Department of Environment and Resource Management – Parliamentary Briefing Note

To	Minister Robertson
Prepared for	Parliamentary sittings 5 -7 October 2010

WIVENHOE DAM SPILLING – the likelihood of Wivenhoe Dam spilling and safety

KEY POINTS

- On the 1 October 2010, Wivenhoe Dam reached 100 per cent for the first time since 2001.
- After the weekend's weather, the dam reached 101 per cent on Monday.
- On Monday 4 October, Seqwater commenced controlled increased releases from Wivenhoe Dam through the hydro-electric plant in the dam wall.
- Even with substantial rain, Wivenhoe Dam's flood capacity is equal to 3 times Sydney harbour - or - 1.45 million megalitres.
- Releases from Somerset Dam into Wivenhoe Dam via the cone valves ceased over the weekend.
- Seqwater has a Dam Safety Management Program and a Flood Control Centre. The program ensures that each of its dams is operated and maintained in a manner that is both safe and minimises the risks associated with a dam failure and flood events, including working with local councils and emergency services.

Contact: Dan Spiller
Telephone: [redacted]
Date: 4 October 2010
CTS No. 17669/10

Approved: Mike Lyons, Director, SEQ Water Grid Comms
Approved: [Insert title of ADG or DDG]
Approved: Director-General

RESPONSE

- On the 1 October 2010 Wivenhoe Dam reached 100 per cent for the first time since 2001.
- After the weekend's weather, the dam reached 101 per cent on Monday 4 October 2010.
- The trigger level for full gate releases for Wivenhoe Dam is 102.5 per cent.
- Also on Monday 4 October, Seqwater commenced controlled increased release from Wivenhoe Dam through the hydro-electric plant in the dam wall.
- The released water passes through the dam's hydro-electric generator before being sent to Mt Crosby Water Treatment Plant as part of the Grid's water supply.
- These releases will continue for roughly 10 days, depending on further inflows and weather.
- Seqwater expects to have released between 10,000 and 12,000 megalitres to reduce Wivenhoe Dam to just below the Full Supply Level.
- There is no impact downstream as a result of these releases.
- The hydro-electric plant, owned by Stanwell Energy Corporation, is built into the dam wall.
- Water is fed through a turbine in the hydro-electric plant to generate renewable energy.

Contact: Dan Spiller
Telephone: [redacted]
Date: 4 October 2010
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Approved: Mike Lyons, Director, SEQ Water Grid Comms
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Approved: Director-General

- Water supplied for consumption is always released through the hydro-electric plant.

SEQ Water Grid flood preparation

- Wivenhoe has enormous flood capacity – almost the equivalent of three times Sydney Harbour (1.45 million megalitres). To put this in context, Wivenhoe has received 376,000 megalitres in flows for the year to date.
- As well as the protection of flood storages, Seqwater has a Dam Safety Management Program. The program ensures that each of its dams are operated and maintained in a manner that is both safe and minimises the risks associated with a dam failure and flood events, including working with local councils and emergency services.
- The program has been endorsed and approved by the Dam Safety Regulator.
- The Flood Control Centre will mobilise during a flood event at North Pine, Somerset or Wivenhoe dams. It operates 24 hours a day with teams of operators at each dam 24 hours a day managing releases.

Benefits of the Grid

- The Grid enables us to choose the water use – meaning that it is the most secure water supply in Australia, in drought and when the dams are full.
- Heavy rain often causes water quality issues. It drags nutrients and other compounds from the catchments into our water supplies.
- With the Grid, we are better prepared for these events than ever before. We can isolate, or blend water from multiples sources.

Wivenhoe Dam operating level

- Investigations have commenced into the extent to which the full supply level of Wivenhoe Dam could be raised, without raising the dam wall and while maintaining acceptable risk levels at the dam itself and inundated areas.
- We will not take risks with flood safety.
- The investigation will involve detailed investigations associated with upstream and downstream flooding, environmental considerations, impacts on infrastructure and lease resumptions.
- Until the raising of the full supply level is fully assessed, flood waters will be cleared to the existing Full Supply Level in accordance with the existing Flood Operations Manual

developed by Seqwater and approved by the Dam Safety Regulator, to ensure public safety is maintained.

BACKGROUND

Hydro Electric Plant at Wivenhoe Dam

- Wivenhoe Dam houses a pumped-storage, hydro-electric generating facility. This power station is situated between Splityard Creek Dam and Lake Wivenhoe.
- During the pumping phase in the operating cycle the generator will operate as an electric motor driving the pump to lift water from Lake Wivenhoe to the upper storage of Splityard Creek Dam. When peak electricity demand occurs the flow of water is reversed, flowing from the upper to the lower storage and driving the turbine generator to generate electricity.
- The pumped storage power station consists of two circular concrete silos, each of about 32 metres internal diameter. Each of the silos house a 250MW turbine generator and pump set.
- The power station is unmanned and is controlled remotely from the central operating centre for the Queensland power grid system. All aspects of the operation are monitored by computers within the centre. Twin 275KV transmission lines connect the power station to the State's grid system

Department of Environment and Resource Management – Parliamentary Briefing Note

To Minister Robertson

Prepared for Parliamentary sittings ~~26-28 October~~23-25 November 2010

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WIVENHOE DAM SPILLING – likelihood of spilling and safety

KEY POINTS

- On the 1 October 2010, Wivenhoe Dam reached 100 per cent for the first time since 2001.
- On Saturday 9 October, Seqwater commenced releases from the Wivenhoe Dam spillway.
- Releases continued until 19 October 2010, which included a phased shutdown of the spillway gates.
- At the time the Wivenhoe gates were closed on 19th October, small baseflows, supplemented by occasional rainfall, continued to flow into Somerset and Wivenhoe Dams and resulted in both dams rising above Full Supply Level.
- Under Flood Manual rules, Seqwater is required to maintain the flood storage component and return the dams to Full Supply Level.
- To date, 15,000 megalitres have been released from Somerset and 72,000 megalitres have been released from Wivenhoe since the gates were closed on 19 October 2010.
- No releases are currenty being made from Somerset Dam and a normal operating release of 319 megalitres per day is being maintained from Wivenhoe Dam.

