terry Malone<br>John Tibaldi | |
| Thu 13/01/2011 19:00 | Fri 14/01/2011 07:00 | Rob Ayre | |
| Fri 14/01/2011 07:00 | Fri 14/01/2011 19:00 | Terry Malone | |
| Fri 14/01/2011 19:00 | Sat 15/01/2011 07:00 | John Tibaldi | |
| Sat 15/01/2011 07:00 | Sat 15/01/2011 19:00 | Terry Malone | |
| Sat 15/01/2011 19:00 | Sun 16/01/2011 07:00 | John Ruffini | |

| | | | |
|---|---|---|---|
| Sun 16/01/2011 07:00 | Sun 16/01/2011 19:00 | Rob Ayre | |
| Sun 16/01/2011 19:00 | Mon 17/01/2011 07:00 | John Tibaldi | |
| Mon 17/01/2011 07:00 | Mon 17/01/2011 19:00 | John Ruffini | |
| Mon 17/01/2011 19:00 | Tue 18/01/2011 07:00 | Terry Malone | |
| Tue 18/01/2011 07:00 | Tue 18/01/2011 19:00 | Rob Ayre | |
| Tue 18/01/2011 19:00 | Wed 19/01/2011 07:00 | John Tibaldi | |
| Wed 19/01/2011 07:00 | Wed 19/01/2011 14:00 | Terry Malone | |

| SHIFT START TIME | SHIFT FINISH TIME | TECHNICAL ASSISTANTS | NOTES |
|---|---|---|---|
| Thu 06/01/2011 07:00 | Thu 06/01/2011 19:00 | Mark Tan | |
| Thu 06/01/2011 19:00 | Fri 07/01/2011 07:00 | Neville Ablitt | |
| Fri 07/01/2011 07:00 | Fri 07/01/2011 19:00 | Louw Van Blerk | |
| Fri 07/01/2011 19:00 | Sat 08/01/2011 07:00 | Mark Tan | |
| Sat 08/01/2011 07:00 | Sat 08/01/2011 19:00 | Al Navruk | |
| Sat 08/01/2011 19:00 | Sun 09/01/2011 07:00 | Kim Hang | |
| Sun 09/01/2011 07:00 | Sun 09/01/2011 19:00 | Neville Ablitt | |
| Sun 09/01/2011 19:00 | Mon 10/01/2011 07:00 | Bill Stephens | |
| Mon 10/01/2011 07:00 | Mon 10/01/2011 19:00 | Louw Van Blerk | |
| Mon 10/01/2011 19:00 | Tue 11/01/2011 07:00 | John West | |
| Tue 11/01/2011 07:00 | Tue 11/01/2011 19:00 | David Pokarier<br>Kim Hang | John West assisted as needed as he was living in the building during this period. |
| Tue 11/01/2011 19:00 | Wed 12/01/2011 07:00 | Al Navruk<br>John West | |
| Wed 12/01/2011 07:00 | Wed 12/01/2011 19:00 | Neville Ablitt<br>Kim Hang | John West assisted as needed as he was living in the building during this period. |
| Wed 12/01/2011 19:00 | Thu 13/01/2011 07:00 | Mark Tan | |
| Thu 13/01/2011 07:00 | Thu 13/01/2011 19:00 | John West | |
| Thu 13/01/2011 19:00 | Fri 14/01/2011 07:00 | David Pokarier | |
| Fri 14/01/2011 07:00 | Fri 14/01/2011 19:00 | Neville Ablitt | |

| | | | |
|---|---|---|---|
| Fri 14/01/2011 19:00 | Sat 15/01/2011 07:00 | Kim Hang | |
| Sat 15/01/2011 07:00 | Sat 15/01/2011 19:00 | Al Navruk | |
| Sat 15/01/2011 19:00 | Sun 16/01/2011 07:00 | David Pokarier | |
| Sun 16/01/2011 07:00 | Sun 16/01/2011 19:00 | Bill Stephens | |
| Sun 16/01/2011 19:00 | Mon 17/01/2011 07:00 | Mark Tan | |
| Mon 17/01/2011 07:00 | Mon 17/01/2011 19:00 | Louw Van Blerk | |
| Mon 17/01/2011 19:00 | Tue 18/01/2011 07:00 | John West | |
| Tue 18/01/2011 07:00 | Tue 18/01/2011 19:00 | Ken Price | |
| Tue 18/01/2011 19:00 | Wed 19/01/2011 07:00 | Neville Ablitt | |
| Wed 19/01/2011 07:00 | Wed 19/01/2011 14:00 | Kim Hang | |

| SHIFT START TIME | SHIFT FINISH TIME | WIVENHOE DAM OPERATORS | SOMERSET DAM OPERATORS |
|---|---|---|---|
| Thu 06/01/2011 07:00 | Thu 06/01/2011 19:00 | Matthew O'Reilly<br>Darren Varley | Agg Dagan<br>Adam Weller |
| Thu 06/01/2011 19:00 | Fri 07/01/2011 07:00 | Doug Grigg<br>Mark Granzien | Graham Francis<br>Col Gillam |
| Fri 07/01/2011 07:00 | Fri 07/01/2011 19:00 | Matthew O'Reilly<br>Darren Varley | Agg Dagan<br>Adam Weller |
| Fri 07/01/2011 19:00 | Sat 08/01/2011 07:00 | Doug Grigg<br>Mark Granzien | Graham Francis<br>Dave Hesse |
| Sat 08/01/2011 07:00 | Sat 08/01/2011 19:00 | Matthew O'Reilly<br>Russell Titmarsh | Agg Dagan<br>Brent Billington |
| Sat 08/01/2011 19:00 | Sun 09/01/2011 07:00 | Doug Grigg<br>Graham Keegan | Graham Francis<br>Ray Ballinger |
| Sun 09/01/2011 07:00 | Sun 09/01/2011 19:00 | Matthew O'Reilly<br>Russell Titmarsh | Agg Dagan<br>Adam Weller |
| Sun 09/01/2011 19:00 | Mon 10/01/2011 07:00 | Doug Grigg<br>Graham Keegan | Graham Francis<br>Ray Ballinger |
| Mon 10/01/2011 07:00 | Mon 10/01/2011 19:00 | Matthew O'Reilly<br>Russell Titmarsh | Agg Dagan<br>Adam Weller |
| Mon 10/01/2011 19:00 | Tue 11/01/2011 07:00 | Doug Grigg<br>Graham Keegan | Graham Francis<br>Ray Ballinger |
| Tue 11/01/2011 07:00 | Tue 11/01/2011 19:00 | Matthew O'Reilly<br>Russell Titmarsh<br>Doug Grigg from 14:00 | Agg Dagan<br>Adam Weller |
| Tue 11/01/2011 19:00 | Wed 12/01/2011 07:00 | Doug Grigg<br>Mark Granzien | Graham Francis<br>Ray Ballinger |
| Wed 12/01/2011 07:00 | Wed 12/01/2011 19:00 | Matthew O'Reilly<br>Russell Titmarsh | Agg Dagan<br>Adam Weller |
| Wed 12/01/2011 19:00 | Thu 13/01/2011 07:00 | Doug Grigg<br>Mark Granzien | Graham Francis<br>Ray Ballinger |
| Thu 13/01/2011 07:00 | Thu 13/01/2011 19:00 | Matthew O'Reilly<br>Russell Titmarsh | Agg Dagan<br>Adam Weller |
| Thu 13/01/2011 19:00 | Fri 14/01/2011 07:00 | Doug Grigg<br>Mark Granzien | Graham Francis<br>Ray Ballinger |