Contact: Dan Spiller
Telephone: [redacted]
Date: 18 October 2010

Approved: Barry Dennien, CEO Water Grid Manager
Approved: Chris Robson, A/Deputy Director-General
Approved:

CTS No. 18687/10

- Wivenhoe Dam's flood capacity is equal to three times Sydney harbour - or - 1.45 million ~~Megalitres~~megalitres.

- Seqwater has a Dam Safety Management Program approved by the State's Dam Safety Regulator, as well as a Flood Control Centre.

- The program ensures that each of its dams is operated and maintained in a manner that is both safe and minimises the dam failure risks associated with flood events, including developing and implementing working arrangements with local councils and emergency management groups.

RESPONSE

- On the 1 October 2010 Wivenhoe Dam reached 100 per cent for the first time since 2001.
- On Saturday 9 October 2010, Seqwater began releasing water from Wivenhoe Dam over and above that required for consumption, as a result of flood inflows.
- This action is in accordance with the Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam, which is approved by the State's Dam Safety Regulator in accordance with the *Water Supply Act 2008*.
- The current flood release manual was reviewed during 2009 and finalised in January 2010. Seqwater is required to provide

relevant catchment councils with a copy of the flood manual and this occurred. Councils provided with copies include Somerset Regional Council, Ipswich City Council and Brisbane City Council.

- Flood water releases through the dam's spillway gates continued until the morning of 19 October 2010, including a 48 hour phased shutdown.
- The phased shutdown allows Seqwater to control the water through a systematic closure of the gates to discharge stored floodwater to provide for further flood events and to allow Councils to reopen river crossings.
- The phased shutdown also aims to minimise adverse environmental impacts on the river system by copying the natural regression of the flood event.
- Seqwater released 655,000 megalitres to bring Wivenhoe Dam back Full Supply Level.
- At the time the Wivenhoe gates were closed on 19th October, small baseflows, supplemented by occasional rainfall, continued to flow into Somerset and Wivenhoe Dams and resulted in both dams rising above Full Supply Level. Under Flood Manual rules, Seqwater is required to maintain the flood storage component and return the dams to Full Supply Level.
- Water is continuing to be released through 1.5 metre Cone Dispersion Vales to maintain Full Supply Level.

- Water supplied for consumption is released through the hydro-electric plant whenever possible.

SEQ Water Grid flood preparation

- Wivenhoe has enormous flood capacity – almost the equivalent of three times Sydney Harbour (1.45 million megalitres).
- In accordance with the requirements of the *Water Supply Act 2008*, Seqwater maintains a comprehensive Dam Safety Management Program covering its 25 referable dams.
- The program ensures that each of its dams are operated and maintained in a manner that is both safe from a structural perspective and minimises the dam failure risks associated with flood events.
- This includes making arrangements with local councils and emergency management agencies for appropriate response to dam safety emergencies including flood events.
- The program has been endorsed and approved by the Dam Safety Regulator.
- The Flood Control Centre will mobilise during a flood event at North Pine, Somerset or Wivenhoe dams. It operates 24 hours a day with teams of operators at each dam 24 hours a day managing releases.

Wivenhoe Dam operating level

- Investigations have commenced into the extent to which the full supply level of Wivenhoe Dam could be raised, without raising the dam wall and while maintaining acceptable risk levels at the dam itself and inundated areas.
- When it comes to flood, we will not take risks with South East Queensland's safety.
- The investigation will involve detailed ~~investigations~~ assessments associated with upstream and downstream flooding, environmental considerations, impacts on infrastructure and lease resumptions.
- Until the raising of the full supply level is fully assessed, flood waters will be cleared in accordance with the existing Manual of Operational Procedures for Flood Mitigation.

Contact: Dan Spiller
Telephone: [redacted]
Date: 18 October 2010

CTS No. 18687/10

Approved: Barry Dennien, CEO Water Grid Manager
Approved: Chris Robson, A/Deputy Director-General
Approved:

CTS No. 21654/10

I/10/0523

Advisor	OK
Dated	/ /
Approved Not Approved Noted Further information required	
Minister.....	
Dated	/ /

SEQ Water Grid
MINISTERIAL DEPUTATION BRIEFING NOTE
SEQ Water Grid Manager Board Meeting
Monday 13 December 2010 at 1.00pm

TO: **Minister for Natural Resources, Mines and Energy and Minister for Trade**

SUBJECT: Points for discussion for meeting with the SEQ Water Grid Manager Board

BACKGROUND

- The Minister has been invited to meet with the South East Queensland (SEQ) Water Grid Manager (WGM) Board on 13 December 2010 at 1.00pm.
- The WGM intends this to be an informal meeting which will include a tour of the newly completed Water Grid Emergency Management Room and provide an opportunity for the Minister to ask questions and discuss the operation of the Water Grid.
- All WGM Board members will attend the meeting. All members of the WGM executive management team will also attend this meeting.

CURRENT ISSUES

- In addition to providing a tour of the newly completed Water Grid Emergency Management Room, the WGM is particularly interested in discussing three matters with the Minister, namely:
  1. General feedback from the Minister on the WGMs optimal operation of the Water Grid, focused on the WGMs Climate Resilience Report,
  2. An update of the role of the SEQ Water Grid Manager in the planning and approval process for capital expenditure, and;
  3. An update on Wivenhoe Dam's operating level, for flood mitigation.
- The Minister wrote to the WGM and WaterSecure on 13 September 2010 (CTS13479/10), requesting advice on optimised operating arrangements for the Water Grid and climate resilient supply projects, in relation to current and potential demand for bulk water and purified recycled water.
- The Minister also wrote to QWC in September 2010 (CTS13479/10), inviting QWC to provide input into optimal operating arrangements for the Water Grid.

Climate Resilience Report

- The WGMs Climate Resilience Report (the Report) has been completed and sent to responsible Ministers.
- The Minister replied to this advice on 3 December 2010 (CTS21372/10). Further to the Ministers response of 3 December 2010, the Minister will be advised on the timing and program for implementation of the recommended strategy, during the meeting with the WGM Board and executive management team on 13 December 2010.

Emergency Response

- The WGM would also like to provide the Minister with a general demonstration of the Emergency Management Room facilities. This will mainly involve a demonstration of the

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	Name : Barry Dennien Position: CEO, SEQWGM Tel No: [redacted] Date: 3 December 2010	Name: Position: Tel No: Date:	

File Ref:

new OCA Incident Manager which is being implemented as a result of the recommendations from the Exercise Matrix.

- The Exercise Matrix, the test of the Water Grid's response to an emergency, was successfully completed over the period 2 to 3 March 2010. The exercise was facilitated and conducted by MC2 Pacific, an independent emergency management consultancy, who assessed the suitability and effectiveness of responses by Grid Participants. As a result of the Exercise Matrix MC2 Pacific prepared a report containing recommendations for the WGM.
- The WGM has accepted and will implement all recommendations developed by MC2 Pacific. The State Disaster Coordination Centre in Emergency Management Queensland supported the recommendations included in the MC2 Pacific report.
- The MC2 Pacific recommendations (CTS10434/10) noted that there were several major strengths, like technical strategy, and weaknesses, both in the processes and their deployment and handling of communications, in the multi-participant test. Specific actions were recommended in relation to documentation and implementation (CTS10434/10).
- The OCA Incident Manager system (the system) is a secure, online software solution for managing emergencies across the Water Grid. It gives the WGM and all Grid Participants involved the tools to manage an emergency in one place, in real time.
- The system provides a live, up-to-date solution for managing whole-of-Grid emergencies and aligns with the SEQ Water Grid Risk Management Plan. The system has the ability to send communications, manage incident information and monitor situation reporting, logging and mapping.
- The Minster and relevant staff from the Ministers Office will be set up as 'visitors' on the system, meaning that they are able to view key incident management data, including situation reports, in real time.

Planning and approval process for capital expenditure

- The Minister wrote to the Chair of the WGM on 20 October 2010 (CTS17750/10), in relation to clarification of the role of the WGM in the planning and approval process for capital expenditure.
- The WGM will provide response to the Ministers correspondence shortly.
- The WGM will also provide a verbal update of capital expenditure planning and approval process at the meeting of 13 December 2010.

Wivenhoe operating level, for flood mitigation.

- The Minister also wrote to the Chair of the WGM on 25 October 2010 (CTS19311/10), seeking advice regarding available options and likely benefits of releasing water from key storages in anticipation of major inflows over the coming summer.
- The WGM will provide response to the Ministers correspondence shortly.
- The WGM will also provide a verbal update of options and likely benefits of reducing Wivenhoe Dam's operating level, for flood mitigation in anticipation of major inflows from rainfall in the catchment area over summer, at the meeting of 13 December 2010.

MNISTER'S COMMENTS

ATTACHMENTS
There are no attachments to this Brief

Author	Cleared by	Cleared by	Recommended:
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File Ref:

TRIM ref: D/10/7953

24 December 2010

Hon Stephen Robertson MP
Minister for Natural Resources, Mines and Energy
and Minister for Trade
PO Box 15216
Brisbane Qld 4001

Dear Minister

I am pleased to respond to your letter of 25 October 2010 regarding options to and benefits of releasing water from key storages in anticipation of major inflows over the current wet season. Our advice follows, based on discussions with Seqwater.

Only four of the dams in South East Queensland region are gated, with the ability to release significant amounts of water in anticipation of major inflows. These are Wivenhoe, Somerset, North Pine and Leslie Harrison dams.

Detailed operational procedures have been approved for each of the gated dams. The dams will continue to be operated in accordance with these procedures. These procedures generally relate to the management of the dams and should be managed above Full Supply Level. This advice relates to the water security aspect of the management of the dams below Full Supply Level.

Based on information currently available, Seqwater has advised that releasing water to below Full Supply Level may provide some benefits in terms of reduced community and operational impacts during minor inflow events, such as has occurred over the past month. For medium and major flood events, it considers that pre-emptive releases will provide negligible benefits.

Informed by this advice, the SEQ Water Grid Manager has advised Seqwater that, from a water security perspective, it has no in-principle objection to minor releases from Wivenhoe, Somerset and North Pine dams to minimise the operational and community impacts of gate releases. Specifically, it has advised that it has no in-principle objection to:

- Wivenhoe and Somerset dams being drawn down to 95 per cent of their combined Full Supply Level
- North Pine Dam being drawn down to 97.5 per cent of its Full Supply Level.