| | | | |
|---|---|---|---|
| Fri 14/01/2011 07:00 | Fri 14/01/2011 19:00 | Matthew O'Reilly<br>Darren Varley | Agg Dagan<br>Adam Weller |
| Fri 14/01/2011 19:00 | Sat 15/01/2011 07:00 | Doug Grigg<br>Col Gillam | Graham Francis<br>Ray Ballinger |
| Sat 15/01/2011 07:00 | Sat 15/01/2011 19:00 | Matthew O'Reilly<br>Darren Varley | Agg Dagan<br>Adam Weller |
| Sat 15/01/2011 19:00 | Sun 16/01/2011 07:00 | Doug Grigg<br>Col Gillam | Graham Francis<br>Ray Ballinger |
| Sun 16/01/2011 07:00 | Sun 16/01/2011 19:00 | Matthew O'Reilly<br>Darren Varley | Agg Dagan<br>Adam Weller |
| Sun 16/01/2011 19:00 | Mon 17/01/2011 07:00 | Doug Grigg<br>Col Gillam | Graham Francis<br>Ray Ballinger |
| Mon 17/01/2011 07:00 | Mon 17/01/2011 19:00 | Matthew O'Reilly<br>Mark Granzien | Drain Down Complete. |
| Mon 17/01/2011 19:00 | Tue 18/01/2011 07:00 | Doug Grigg<br>Col Gillam | Drain Down Complete. |
| Tue 18/01/2011 07:00 | Tue 18/01/2011 19:00 | Matthew O'Reilly<br>Mark Granzien | Drain Down Complete. |
| Tue 18/01/2011 19:00 | Wed 19/01/2011 07:00 | Doug Grigg<br>Col Gillam | Drain Down Complete. |
| Wed 19/01/2011 07:00 | Wed 19/01/2011 14:00 | Matthew O'Reilly<br>Graham Keegan | Drain Down Complete. |

## 2.4 Qualifications of Staff on Duty

### Duty Engineers

The four duty engineers approved by the Chief Executive to direct the operations of Wivenhoe and Somerset Dams during flood events are:

Robert Ayre
Terrence Malone
John Ruffini
John Tibaldi

These engineers all hold a current Certificate of Registration as a Registered Professional Engineer of Queensland and hold tertiary degrees in engineering. All engineers have demonstrated to the Chief Executive that they have:

(1) Knowledge of design principles related to the structural, geotechnical and hydraulic design of large dams, and

(2) At least a total of five years of suitable experience and demonstrated expertise in at least two of the following areas:

- Investigation, design or construction of major dams;
- Operation and maintenance of major dams;
- Hydrology with particular reference to flooding, estimation of extreme storms, water management or meteorology;
- Applied hydrology with particular reference to flood forecasting and/or flood forecasting systems.

Robert Ayre, Terrence Malone and John Ruffini are recognised as three of the most experienced and expert engineers available in relation to their knowledge of Brisbane River Flood Hydrology. John Tibaldi is probably the most experienced engineer in Queensland in relation to knowledge of the operation and maintenance of gated dams.

## TECHNICAL ASSISTANTS

The nine technical assistants that assisted in the Flood Operations Centre during the event were:

Neville Ablitt
Kim Hang
Al Navruk
David Pokarier
Ken Price
Bill Stephens
Mark Tan
Louw Van Blerk
John West

All of these assistants have been trained in Flood Operations Centre duties.

## DAM OPERATORS

The thirteen dam operators that operated Wivenhoe and Somerset dams during the event were:

Ray Ballinger
Agg Dagan
Brent Billington
Graham Francis
Col Gillam
Mark Granzien
Doug Grigg
Dave Hesse
Graham Keegan
Matthew O'Reilly
Darren Varley
Russell Titmarsh
Adam Weller

All of these assistants have been trained in Flood Operations Centre duties.

## Brooke Foxover

**From:** DutyEngineer [dutyse[redacted]
**Sent:** Friday, 28 January 2011 3:41 PM
**To:** John Tibaldi
**Subject:** Flood Event Summary - 03.doc
**Attachments:** @

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Flood Event Summary - 03.doc (322 KB)

## SUMMARY OF JANUARY 2011 FLOOD EVENT

The following series of tables provides a detailed summary of the operation of Wivenhoe and Somerset Dams during the January 2011 Flood Event that impacted on Brisbane. Each table covers a period of the event during which one of the following occurred:

- There was a transition or change to the flood operation strategy used as defined by the Manual.
- There was a period of stability during which no gate operations from either Wivenhoe Dam or Somerset Dam were directed.
- There was a period of sustained gate operations (either opening of closing) at either Wivenhoe Dam or Somerset Dam.

Each table also provides a summary of both relevant background information and a summary of the information that was used in decision making during the period covered by the table. This information includes:

- Details of the time period covered by the table.
- Relevant background information from the period leading up to and during the time period covered by the table.
- Changes in dam levels during the period.
- Rainfall information (including forecast rainfall) and model results available during the period.
- The Strategy used and/or adopted during the period.

Further reports and appendices are available to explain in detail the derivation of the technical information presented in the tables. Much of the background detail in the reports is taken from the event log.

In summary, the event was extreme, with some relevant statistics that demonstrate this fact as follows:

- Catchment average rainfalls recorded for the catchment area above Wivenhoe Dam indicate rainfall intensities for the 72 hour and 120 hour periods to Tuesday 11 January 2011 at 19:00 had an annual exceedance probability of between 1 in 500 years and 1 in 1000 years.

- Point rainfalls experienced in the Wivenhoe Dam storage area experienced between 05:00 and 13:00 on Tuesday 11 January 2011 have been calculated to have an annual exceedance probability of between 1 in 500 years and 1 in 1000 years. Although this rainfall was not recorded at a single station, it is calculated to have occurred based on the extreme storage level rises experienced at Wivenhoe Dam during this period.

- The volume of total inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 40% more that the comparable volume of inflow calculated from the January 1974 event.

- The peak inflow into Wivenhoe Dam experienced during this event has been calculated to be in the order of 50% more that the comparable peak inflow calculated from the January 1974 event.

| JANUARY 2011 FLOOD EVENT - PERIOD 1 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W1A and Strategy S2** | | | **Strategy W1A and Strategy S2 (Lake Level greater than 67.25, maximum release 110 cumecs)** |
| Commenced Thursday 06 Jan 2011 07:42<br><br>Completed Friday 07 Jan 2011 02:00 | • No significant rainfall occurred in the 24 hours to 0900 on 5 January 2011.<br><br>• Catchment average rainfalls in the 24 hours to 0800 on 6 January 2011were:<br>o Wivenhoe 25mm;<br>o Somerset 21mm;<br>o Lockyer 23mm;<br>o Bremer 23mm.<br><br>• Event Mobilisation occurred at 7:42 on Thursday 6 January 2011, using Strategies W1A and S2.<br><br>• Once mobilisation occurs, 24/7 staffing of the Flood Operations Centre and dams continues until official de-mobilisation is announced. For this event, this occurred at 12:00 on Wednesday 19 January 2011.<br><br>• Duty Engineer called back early from annual Christmas holidays to assist with the management of the event. | Wivenhoe Dam level rises from 67.31 to 67.52 over the 18 hour period.<br><br>Somerset Dam level rises from 99.34 to 99.55 over the 18 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 53mm; Somerset 44mm; Lockyer 53mm; Bremer 54mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 28mm;<br>o Somerset 23mm;<br>o Lockyer 30mm;<br>o Bremer 31mm.<br><br>• Forecast rainfall is 25mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.2 (excluding forecast) 68.4 (including forecast).<br><br>• Somerset Lake level forecast to peak at 99.7 (excluding forecast) 99.9 (including forecast).<br><br>• Total dam inflow volume forecast is 224,000ML (excluding forecast) 287,000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 470 cumecs (excluding forecast) 560 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 590 cumecs (excluding forecast) 750 cumecs (including forecast). | • Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 400 cumecs, but these flows will not inundate Colleges Crossing for more than 24 hours.<br><br>• Lake level not expected to reach 67.50 (Strategy W1B) until 07 January 2011. Lake level unlikely to exceed 68.5.<br><br>• Endeavour to maintain College's Crossing trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 cumecs.<br><br>• Water held in Wivenhoe in an attempt to maintain College's Crossing trafficable in accordance with Strategy W1A.<br><br>• In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed. |