The SEQ Water Grid Manager has assessed the water security implications of the release to be negligible, having no impact on our ability to meet the risk criteria specified in the System Operating Plan or our ability to meet our supply obligations to Grid Customers. From a water security perspective, the Queensland Water Commission has also confirmed that it does not have any objections to the potential release.

Please note that these arranges are intended to apply for the current wet season only, taking into account the level of storages and the rainfall forecasts over coming months.

For future wet seasons, the SEQ Water Grid Manager will continue to work with Seqwater to investigate the optimal arrangements. In particular, we propose to further investigate options that may reduce the frequency or duration of intermediate level flows (between 1,900 and 3,500 cubic metres per second). In addition, we recommend that the investigations with the Queensland Water Commission to examine the opportunity of raising the full supply level of Wivenhoe Dam for water supply be expanded to include options involving the release of the additional water once major inflows are forecast.

I trust that this advice is sufficient. If you have any questions, please do not hesitate to contact Mr Dan Spiller, Director Operations, by telephone on [redacted] or by email on [redacted]

Yours sincerely

[redacted]

Gary Humphrys
Chair

ATTACHMENT

Wivenhoe and Somerset dams

Wivenhoe Dam can store up to 1.15 million litres (ML) of drinking water. In addition, it has the capacity to store an additional 1.45 ML of flood water.

While large, the flood compartment can be filled within days. For example, following heavy rainfall in October 2010 Wivenhoe Dam received inflows equivalent to almost half of the flood storage compartment capacity in just a few days.

Several factors influence flood release strategies for Wivenhoe and Somerset dams.

First, rain events that have caused flooding have historically been prolonged events over several days, often with a second event occurring several days to a week after the first. As a result, the operational procedures for the dam are designed to ensure that all water held in the flood compartments is released within seven days of a rain event, ensuring that the flood compartment is available for any future inflows.

Secondly, the dam only controls flood waters from part of the Brisbane River catchment area. About 50 per cent of the catchment area of the Brisbane River is upstream of the Wivenhoe Dam wall, and can be potentially controlled by it. No flood mitigation structures exist for most of the potential run-off from the other 50 per cent of the catchment area.

Third, the Bureau of Meteorology has had limited success in plotting rainfall distribution accurately to assess where most flooding risk lies above or below the dam wall. Historical floods have demonstrated that flooding can occur from both. For example, the 1974 flood flows primarily occurred below the dam wall whilst the 1890's event occurred above the dam wall. As a result, when releasing water from Wivenhoe Dam it is very important to predict and monitor below the dam wall flows so as to understand combined river flows that cause flood impacts.

Taking these factors into account, the flood release strategy for Wivenhoe and Somerset dams has a hierarchy of objectives:

- Ensure the structural safety of the dam
- Provide optimum protection of urbanised areas from inundation
- Minimise disruption to rural life
- Retain full supply level after a flood event
- Minimise impacts to flora and fauna during the drain down phase.

Within this framework, flood releases from Wivenhoe Dam typically fall into two categories of flood events based on the impact they cause when combined with below the dam wall catchment runoff:

- Larger events typically involving combined river flows greater than 3,500 cubic meters per second measured at Moggill. These events would have flood impacts on

urban areas in Brisbane. This scale of release has not been required since Wivenhoe Dam was completed.

- Smaller events with combined river flows of less than 1,900 cubic meters per second measured at the Mt Crosby weir which can inundate up to seven rural bridges isolating up to 50 households and causing inconvenience to many more. There has been six of these events since 1984, when Wivenhoe Dam was completed.

Our assessment of the benefits of lowering dam storage levels to reduce flooding impacts is below for these two event types.

Large events

Seqwater has advised that releases of greater than 3,500 cubic metres per second (m3/s) from Wivenhoe Dam are likely to impact on urban areas in Brisbane. Events of this nature have not been experienced since Wivenhoe Dam was completed in 1984.

Seqwater has advised that:

- pre-emptive releases are likely to have negligible impacts on the extent of these impacts
- any impacts would require releases of at least 250,000 ML. This is equivalent to a release of about 16 per cent of the combined storage capacity of Wivenhoe and Somerset dams.

A pre-emptive release of this scale is not recommended, based on information currently available. The potential water security impacts are considered to be more significant than the negligible benefits. These potential security impacts include costs associated with the earlier or avoidable operation of the desalination facility at capacity, as well as the increased probability of triggering the implementation of a drought response plan.

More detailed investigation of opportunities to actively manage flood storage is recommended, including options to increase flood supply level on a temporary basis. These investigations need to be led by Seqwater, and involve the Bureau of Meterology, Councils and the SEQ Water Grid Manager.

In particular, t has been identified that it is worth investigating the impacts on downstream flooding for intermediate level flows (flows between 1900 and 3500 cm^3/s).

Seqwater will undertake extensive investigations for the Queensland Water Commission in early 2011 to examine the opportunity of raising the full supply level of Wivenhoe Dam for water supply. We will recommended that the scope of this work be widened to consider the benefits of pre-lowering storage levels based on mid range rainfall events and the reduced impacts to river levels and subsequent property impacts. It is noted that predicting rainfall intensity and location, even as events are about to occur has not been accurate, however the Bureau of Meteorology is improving its methods.

Smaller events

Pre-emptive releases from Wivenhoe Dam may reduce the impacts of minor gate releases (strategies W1A to W1E in the operational procedures).