| JANUARY 2011 FLOOD EVENT - PERIOD 2 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W1B and Strategy S2** | | | **Strategy W1B and Strategy S2 (Lake Level greater than 67.50, maximum release 110 cumecs)** |
| Commenced Friday 07 Jan 2011 02:00<br><br>Completed Friday 07 Jan 2011 07:00 | • Transition from Strategy W1A to W1B due to the Wivenhoe Lake Level exceeding 67.50. | Wivenhoe Dam level rises from 67.52 to 67.68 over the 5 hour period.<br><br>Somerset Dam level rises from 99.55 to 99.60 over the 5 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 58mm; Somerset 54mm; Lockyer 55mm; Bremer 58mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 5mm;<br>o Somerset 10mm;<br>o Lockyer 2mm;<br>o Bremer 4mm.<br><br>• Forecast rainfall is 25mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) 68.7 (including forecast).<br><br>• Somerset Lake level forecast to peak at 99.8 (excluding forecast) 100.2 (including forecast).<br><br>• Total dam inflow volume forecast is 236,000ML (excluding forecast) 370,000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 480 cumecs (excluding forecast) 680 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 600 cumecs (excluding forecast) 1040 cumecs (including forecast). | • Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge.<br><br>• Lake level not expected to reach 67.75 (Strategy W1C) for at least 6 hours. Lake level may not exceed 68.5.<br><br>• Endeavour to maintain Burtons Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 cumecs.<br><br>• Water held in Wivenhoe in an attempt to maintain Burtons Bridge trafficable in accordance with Strategy W1B.<br><br>• In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed. |

| JANUARY 2011 FLOOD EVENT - PERIOD 3 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W1C and Strategy S2** | | | **Strategy W1C and Strategy S2 (Lake Level greater than 67.75, maximum release 500 cumecs)** |
| Commenced Friday 07 Jan 2011 07:00<br><br>Completed Friday 07 Jan 2011 09:00 | • Transition from Strategy W1B to W1C due to Wivenhoe Lake Level exceeding 67.75. | Wivenhoe Dam level rises from 67.68 to 67.75 over the 2 hour period.<br><br>Somerset Dam level rises from 99.60 to 99.65 over the 2 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 64mm; Somerset 60mm; Lockyer 57mm; Bremer 60mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 6mm;<br>o Somerset 5mm;<br>o Lockyer 2mm;<br>o Bremer 1mm.<br><br>• Forecast rainfall is 25mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.3 (excluding forecast) 68.7 (including forecast).<br><br>• Somerset Lake level forecast to peak at 99.8 (excluding forecast) 100.2 (including forecast).<br><br>• Total dam inflow volume forecast is 236,000ML (excluding forecast) 370,000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 480 cumecs (excluding forecast) 680 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 600 cumecs (excluding forecast) 1040 cumecs (including forecast). | • Peak inflows into the Brisbane River from Lockyer are estimated to be in the order of 500 cumecs, but these flows may not be sufficient to inundate Burtons Bridge or Kholo Bridge.<br><br>• Endeavour to maintain Kholo Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 550 cumecs.<br><br>• Lake level may not exceed 68.5.<br><br>• Water held in Wivenhoe in an attempt to maintain Kholo Bridge trafficable in accordance with Strategy W1C.<br><br>• In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed. |

| JANUARY 2011 FLOOD EVENT - PERIOD 4 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Transition from Strategy W1 to W2; and Strategy S2** | | | **Strategy W1E and Strategy S2 (Lake Level greater than 68.25, maximum release 1900 cumecs)** |
| Commenced Friday 07 Jan 2011 09:00<br><br>Completed Friday 07 Jan 2011 15:00 | • Transition from Strategy W1 to W2 once it becomes apparent that the Wivenhoe Dam level is likely to exceed 68.5.<br><br>• Additionally, based on observed stream flows it becomes clear that all bridges apart from the Mt Crosby Weir Bridge and Fernvale Bridge will be flooded by combined Lockyer Creek flows and local Brisbane River inflows downstream of Wivenhoe Dam.<br><br>• All impacted Councils are notified of situation and that releases are to be commenced from Wivenhoe Dam. Releases were delayed until 15:00 to allow bridges to be closed and arrangements to be made to cater for rural community isolation. The impacted rural communities had been isolated over the Christmas period and time was needed for suitable arrangements to be made to allow these communities to be prepared for another potentially extended period of isolation.<br><br>• Rainfall on the ground and rainfall forecasts did not suggest that the event was likely to approach the use of Strategy W4. | Wivenhoe Dam level rises from 67.75 to 68.03 over the 6 hour period.<br><br>Somerset Dam level rises from 99.65 to 99.94 over the 6 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 89mm; Somerset 90mm; Lockyer 71mm; Bremer 71mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 24mm;<br>o Somerset 30mm;<br>o Lockyer 14mm;<br>o Bremer 12mm.<br><br>• Forecast rainfall is 25mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.4 (excluding forecast) 68.9 (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.3 (excluding forecast) 100.6 (including forecast).<br><br>• Total dam inflow volume forecast is 346,000ML (excluding forecast) 484,000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 710 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 670 cumecs (excluding forecast) 1060 cumecs (including forecast). | • Due to the further rain and observed stream rises, it has become apparent that flows from Lockyer Creek into the Brisbane River combined with local Brisbane River inflows downstream of Wivenhoe will be sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.<br><br>• Transition from Strategy W1 to W2 once it becomes apparent that the Wivenhoe Dam level is likely to exceed 68.5.<br><br>• Initial consideration on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This emphasis will change if further significant rainfall is experienced.<br><br>• Releases from Wivenhoe Dam managed in an attempt to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable in accordance with Strategy W1E.<br><br>• In accordance with Strategy S2, the crest gates at Somerset Dam were raised to enable uncontrolled discharge and the low level regulators and sluices at Somerset Dam were kept closed. |

| JANUARY 2011 FLOOD EVENT - PERIOD 5 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Friday 07 Jan 2011 15:00<br><br>Completed Saturday 08 Jan 2011 14:00 | **Strategy W2 and Strategy S2 Wivenhoe Directives #1 to #4. Somerset Directives #1 to #3.**<br><br>• Gates opened continuously at Wivenhoe Dam for 23 hours in accordance with the standard gate opening sequence at a rate or 0.5 metres of opening per hour.<br><br>• At 14:00 on 08 January 2011, Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.<br><br>• Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2. | Wivenhoe Dam level rises from 68.03 to 68.61 over the 23 hour period.<br><br>Somerset Dam level rises from 99.94 to 100.44 over the 23 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 92mm; Somerset 95mm; Lockyer 72mm; Bremer 72mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 3mm;<br>o Somerset 5mm;<br>o Lockyer 1mm;<br>o Bremer 1mm.<br><br>• Forecast rainfall is 40mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) 69.1 (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.6 (including forecast).<br><br>• Total dam inflow volume forecast is 420,000ML (excluding forecast) 662,000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 950 cumecs (including forecast). | **Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)**<br><br>• Inflows from Lockyer Creek into the Brisbane River have been sufficient to inundate all bridges downstream of the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge.<br><br>• Consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This emphasis will change if further significant rainfall is experienced.<br><br>• Due to rainfall on the ground, it was apparent that the Somerset Dam level would significantly exceed 100.45. Accordingly two sluice gates were opened during this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2. |

| JANUARY 2011 FLOOD EVENT - PERIOD 6 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W2 and Strategy S2** | | | **Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)** |
| Commenced Saturday 08 Jan 2011 14:00<br><br>Completed Sunday 09 Jan 2011 01:00 | • Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.<br><br>• No change to gate settings over this period. Wivenhoe discharge is 1271 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded. | Wivenhoe Dam level rises very slightly from 68.61 to 68.63 over the 13 hour period.<br><br>Somerset Dam level falls from 100.44 to 100.32 over the 13 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 100mm; Somerset 111mm; Lockyer 75mm; Bremer 75mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 8mm;<br>o Somerset 16mm;<br>o Lockyer 3mm;<br>o Bremer 2mm.<br><br>• Forecast rainfall is 40mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.8 (excluding forecast) 68.9 (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.5 (excluding forecast) 100.6 (including forecast).<br><br>• Total dam inflow volume forecast is 457,000ML (excluding forecast) 697,000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 850 cumecs (including forecast). | • With lake levels rising slightly (Wivenhoe) and falling (Somerset) consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This emphasis will change if further significant rainfall is experienced.<br><br>• With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe remaining relatively static, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a short period. |

| JANUARY 2011 FLOOD EVENT - PERIOD 7 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W2 and Strategy S2 Wivenhoe Directives #5 to #7.** | | | **Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)** |
| Commenced Sunday 09 Jan 2011 01:00<br><br>Completed Sunday 09 Jan 2011 08:00 | • Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.<br><br>• Wivenhoe discharge is increased from 1271 cumecs to 1367 cumecs.<br><br>• No change to Somerset Dam gate settings over this period.<br><br>• All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded. | Wivenhoe Dam level falls from 68.63 to 68.57 over the 7 hour period.<br><br>Somerset Dam level falls from 100.32 to 100.28 over the 7 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 112mm; Somerset 146mm; Lockyer 76mm; Bremer 75mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 12mm;<br>o Somerset 36mm;<br>o Lockyer 1mm;<br>o Bremer 0mm.<br><br>• Forecast rainfall is 40mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 68.7 (excluding forecast) 69.3 (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.5 (excluding forecast) 101.0 (including forecast).<br><br>• Total dam inflow volume forecast is 569,000ML (excluding forecast) 813,000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 530 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 800 cumecs (including forecast). | • With lake levels falling at both dams consideration remains on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs. This emphasis will change if further significant rainfall is experienced.<br><br>• With the Somerset Lake Dam Level still expected to exceed 100.45 and the level in Wivenhoe Dam falling, releases from Somerset Dam continued. In any event, closing of the sluices would have resulted in dam levels quickly moving under the Wivenhoe/Somerset Operations Target Line requiring sluice re-opening within a short period, particularly given the rainfall that occurred in the Somerset Dam catchment during this period.<br><br>• Write about sit rep at 11:00am see Terry's note based on three day outlook. |

| JANUARY 2011 FLOOD EVENT - PERIOD 8 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Sunday 09 Jan 2011 08:00<br><br>Completed Sunday 09 Jan 2011 14:00 | **Strategy W2 and Strategy S2 Wivenhoe Directives #7. Somerset Directives #4 to #5.**<br><br>• Releases increased marginally from Wivenhoe Dam to account for the passing of the Lockyer peak while maintaining Mt Crosby Weir Bridge and Fernvale Bridge trafficable.<br><br>• Wivenhoe discharge is increased from 1367 cumecs to 1420 cumecs.<br><br>• Somerset Dam sluice gates opened progressively over this period to allow dam levels to move towards the Wivenhoe/Somerset Operations Target Line in accordance with Strategy S2.<br><br>• All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded. | Wivenhoe Dam level rises very slightly from 68.57 to 68.58 over the 6 hour period.<br><br>Somerset Dam level rises from 100.28 to 100.47 over the 4 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 146mm; Somerset 199mm; Lockyer 94mm; Bremer 90mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 34mm;<br>o Somerset 53mm;<br>o Lockyer 18mm;<br>o Bremer 15mm.<br><br>• Forecast rainfall is 50mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 70.0 (excluding forecast) 71.3 (including forecast).<br><br>• Somerset Lake level forecast to peak at 100.7 (excluding forecast) 101.1 (including forecast).<br><br>• Total dam inflow volume forecast is 804,000ML (excluding forecast) 1,109,000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 690 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 1230 cumecs (including forecast). | **Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)**<br><br>• With lake levels rising at both dams and heavy rain being experienced in the dam catchments, consideration was given to transitioning the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.<br><br>• With dam levels under the Wivenhoe/Somerset Operations Target Line at the end of this period, releases continued from Somerset Dam.<br><br>• Model results showing rapid rises in water level in the Dams provide justification to consider transitioning to Strategy W3 within the next 6 hours. |

| JANUARY 2011 FLOOD EVENT - PERIOD 9 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Transition from Strategy W2 to Strategy W3; and Strategy S2** | | | **Strategy W2 and Strategy S2 (Lake Level greater than 68.50, maximum release 3500 cumecs)** |
| Commenced Sunday 09 Jan 2011 14:00<br><br>Completed Sunday 09 Jan 2011 19:00 | • Releases maintained from both dams to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable.<br><br>• No change to gate settings over this period. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded.<br><br>• Due to rainfall on the ground and the rapid lake level rises, a decision is made to transition to Strategy W3 at 19:00. | Wivenhoe Dam level rises from 68.58 to 68.97 over the 5 hour period.<br><br>Somerset Dam level rises from 100.47 to 101.43 over the 5 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 208mm; Somerset 305mm; Lockyer 116mm; Bremer 96mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 62mm;<br>o Somerset 106mm;<br>o Lockyer 22mm;<br>o Bremer 6mm.<br><br>• Forecast rainfall is 65mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 72.1 (excluding forecast) 73.9 (including forecast).<br><br>• Somerset Lake level forecast to peak at 102.3 (excluding forecast) 103.0 (including forecast).<br><br>• Total dam inflow volume forecast is 1,273,000ML (excluding forecast) 1,712,000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 530 cumecs (excluding forecast) 1250 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 800 cumecs (excluding forecast) 1970 cumecs (including forecast). | • With lake levels continuing to rise at both dams combined with heavy rain in the dam catchments during this period, the decision was made to transition the primary consideration from minimizing disruption to downstream rural life to protecting urban areas from inundation. However during this period, consideration remained on minimizing disruption to downstream rural life and endeavoring to maintain Mt Crosby Weir Bridge and Fernvale Bridge trafficable by limiting combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 cumecs.<br><br>• With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.<br><br>• Decision is made to transition to Strategy W3 at 19:00. |