Minor gate releases may result in the closure of up to six bridges, isolating up to 50 dwellings and inconveniencing many more. As stated in existing flood management plans, releases should be managed to minimise the impacts on these residents. Over the immediate term, Councils have requested that bridge closures be avoided over the Christmas to New Year period, if at all possible. In addition:

- There are resource implications involved in the activation of the flood control centre. Under flood management plans, the centre must be staffed by suitability qualified officers at all times during gate releases. There are currently only four quality duty engineers, who have staffed the flood centre for much of period since the initial release in October.
- Gate releases during the Christmas holiday period would result in closure of dams to water based activities, impacting on up to 150,000 people who are expected to use the recreational facilities over the holiday period.

The Water Grid Manager has advised Seqwater that, from a water security perspective, it would not object to water being released from Wivenhoe and Somerset dams to 95 per cent of storage capacity at any time until end March 2010.

Under this recommendation, storage levels could potentially be reduced by up to about 77,250 ML. This is equivalent to the amount of water released between 13 and 16 December 2010, through a single gate.

Pre-emptive releases will be managed so as to minimise the likelihood of gate releases due to small storms and local rainfall. Storage capacity will usually be reduced through a combination of:

- Extended gate releases, especially for strategy W1C. For comparison, up to 130,000 ML/day was released during in November and mid December 2010. At this rate, the additional releases could occur in about half a day.
- Ongoing gate releases of up to 30,000 ML/day, which do not isolate any residents but can inundate some lower bridges that cause inconvenience.
- Ongoing valve release of up to about 4,300 ML/day, which can be maintained without inundate any bridges.

Actual releases would be decided by Seqwater based on operational considerations and in accordance with its statutory and regulatory obligations.

Water security impacts

The water security impacts of releases will be zero if the dams fill over the remainder of the wet season. Current forecasts indicate that there is a high probability of this occurring:

- Heavy rainfall is forecast over the Christmas holiday period, as noted above.
- Over the remainder of the wet season, advice from the Bureau of Meteorology is that sea surface temperatures are likely to remain at levels typical of a La Niña event into the first quarter of 2011, with the majority of the models indicating the event will gradually weaken over the coming months.

The water security impacts will be minimal, even if there were no further inflows to the dams. Modelling indicates that the reduction would have a minimal impact on the probability of key water Grid storages falling to 40 per cent of capacity over the next five years.

North Pine and Leslie Harrison dams

North Pine and Leslie Harrison dams do not have flood mitigation potential. Once the dams have reached Full Supply Level, all water flows into the dam must be released to protect the structural safety of the dam.

Seqwater has advised that, without major releases, there are negligible benefits to reducing volumes stored in North Pine or Leslie Harrison dams for the purposes of reducing the extent or duration of any downstream flooding impacts.

For North Pine Dam, there may be some operational and community benefits to minor releases to below Full Supply Level in some circumstances. Any gate operation at North Pine Dam results in inundation of Youngs Crossing Road, which isolates a number of residents. These impacts are currently being minimised by releasing from North Pine Dam at night. With further rainfall forecast, Seqwater may choose to reduce the level to below Full Supply Level in order to reduce the frequency of night releases or the likelihood of releases being required during the day.

For this dam, the SEQ Water Grid Manager has advised Seqwater that, from a water security perspective, it would not object to water being released to 97.5 per cent of storage capacity at any time until end March 2010.

For Leslie Harrison Dam, gate operations do not impact on public roads and generally only inconvenience the general public during large flood events. There is no scope to reduce this inconvenience through small pre-emptive releases. Accordingly, no in-principle approval be made for pre-emptive releases from this dam.

CTS No. 01661/10

Advisor .....☐ Ok
Dated / /
☐ Approved ☐ Not Approved ☐ Noted
☐ Further information required
Minister [redacted]
Dated 16/1/10

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17 JAN 2011

☐ MINISTER
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☐ ADMIN
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SEQ Water Grid Manager and Seqwater MINISTERIAL BRIEFING NOTE

TO: **Minister for Natural Resources, Mines and Energy and Minister for Trade**

SUBJECT: **January 2011 flood event and Wivenhoe Dam operations**

REQUESTED BY

- The Ministers Office requested this brief by 16 January 2011.

TIMEFRAME

- Noting of this brief is required prior to the Emergency Cabinet meeting to be held on 17 January 2011.

RECOMMENDATION

It is recommended that the Minister:

- **note** Seqwater's Ministerial briefing note setting out background information on Wivenhoe Dam, the January 2011 flood event and Seqwater's Flood Mitigation Manual.
- **note** the advice on the benefits of pre-emptive releases from Wivenhoe Dam in response to the Minister's request.
- **note** Mr Brian Cooper's independent compliance review of the operation of Wivenhoe Dam against the Flood Mitigation Manual for the January 2011 flood event.
- **approve** key media responses on the flood event and Wivenhoe Dam.
- **approve** that Mr Barry Dennien, Chief Executive Officer, SEQ Water Grid Manager, speak to the media in accordance with the key media responses.

BACKGROUND

- From 13 December 2010 to 11 January 2011, South East Queensland experienced unprecedented rainfall, which resulted in the January 2011 flood event. Wivenhoe Dam played a significant role in mitigating the downstream flood peak.
- **Attachment A** contains Seqwater's Ministerial briefing note setting out background information on Wivenhoe Dam, Wivenhoe Dam's flood mitigation and operations, Seqwater's Flood Mitigation Manual, the regulatory context of the Flood Mitigation Manual and Seqwater's proposed procedure for the preparation of its comprehensive Flood Mitigation Manual report to the Chief Executive, Department of Environment and Resource Management, on Wivenhoe Dam operations for the January 2011 flood event.
- After the Wivenhoe Dam release in October 2010, by way of a letter dated 25 October 2010 at **Attachment B,** the Minister requested the SEQ Water Grid Manager to procure urgent advice as to whether South East Queensland's water security situation would provide "*an opportunity to reduce the volume stored in key dams as a means of reducing the severity, frequency and duration of flooding in downstream areas.*"
- The Minister also sought the SEQ Water Grid Manager's "*confirmation that these options would not significantly impact upon our current water security, measured as the probability of needing to reintroduce Medium Level Restrictions over the next five to ten years.*"
- As a result, the SEQ Water Grid Manager requested that Seqwater provide a report assessing the options requested by the Minister.