| JANUARY 2011 FLOOD EVENT - PERIOD 10 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W3 and Strategy S2** | | | **Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)** |
| Commenced Sunday 09 Jan 2011 19:00<br><br>Completed Monday 10 Jan 2011 01:00 | • Council and Agency notifications commenced at 7:00pm.<br><br>• Fernvale Bridge closed by police at around 01:00 on 10 January 2011 and once this was confirmed a directive was issued to increases releases from Wivenhoe Dam.<br><br>• No change to gate settings over this period due to the potential danger to the public associated with inundating Fernvale Bridge from Wivenhoe Dam outflows prior to the bridge being closed to traffic. Councils also required some time to prepare for the isolation of rural communities and to undertake evacuations. Wivenhoe discharge is 1436 cumecs. All rural bridges below the dam with the exception of the Mt Crosby Weir Bridge and Fernvale Bridge are flooded. | Wivenhoe Dam level rises from 68.97 to 69.97 over the 6 hour period.<br><br>Somerset Dam level rises from 101.43 to 102.51 over the 6 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 232mm; Somerset 343mm; Lockyer 131mm; Bremer 102mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 24mm;<br>o Somerset 38mm;<br>o Lockyer 14mm;<br>o Bremer 6mm.<br><br>• Forecast rainfall is 65mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 72.9 (excluding forecast) 74.7 (including forecast).<br><br>• Somerset Lake level forecast to peak at 102.9 (excluding forecast) 103.4 (including forecast).<br><br>• Total dam inflow volume forecast is 1,468,000ML (excluding forecast) 1,922,000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 620 cumecs (excluding forecast) 1290 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 840 cumecs (excluding forecast) 2030 cumecs (including forecast). | • Consideration on protecting urban areas from inundation.<br><br>• Before releases are increased towards the limit of non-damaging floods at Moggill, Councils and other impacted agencies are notified so that appropriate actions can be taken including any necessary evacuations and the closure of both the Mt Crosby Weir Bridge and Fernvale Bridge. The increased releases will result in the isolation of significant rural communities and result in the closure of both the Brisbane Valley Highway and the D'Aguilar Highway.<br><br>• With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 11 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W3 and Strategy S2 Wivenhoe Directives #8 to #10.** | | | **Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)** |
| Commenced Monday 10 Jan 2011 01:00<br><br>Completed Monday 10 Jan 2011 09:00 | • Gates opened continuously at Wivenhoe Dam for 8 hours in accordance with the standard gate opening sequence at a rate or 0.5 metres of opening per hour.<br><br>• Wivenhoe discharge is increased from 1484 cumecs to 2030 cumecs. All rural bridges below the dam are flooded.<br><br>• Further gate openings at Wivenhoe Dam were paused at 09:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 3500 cumecs. This was done following advice from the Brisbane City Council that 3500 cumecs at Moggill will submerge 322 properties and impact on 7000 properties.<br><br>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe. | Wivenhoe Dam level rises from 69.97 to 71.56 over the 8 hour period.<br><br>Somerset Dam level rises from 102.51 to 103.08 over the 8 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 244mm; Somerset 373mm; Lockyer 143mm; Bremer 120mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 12mm;<br>o Somerset 30mm;<br>o Lockyer 12mm;<br>o Bremer 18mm.<br><br>• Forecast rainfall is 65mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 72.9 (excluding forecast) 74.5 (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.1 (excluding forecast) 103.5 (including forecast).<br><br>• Total dam inflow volume forecast is 1,531,000ML (excluding forecast) 2,064,000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 630 cumecs (excluding forecast) 1220 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1100 cumecs (excluding forecast) 2140 cumecs (including forecast). | • Consideration on protecting urban areas from inundation.<br><br>• Due to advice received from the Brisbane City Council that the limit of non-damaging floods is a flow of 3500 cumecs at Moggill, an attempt is made to remain within this flow (see spreadsheet associated with Model Run 41).<br><br>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>• With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 12 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Monday 10 Jan 2011 09:00<br><br>Completed Monday 10 Jan 2011 15:00 | **Strategy W3 and Strategy S2**<br><br>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2099 cumecs. All rural bridges below the dam are flooded.<br><br>• At 15:00 the attempt to restrict Brisbane River flows at Moggill to 3500 cumecs was abandoned due to the rainfall being experienced in the dam catchments. A new target of 4000 cumecs was set in accordance with the Manual.<br><br>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe. | Wivenhoe Dam level rises from 71.56 to 72.53 over the 6 hour period.<br><br>Somerset Dam level rises from 103.08 to 103.43 over the 6 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 274mm; Somerset 407mm; Lockyer 169mm; Bremer 149mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 34mm;<br>o Somerset 31mm;<br>o Lockyer 27mm;<br>o Bremer 30mm.<br><br>• Forecast rainfall is 75mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 73.6 (excluding forecast) 75.2 (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.4 (excluding forecast) 103.7 (including forecast).<br><br>• Total dam inflow volume forecast is 1,708,000ML (excluding forecast) 2,161,000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 780 cumecs (excluding forecast) 1590 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1480 cumecs (excluding forecast) 2630 cumecs (including forecast). | **Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)**<br><br>• Consideration on protecting urban areas from inundation.<br><br>• A decision is made at 15:00 to attempt to remain within a target flow of around 4000 cumecs at Moggill (see spreadsheet associated with Model Run 43).<br><br>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>• With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 13 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W3 and Strategy S2 Wivenhoe Directive #11.** | | | **Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)** |
| Commenced Monday 10 Jan 2011 15:00<br><br>Completed Monday 10 Jan 2011 20:00 | • Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at a rate or 1.0 metres of opening per hour.<br><br>• Wivenhoe discharge is increased from 2099 cumecs to 2707 cumecs. All rural bridges below the dam are flooded.<br><br>• Further gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to 4000 cumecs.<br><br>• No gate movements occurred at Somerset Dam during this period, with dam levels plotting under the Wivenhoe/Somerset Operations Target Line. This meant that the only gate movements allowable at Somerset under Strategy S2 would be openings and this was not done to limit further rises in Wivenhoe. | Wivenhoe Dam level rises from 72.53 to 73.06 over the 5 hour period.<br><br>Somerset Dam level rises from 103.43 to 103.45 over the 5 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 279mm; Somerset 415mm; Lockyer 174mm; Bremer 153mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 4mm;<br>o Somerset 8mm;<br>o Lockyer 5mm;<br>o Bremer 3mm.<br><br>• Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.<br><br>• Wivenhoe Lake level forecast to peak at 73.6 (excluding forecast) 74.3 (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.5 (excluding forecast) 103.5 (including forecast).<br><br>• Total dam inflow volume forecast is 1,731,000ML (excluding forecast) 1,982,000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at 780 cumecs (excluding forecast) 1070 cumecs (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at 1480 cumecs (excluding forecast) 1930 cumecs (including forecast). | • Consideration on protecting urban areas from inundation.<br><br>• A decision is made at 15:00 to attempt to remain within a target maximum flow of around 4000 cumecs at Moggill (see spreadsheet associated with Model Run 24).<br><br>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>• With dam levels under the Wivenhoe/Somerset Operations Target Line during this period, releases continued from Somerset Dam.<br><br>• Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 14 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W3 and Strategy S2** | | | **Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)** |
| Commenced Monday 10 Jan 2011 20:00<br><br>Completed Tuesday 11 Jan 2011 04:00 | ◦ Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.<br><br>◦ No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2752 cumecs. All rural bridges below the dam are flooded.<br><br>◦ Gate openings at Wivenhoe Dam were paused at 20:00 in an attempt to allow the initial Lockyer and Bremer peaks to pass Brisbane and to restrict Brisbane River flows at Moggill to close to 4000 cumecs.<br><br>◦ Initial advice on a flash flood originating in Lockyer headwaters received at 20:00 and considerations undertaken during this period to develop a strategy to manage these potential flows.<br><br>• During this period the plotted dam levels drifted just above the Wivenhoe/Somerset Operations Target Line. This lead to a decision at 04:00 to commence closing down releases from Somerset Dam to limit further rises in Wivenhoe. This decision is consistent with Strategy S2. | Wivenhoe Dam level rises from 73.06 to 73.40 over the 8 hour period.<br><br>Somerset Dam level fell from 103.45 to 103.23 over the 8 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 323mm; Somerset 437mm; Lockyer 186mm; Bremer 167mm. | ◦ Forecasts indicate that areas of intense rainfall are likely to shift south and possibly miss the dam catchments.<br><br>• Catchment average rainfalls over this period were:<br>o Wivenhoe 44mm;<br>o Somerset 22mm;<br>o Lockyer 12mm;<br>o Bremer 14mm.<br><br>• Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.<br><br>• Wivenhoe Lake level forecast to peak at 74.00 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.5 (excluding forecast) ??.?? (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | • Consideration on protecting urban areas from inundation, with the target being a maximum flow of around 4000 cumecs at Moggill (see spreadsheet associated with Model Run 28).<br><br>◦ This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>◦ Model results show that a peak level in the dam close to 74.0 remains possible, but is appearing increasing unlikely.<br><br>• With dam levels moving above the Wivenhoe/Somerset Operations Target Line during this period, a decision is made commence closing down releases from Somerset Dam to limit further rises in Wivenhoe.<br><br>◦ Although there is a full awareness of the rainfall forecasts and associated potential flood impacts, the strategy is not to release flows that will cause serious urban inundation until it is certain that this cannot be avoided. Model results continue to indicate that this may be possible. |

| JANUARY 2011 FLOOD EVENT - PERIOD 15 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Transition from Strategy W3 to Strategy W4; and Strategy S2 Wivenhoe Directive #12. Somerset Directive #6.** | | | **Strategy W3 and Strategy S2 (Lake Level greater than 68.50, maximum release 4000 cumecs)** |
| Commenced Tuesday 11 Jan 2011 04:00<br><br>Completed Tuesday 11 Jan 2011 08:00 | • The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.<br><br>• Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) are experienced on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.<br><br>• Because the extreme rainfall is occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to protect the safety of the dam.<br><br>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2832 cumecs. All rural bridges below the dam are flooded.<br><br>• During this period sluice gate openings at Somerset Dam are reduced from 5 to 2 as the plotted dam levels had drifted just above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2. | Wivenhoe Dam level rises from 73.40 to 73.70 over the 4 hour period.<br><br>Somerset Dam level rises from 103.23 to 103.46 over the 4 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 356mm; Somerset 483mm; Lockyer 240mm; Bremer 183mm. | • The forecast indicating that the intense rainfall could shift south and miss the dam catchments did not eventuate.<br><br>• Catchment average rainfalls over this period were:<br>o Wivenhoe 33mm;<br>o Wivenhoe Local 78mm;<br>o Somerset 46mm;<br>o Lockyer 54mm;<br>o Bremer 16mm.<br><br>• Forecast rainfall is 38mm in the next 24 hours, with isolated falls to 100mm.<br><br>• Wivenhoe Lake level forecast to peak at 74.6 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 103.8 (excluding forecast) ??.?? (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Peak flow at Lowood (excluding Wivenhoe releases) estimated at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Peak flow at Moggill (excluding Wivenhoe releases) estimated at??.?? (excluding forecast) ??.?? (including forecast). | • Consideration on protecting urban areas from inundation, with the target being a maximum flow of 4000 cumecs at Moggill.<br><br>• This strategy is consistent with the Manual directive that requires the flow at Moggill to be minimized prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases) being experienced.<br><br>• Model results show that restricting the peak level in the dam close to 74.0 is no longer possible due to the high intensity rainfall experienced over this period.<br><br>• With dam levels moving above the Wivenhoe/Somerset Operations Target Line during this period releases from Somerset Dam are closed down to limit further rises in Wivenhoe.<br><br>• At 08:00 a decision is made to transition to Strategy W4 and the Dam Safety Regulator (DERM) is advised of this decision. It is now apparent that significant urban damage resulting from releases from Wivenhoe Dam cannot be avoided.<br><br>• Note here about minimized response time because where the rainfall is falling, normally 24 hours, now only a few hours. |

| JANUARY 2011 FLOOD EVENT - PERIOD 16 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced<br>Tuesday<br>11 Jan 2011<br>08:00<br><br>Completed<br>Tuesday<br>11 Jan 2011<br>13:00 | **Strategy W4 and Strategy S2**<br>**Wivenhoe Directive #12 to #14.**<br>**Somerset Directive #7.**<br><br>• Extreme intense rainfall (IFD curves indicate that this rainfall could have exceeded 1 in 500 year intensities) continues on and close to the Wivenhoe Dam lake area during this period. If the centroid of this rainfall was located 50 kms east or south, it is likely that there would not have been a need to transition to Strategy W4.<br><br>• Because the extreme rainfall is occurring on and close to the dam rather than in the northern areas of the dam catchment, response time is minimized and actions must be taken quickly to protect the safety of the dam.<br><br>• Gates opened continuously at Wivenhoe Dam for 5 hours in accordance with the standard gate opening sequence at an average rate of 2.0 metres of opening per hour.<br><br>• Wivenhoe discharge is increased from 2832 cumecs to 3992 cumecs. All rural bridges below the dam are flooded.<br><br>• During this period sluice gate openings at Somerset Dam are closed off as the plotted dam levels remain above the Wivenhoe/Somerset Operations Target Line. This decision is consistent with Strategy S2. | Wivenhoe Dam level rises from 73.70 to 74.39 over the 5 hour period.<br><br>Somerset Dam level rises from 103.46 to 103.91 over the 5 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 382mm;<br>Somerset 570mm;<br>Lockyer 287mm;<br>Bremer 237mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 27mm;<br>o Wivenhoe Local 85mm;<br>o Somerset 86mm;<br>o Lockyer 47mm;<br>o Bremer 55mm.<br><br>• Forecast rainfall is 100mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at 105.0 (excluding forecast) ??.?? (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations. | **Strategy W4 and Strategy S2**<br>**(Lake Level predicted to exceed 74.00, no maximum release rate)**<br><br>• The target was to protect the structural safety of the dam.<br><br>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.<br><br>• The dam level continued to rise at 01:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.<br><br>• With dam levels above the Wivenhoe/Somerset Operations Target Line during this period releases from Somerset Dam are stopped to limit further rises in Wivenhoe. |

| JANUARY 2011 FLOOD EVENT - PERIOD 17 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W4 and Strategy S2 Wivenhoe Directive #12 to #14.** | | | **Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)** |
| Commenced Tuesday 11 Jan 2011 13:00<br><br>Completed Tuesday 11 Jan 2011 19:00 | • Extreme lake level rises in Wivenhoe Dam continue during this period and a severe weather warning for intense rainfall remains current.<br><br>• Gates opened continuously at Wivenhoe Dam for 6 hours in accordance with the standard gate opening sequence at an average rate of 4.5 metres of opening per hour.<br><br>• Wivenhoe discharge is increased from 3992 cumecs to 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.<br><br>• No releases are made from Somerset Dam in accordance with Strategy S2. | Wivenhoe Dam level rises from 74.39 to 74.97 over the 6 hour period.<br><br>Somerset Dam level rises from 103.91 to 104.57 over the 6 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 397mm; Somerset 610mm; Lockyer 325mm; Bremer 278mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 15mm;<br>o Wivenhoe Local 35mm;<br>o Somerset 40mm;<br>o Lockyer 38mm;<br>o Bremer 40mm.<br><br>• Forecast rainfall is 75mm in the next 24 hours (issued at 16:00; actual rain recorded after this time was minimal as shown below) and a severe weather warning for potential intense rainfall in the dam catchments remains current. Catchment average rainfalls for the 24 hour period commencing at 16:00 during this period were:<br>o Wivenhoe 8mm;<br>o Wivenhoe Local 13mm;<br>o Somerset 19mm;<br>o Lockyer 9mm;<br>o Bremer 8mm.<br><br>• Wivenhoe Lake level forecast to peak at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Somerset Lake level forecast to peak at ??.?? (excluding forecast) ??.?? (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations. | • The target was to protect the structural safety of the dam.<br><br>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.<br><br>• The dam level continued to rise at during this period. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.<br><br>• With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.<br><br>• The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011. |