Author	Cleared by	Cleared by	Recommended:
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Position: Chief Executiv	Position:	Position:	Director-General, DERM
Officer, SEQ Water Gric	Tel No:	Tel No:	Tel No: [redacted]
Manager	Name:	Name:	Date:
Tel No: [redacted]	Position:	Position:	
Date: 16 January 2011	Tel No:	Tel No:	

File Ref: [redacted]

- **Attachment C** contains the SEQ Water Grid Manager's letter to the Minister dated 24 December 2010, in response to the pre-emptive Wivenhoe Dam release advice sought, based on Seqwater's advice. This letter stated that "*Seqwater has advised that releasing water to below Full Supply Level may provide some benefits in terms of reduced community and operational impacts during minor inflow events, such as has occurred over the past month. For medium and major flood events, it considers that pre-emptive releases will provide negligible benefits...Informed by this advice, the SEQ Water Grid Manager has advised Seqwater that, from a water security perspective, it has no in-principle objection to minor releases from Wivenhoe, Somerset and North Pine dams to minimise the operational and community impacts of gate releases.*"
- It should be noted that while seeking advice from Seqwater on pre-emptive dam releases, the SEQ Water Grid Manager continued to provide the Department of Environment and Resource Management with progress reports.
- On 11 January 2011, the Minister requested the SEQ Water Grid Manager to procure an urgent independent review of Seqwater's operation of Somerset and Wivenhoe Dams in accordance with the Flood Mitigation Manual, for the period 13 December 2010 to 11 January 2011.
- Mr Brian Cooper was engaged to conduct the independent review and his report and curriculum vitae are contained in **Attachment D.**
- Mr Brian Cooper concludes that the "*strategies as set out in the Flood Mitigation Manual have been followed, allowing for the discretion given to making variations in order to maximise flood mitigation effects. The actions taken and decisions made during the Flood Event appear to have been prudent and appropriate in the context of the available knowledge available to those responsible for flood operations and the way events unfolded.*"

CURRENT ISSUES

- The purpose of this Ministerial brief is to provide the Minister with background information on the January 2011 flood event and the operation of Wivenhoe Dam, in preparation for an Emergency Cabinet meeting scheduled on 17 January 2011.
- This Ministerial brief provides information that may assist in responding to questions raised, or anticipated to be raised, by the public and media.
- **Attachment E** contains key media responses based on factual information from Seqwater's Ministerial briefing note.

RESOURCE/IMPLEMENTATION IMPLICATIONS

- Any recommendations regarding the Flood Mitigation Manual, improvements to the structure or operation of Wivenhoe Dam, resourcing etc. will arise after any relevant flood event debriefs and Seqwater's Flood Mitigation Manual report to the Chief Executive, Department of Environment and Resource Management.

PROPOSED ACTION

- In accordance with the Flood Mitigation Manual, Seqwater will submit a comprehensive report to the Chief Executive, Department of Environment and Resource Management, containing details of the procedures used, the reasons for such and other pertinent information for the operation of Wivenhoe Dam during the January 2011 flood event.
- This report is required to be submitted within six weeks of completion of the flood event.

Author	Cleared by	Cleared by	Recommended:
Name: Barry Dennien Position: Chief Executive Officer, SEQ Water Grid Manager Tel No: [redacted] Date: 16 January 2011	Name: Position: Tel No: Name: Position: Tel No:	Name: Position: Tel No: Name: Position: Tel No:	Name: John Bradley Director-General, DERM Tel No: [redacted] Date:

OTHER INFORMATION

- *Consultation:* In preparing the Ministerial briefing note at **Attachment A**, Seqwater consulted with Mr Peter Allen and Mr Bob Reilly from the Office of the Water Supply Regulator, Department of Environment and Resource Management. The SEQ Water Grid Manager provided information on the Minister's request for advice on pre-emptive releases from Wivenhoe Dam and the independent compliance review from Mr Brian Cooper.
- *Legislation:* The Flood Mitigation Manual is a requirement of, and approved by the Chief Executive, Department of Environment and Resource Management, under the *Water Supply (Safety and Reliability) Act 2008*.
- *Key Communication Messages:* The information contained in this Ministerial brief may be used to formulate public messaging regarding the flood event and the operation of Wivenhoe Dam. Communicating the benefits of Wivenhoe Dam for flood mitigation may present positive communication opportunities.