| JANUARY 2011 FLOOD EVENT - PERIOD 18 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| | **Strategy W4 and Strategy S2 Wivenhoe Directive #15 to #24.** | | | **Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)** |
| Commenced Tuesday 11 Jan 2011 19:00<br><br>Completed Tuesday 11 Jan 2011 21:00 | • The lake level in Wivenhoe dam stabilizes and then falls slightly at 21:00. A severe weather warning for intense rainfall remains current, but it appears from the BOM radar that the rainfall may have dissipated. On this basis a decision to commence closing down the gates to reduce urban flood impacts is taken at 21:00. This decision is potentially in contravention with the minimum gate opening settings required under Strategy W4.<br><br>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 7464 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.<br><br>• No releases are made from Somerset Dam in accordance with Strategy S2. | During this 2 hours period, the lake level in Wivenhoe Dam stabilizes at 74.97 and then falls slightly to 74.95 at 21:00.<br><br>Somerset Dam level rises from 104.45 to 104.78 over the 2 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 1mm;<br>o Somerset 1mm;<br>o Lockyer 1mm;<br>o Bremer 1mm.<br><br>• Forecast rainfall is 75mm in the next 24 hours and a severe weather warning for possible intense rainfall in the catchments remains current.<br><br>• Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).<br><br>• Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations. | • The target was to protect the structural safety of the dam.<br><br>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.<br><br>• The dam level stabilized during this period and then fell slightly at 21:00. A dam operator was relaying Wivenhoe Dam gauge board readings to the Flood Operations Centre every 30 minutes. All four duty engineers were present in the Flood Operations Centre and decisions were being made on a half hourly basis once the gauge board readings were received.<br><br>• With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.<br><br>• The water level in Wivenhoe Dam peaked at 18:00 on 11 January 2011. |

| JANUARY 2011 FLOOD EVENT - PERIOD 19 OF 21 | | | | |
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| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Tuesday 11 Jan 2011 21:00<br><br>Completed Wednesday 12 Jan 2011 08:00 | **Strategy W4 and Strategy S2 Wivenhoe Directive #25 to #34.**<br><br>• During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level. These actions are taken to reduce urban flood impacts downstream. The severe weather warning for intense rainfall is cancelled at 22:00 and it appears from the BOM radar that the rainfall may have dissipated. The decision to close off the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.<br><br>• Gates closed continuously at Wivenhoe Dam for 11 hours in accordance with the standard gate closing sequence at an average rate of just over 3.6 metres of opening per hour.<br><br>• Wivenhoe discharge is decreased from 7464 cumecs to 2547 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane cannot be avoided.<br><br>• No releases are made from Somerset Dam in accordance with Strategy S2. | Wivenhoe Dam level falls from 74.97 to 74.78 over the 11 hour period.<br><br>Somerset Dam level rises from 104.78 to 105.11 over the 11 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm; Somerset 22mm; Lockyer 32mm; Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 1mm<br>o Somerset 3mm;<br>o Lockyer 3m;<br>o Bremer 1m.<br><br>• Forecast rainfall is 75mm in the next 24 hours.<br><br>• Wivenhoe Lake level forecast to peak at 74.9 (excluding forecast) 74.9 (including forecast).<br><br>• Somerset Lake level forecast to peak at 105.1 (excluding forecast) 105.1 (including forecast).<br><br>• Total dam inflow volume forecast is 181000ML (excluding forecast) 226000ML (including forecast).<br><br>• Once Strategy W4 is activated, the peak flows at Lowood and Moggill are no longer relevant to flood release considerations. | **Strategy W4 and Strategy S2 (Lake Level predicted to exceed 74.00, no maximum release rate)**<br><br>• The target was to protect the structural safety of the dam.<br><br>• The Manual requires actions under Strategy 4 to be that Wivenhoe gate openings are to occur at the minimum intervals and sequences until the storage level of Wivenhoe Dam begins to fall.<br><br>• During this period Wivenhoe Dam gates are closed off as quickly as possible without causing rises in lake level.<br><br>• It was calculated that reducing to a discharge of 2547 cumecs from Wivenhoe Dam will:<br><br>o Not increase the downstream flood peak;<br>o Not cause the water level in Wivenhoe Dam to rise and;<br>o Allow the dam to be drained back to FSL in 7 days in accordance with the Manual.<br><br>• With dam levels above the Wivenhoe/Somerset Operations Target Line during this period no releases from Somerset Dam are made to limit further rises in Wivenhoe.. |

| JANUARY 2011 FLOOD EVENT - PERIOD 20 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Wednesday 12 Jan 2011 08:00<br><br>Completed Thursday 13 Jan 2011 12:00 | **Transition from Strategy W4 to the Drain Down Phase**<br>**Somerset Directives #8 to #9.**<br><br>• During this period releases from Wivenhoe Dam are kept constant. These actions are taken to reduce urban flood impacts downstream. The decision to maintain the release in this way is potentially in contravention with the minimum gate opening settings required under Strategy W4.<br><br>• No change to gate settings occurred at Wivenhoe Dam over this period. Wivenhoe discharge is 2546 cumecs. All rural bridges below the dam are flooded. Damage to urban areas in Brisbane has not been avoided.<br><br>• Releases commenced from Somerset Dam during this period as the plotted dam levels fell below the Wivenhoe/Somerset Operations Target Line. These actions were undertaken in accordance with Strategy S2 and to allow the D'Aguilar Highway to be opened as soon as possible. Even though plotted dam levels later rose above the Wivenhoe/Somerset Operations Target Line during this period, releases from Somerset dam continued to allow the dam to be drained back to FSL in 7 days in accordance with the Manual. | Wivenhoe Dam level falls from 74.78 to 74.61 over the 28 hour period.<br><br>Somerset Dam level falls from 105.11 to 103.96 over the 28 hour period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm;<br>Somerset 22mm;<br>Lockyer 32mm;<br>Bremer 32mm. | • Catchment average rainfalls over this period were:<br>o Wivenhoe 2mm;<br>o Somerset 6mm;<br>o Lockyer 6mm;<br>o Bremer 6mm.<br><br>• Forecast rainfall is 10mm in the next 24 hours. | **Drain Down Phase**<br>**(Stored floodwaters emptied from the dam in seven days)**<br><br>• During this period the strategy transitioned from Strategy W4, during which the target is to protect the structural safety of the dam, to the Drain Down Phase of the event.<br><br>• Once the Drain Down Phase commenced, the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included:<br><br>o Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;<br>o Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);<br>o Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;<br>o Achieving full supply levels in the dams at the conclusion of the event. |

| JANUARY 2011 FLOOD EVENT - PERIOD 21 OF 21 | | | | |
|---|---|---|---|---|
| **DATE/TIME** | **BACKGROUND** | **DAM LEVELS** | **RAINFALL AND MODEL RESULTS** | **STRATEGY** |
| Commenced Thursday 13 Jan 2011 12:00<br><br>Completed Wednesday 19 Jan 2011 12:00 | **Drain Down Phase**<br>**Wivenhoe Directives #35 to #62**<br>**Somerset Directives #10 to #13.**<br><br>• During this period releases from Wivenhoe Dam are increased to as the peaks from the Lockyer and Bremer subside. Downstream impacts are controlled and and no time during this phase do downstream water levels rise except if impacted by tidal influences.<br><br>• During this period, stored flood water in Somerset Dam is drained into Wivenhoe Dam in accordance with the drain down target of seven days. Importance is placed on opening the D'Aguilar Highway as soon as possible. | Wivenhoe Dam level falls from 74.61 to 66.89 over the 6 day period.<br><br>Somerset Dam level falls from 103.96 to 99.00 over the 6 day period.<br><br>Total rainfall since event commencement (including the current period):<br><br>Wivenhoe 29mm;<br>Somerset 22mm;<br>Lockyer 32mm;<br>Bremer 32mm. | • Catchment average rainfalls over this six day period were:<br>o Wivenhoe 14mm;<br>o Somerset 7mm;<br>o Lockyer 7mm;<br>o Bremer 8mm. | **Drain Down Phase**<br><br>• During this period the target was to release stored floodwaters from the dam within seven days of the flood peak passing through the dams, while controlling downstream impacts. Considerations impacting on the duration and timing of the Drain Down Phase in this instance included:<br><br>o Maintaining an adequate release rate to ensure that the temporary pumps providing water supplies to the Lowood area could continue to operate;<br>o Minimizing bank slumping impacts along the river, particularly in key areas such as Coronation Drive (as requested from the Brisbane City Council);<br>o Re-opening the Brisbane Valley highway and key rural bridges as quickly as possible;<br>o Achieving full supply levels in the dams at the conclusion of the event. |

## Brooke Foxover

**From:** DutyEngineer [dutyseq@[redacted]
**Sent:** Monday, 31 January 2011 4:18 PM
**To:** John Tibaldi
**Subject:** Event Communication - 01.doc
**Attachments:** @

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Event Communication - 01.doc (70 KB)

## 8. EVENT COMMUNICATION

Queensland's disaster management arrangements, based on disaster management groups at local, district and state level, ensure the collaborative and effective coordination of information for all hazards.

Existing local, district and state disaster management and hazard-specific plans outline arrangements and structures for disaster management, or the hazard, and amongst other things, identify the need for coordination of public communications.

Following the Flood Event impacting on Wivenhoe and Somerset dams that occurred in October 2010, a protocol for communication arrangements between local, state and commonwealth agencies impacted by the release of floodwater from Wivenhoe and Somerset Dams was developed. This protocol outlines the arrangements for communication between these agencies during Flood Events. The agencies are:

- Brisbane City Council.
- Ipswich City Council.
- Somerset Regional Council.
- Seqwater.
- Water Grid Manager.
- Queensland Police Service.
- Department of Community Safety.
- Department of Environment and Resource Management.
- Department of Premier and Cabinet.
- Bureau of Meterology.

The intent of the developed protocol is to ensure that consistent, harmonised information, based on an agreed single technical report, is communicated to the public in a way that contributes to resilient communities.

There are three stages in the process of communication as described by the protocol. These stages are:

- Monitoring and Assessment
- Briefing and Activation
- Public Communications

Details of the procedures required by the protocol within each of these three stagesand how these procedures were followed during the January 2011 Flood Event are contained below.

### Monitoring and Assessment

Communications with the public on flood information, including floodwater releases from Wivenhoe Dam, are based on a continuous process of monitoring and technical assessment. The process is dynamic and evolves according to the event, but will normally contain the following steps:

- Routine monitoring of weather events and dam levels by relevant agencies via established systems and procedures;

- The Bureau of Meteorology (BoM) are the primary agency responsible for providing weather forecasts and warnings to the public.

- Councils monitor creek levels, local runoff and flash flooding within their areas of responsibility.

- Seqwater discusses and models implications of the inflows on the necessary floodwater release from Wivenhoe Dam and/or Somerset Dam. The floodwater release strategy is a balance between releasing the water quickly enough so that the flood storage capacity is available if another major rain event occurs, versus minimising downstream flooding impacts (human safety and property damage) from the releases.

- Seqwater calculates the floodwater releases according to the Manual of Flood Mitigation and provides this information to BoM and with the Councils. BoM undertakes modelling of the Brisbane River catchment and its river systems using this information.

- BoM participates in technical discussions with Seqwater, Brisbane City Council, Ipswich City Council and Somerset Regional Council as necessary, to share modelling results. The discussions aim to establish a technical agreement on the flood situation, on which public communications should be based.

- Councils with the necessary resources and expertise undertake modelling, form predictions, identify flood inundation areas and assess impacts for their communities, and regularly share this information with all relevant parties. Councils without the necessary resources and expertise will rely on information from other agencies to complete the impact assessment for their communities.

Any of the agencies may initiate the public communications process and engage with the disaster management arrangements as appropriate. The trigger points for commencing public communication of flooding information are defined according to an agency's responsibilities. During the January 2011 Flood Event, public communications were being undertaken almost continuously by Local, State and Commonwealth Agencies once it became apparent that pubic impacts were likely.

Agencies also have the ability to instigate teleconferences with other agencies involving relevant technical staff during a Flood Event. These teleconferences are used to discuss, clarify and agree modelling inputs and results from a technical sense. Such conferences occurred regularly during the January 2011 Flood Event, particulatly between Seqwater and BoM..

Finally, in every case of floodwater release from Wivenhoe Dam, Seqwater coordinates the completion of the Technical Situation Report - TSR and provides the Report to the Water Grid Manager (according to their Emergency Response Plan) and to relevant local government agencies. Appendix F contains the Technical situation Reports issued during this event.

**Briefing and Activation**

If public safety is considered to be at risk, consideration is given to the activation of the disaster management arrangements, if not already activated. During the January 2011 Flood event the following actions were undertaken.

- The Brisbane City, Ipswich City and Somerset Regional Councils activated their Local Disaster Management Groups (LDMGs);
- LDMGs informed the relevant District Disaster Coordinators of the situation (DDCs);
- The Queensland Police Service (QPS) initiated disaster management actions as provided for under the Disaster Management Act 2003;
- The SEQ Water Grid Manager alerted the Director-General (DG) of the Department of Community Safety (DCS), DG Department of Environment and Resource Management (DERM), and the Brisbane City, Ipswich City and Somerset Regional Councils.
- The DG DCS informed the DG of the Department of Premier and Cabinet (DPC) - the Chair of the State Disaster Management Group (SDMG) and activated the State Disaster Coordination Centre (SDCC). DG DCS also informed the Minister for Police, Corrective Services and Emergency Services.
- The DG DERM will inform the Minister for Natural Resources, Mines and Energy.
- The DG DPC will inform the Premier.
- The Crisis Communications Network, chaired by DPC, was activated at the direction of the SDMG Chair to coordinate public messaging from BoM, Seqwater, SEQ Water Grid Manager, QPS, relevant Councils and DCS.

**Public Communications Issues**

Each agency has its own responsibilities to issue information commensurate with their role without prior approvals. During the January 2011 Flood Event, agencies shared information with other agencies and operated in a fully consultative process to ensure consistent public information.

The BoM, Local Governments and relevant State Government agencies maintained continual discussions to ensure that conflicting information was not released to the public at any time during the event. Genuine efforts were made to ensure consistency by basing public communications on technical reports. Inter-agency consultation did not cause delays in the issuance of public warnings.
Harmonised public communications messages were released from the following agencies as described below:

- **Bureau of Meteorology** - concentrating on Flood Warnings which are widely disseminated to the BoM website, agencies and the media. BoM also participated in media (radio, television, newspaper) interviews to provide factual information regarding observed and forecast weather conditions, rainfalls and water levels;

- **Local Governments / Local Disaster Management Groups** - concentrating on the effects of weather related events and safety for their local communities and residents, and the impacts on councils' assets. Local governments had primacy of public communications within their community.

- **Water Grid Manager** – the Water Grid Manager concentrated on the communication aspects of release timings and duration of effects as the State's lead communication agency on floodwater release. Seqwater operational staff ensured that technical information was communicated to the Water Grid Manager.

These communications were augmented by:

- **Queensland Police Service** - concentrating on specific community safety messaging during operations;

- **Department of Community Safety** - concentrating on general safety matters regarding flooding;

- **Department of Premier and Cabinet (extreme events only)** - concentrating on consistent messages to media and agencies concerned.

Information was released to the public as frequently as required throughout the event. Timings of media releases were guided by the frequency of technical reports and ranged in frequency from once a day to once an hour.

The Water Grid Communications Unit centrally track all communications and ensured that they were shared. The unit liaised with the following or their representatives over pubic safety messages:

- BoM;
- Seqwater;
- Councils' Media Directors;
- QPS Media Director; and
- DCS Media Director.

Generally, public and agency communications through the duration of the event worked well and occurred in accordance with the protocol for communication arrangements that was developed following the October 2010 Flood Event.