MINISTER'S COMMENTS

ATTACHMENTS

- **Attachment A: Seqwater Ministerial briefing note**
- **Attachment B: Letter from Minister Robertson to the SEQ Water Grid Manager dated 25 October 2010**
- **Attachment C: Letter from the SEQ Water Grid Manager to Minister Robertson dated 24 December 2010**
- **Attachment D: Flood Mitigation Manual compliance review report by Mr Brian Cooper and curriculum vitae of Mr Brian Cooper**
- **Attachment E: Key media responses**

Author	Cleared by	Cleared by	Recommended:
Name: Barry Dennien Position: Chief Executive Officer, SEQ Water Grid Manager Tel No: [redacted] Date: 16 January 2011	Name: Position: Tel No: Name: Position: Tel No:	Name: Position: Tel No: Name: Position: Tel No:	Name: John Bradley Director-General, DERM Tel No: [redacted] Date:

File Ref:

Ministerial Briefing Note
17 January 2010
Flood Event January 2011

1 BACKGROUND INFORMATION ON WIVENHOE DAM

Wivenhoe Dam was completed in 1984 and has two main functions;

- A 1,165,000 ML storage providing an urban water supply for Brisbane;
- Flood mitigation in the Brisbane River by providing a dedicated flood storage volume of 1,450,000 ML (this flood storage was increased in 2005 to 1,966,000 ML with the dam at the point of failure).

In accordance with the Queensland Regulatory program for dam spillway upgrades, a further upgrade of Wivenhoe Dam is scheduled to occur prior to 2035 but only for dam safety reasons in the event of a probable maximum flood and has no impact on the current event.

Wivenhoe Dam is in excellent condition with four Comprehensive Dam Safety reviews undertaken in the last 14 years, the latest in 2010.

2 WIVENHOE DAM FLOOD MITIGATION AND FLOOD OPERATIONS

2.1 What were the benefits provided by Wivenhoe Dam during the current event?

The following graphs demonstrate the significant benefits of Wivenhoe Dam in mitigating the current flood event, with reductions in flood peak from Wivenhoe Dam not existing of up to 2.5 metres in the City area and up to 5.5 metres in the Moggill area further upstream.

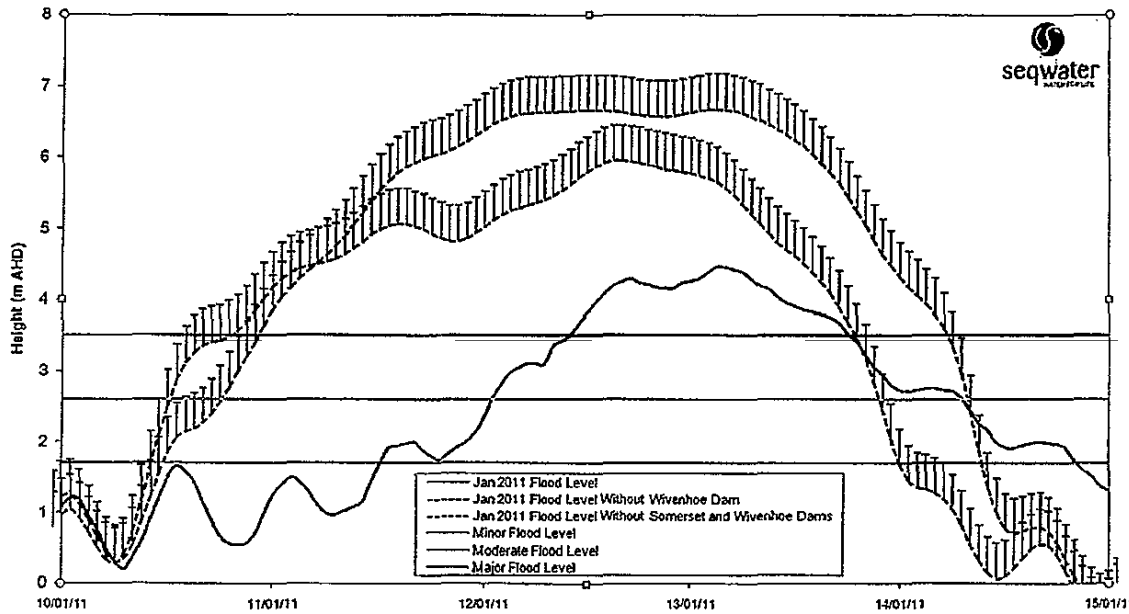
This equates to significant reduction in the potential for loss of life as well as saving in damages in the order of up to $1.6 billion based on current damage curves. Up to 13,000 more properties would have been impacted by the event without the Dam. (Source: Flood Damage Tables provided to Seqwater by the Brisbane City Council).

The time at which flood levels remained elevated above major levels has also been reduced by up to 3 days by the dam. This has significant benefits to impact on the population of the city, property damage and the recovery operation.

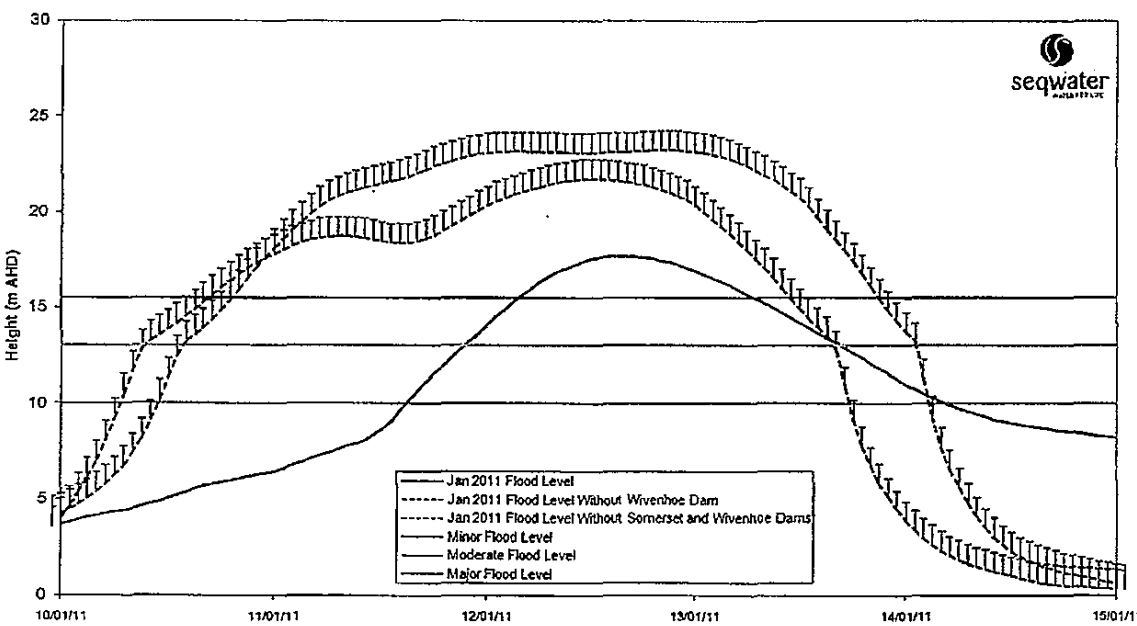
Depending on the nature of the event, the presence of Wivenhoe Dam could also potentially increase flood warning times to impacted areas. How these times may have been increased during the current event is presently difficult to quantify, but discussions will be held with BOM on this issue at a later date.

In addition, the strategy adopted to quickly close off releases once the peak in the dam had been reached and rain stopped falling certainly reduced the predicted flood peak by at least one metre in the lower Brisbane River area. This was carried out because the releases had stopped the dam from rising and careful monitoring allowed rapid reduction of releases while ensuring fuse plug initiation did not occur.

JANUARY 2011 BRISBANE FLOOD
Assessment of Flood Levels at Brisbane City



JANUARY 2011 BRISBANE FLOOD
Assessment of Flood Levels at Moggill



2.2 Why was Wivenhoe Dam only allowed to rise up to 191% and not 230%?

Wivenhoe Dam mitigates downstream flooding by storing incoming flood water during a rainfall event and releasing these waters at a reduced flow rate downstream to reduce flood impacts. The timing of the releases is also manipulated so that the aim is for outflows from the dams to impact on downstream areas only after the peak inflows from the downstream major tributaries have passed. However this aim cannot always be achieved in practice. This is because some large floods, such as the one currently being experienced, have the potential to overflow the dam's flood storage compartment. **Should this occur, the dam would fail and the resulting damage and loss of life would be at least 100 to 1000 times greater than that currently being experienced.**

Therefore the basis of all flood operation decision making is to ensure the dam never fails. This is the reason that the dam's flood storage compartment would never be intentionally fully filled as any additional inflows after this point would result in a dam failure. At any one time, there will always be uncertainty about what rain is going to occur. Hence, we cannot use all of the flood capacity as we would not be able to release sufficient water to cater for large inflows.

2.3 What is the role of the erodible fuse plug embankments?

Another factor that impacts on flood release decision making in large events are the levels at which the erodible fuse plugs are triggered. The fuse plugs act as a safety valve to rapidly increase dam outflows if the structural safety of the dam is in danger. Loss of one or more fuse plugs severely limits the ability of the dam to mitigate the effects of future flood events that may occur prior to the fuse plug or plugs being reinstated. Reinstatement of a fuse plug following an event would take a minimum of 4 to 6 months and would require an extended period of relatively dry weather.

2.4 Why weren't pre-emptive releases undertaken prior to the start of the flood event?

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

During these events, requests were received from Councils and residents impacted by bridge closures downstream of the dam to curtail releases as soon and as quickly as possible. Additionally the 2 January end date of the flood event prior to the current event meant that significant drain down of the dam prior to the onset of the current event that commenced on 6 January 2011, was not possible without major bridge inundation downstream of the dam and without exceeding minor flood levels in the lower Brisbane River.

Additionally, a flood event was also experienced in October 2010 that resulted in a release of 750,000ML from the dam. Accordingly drain down below the dam full supply level prior to the start of the first December event would not have been possible without significant bridge inundation and without exceeding minor flood levels (as defined by BOM and BCC) in the lower Brisbane River.

Regardless, significant drain down prior to the current event would have had little impact on the peak level in Wivenhoe Dam as shown in the table below. The reason for this is that this total event inflow volume of 2,600,000 ML is well in excess of the useable flood storage combined with the available water supply storages shown in the table.

The specific impact on the Lower Brisbane River of these reduced dam levels requires the use of a complex hydraulic model. The results of this modelling would still contain a degree of uncertainty as illustrated by the difficulties in estimating the final flood peak in Brisbane during the event. This is because the rapid closure of the gates after peak inflow was achieved resulted in significant water level reductions downstream and this is difficult to model accurately.

JANUARY 2011 FLOOD			
Starting Level		Peak Height	Capacity
%	m AHD	m AHD	%
100	67.0	74.97	191
95	66.5	74.93	191
90	65.8	74.88	190
75	64.0	74.63	187
50	60.0	74.11	180

It should be noted that the possible reductions shown above are based up a unique dual peaked flood hydrograph with a volume of about 2,600,000 ML which occurred during this event. A hydrograph with the same volume but a different distribution could result in a significantly lower reduction in peak water levels.
Flood operations at the dam are also highly dependent upon the flood inflow volume and a slight variation in the flood volume could significantly reduce the benefits associated with draining down the dam prior to a flood event.

2.5 Is there a detailed record of the events associated with the current flood?

A preliminary report has been prepared and is attached to this briefing.

3 THE MANUAL OF FLOOD MITIGATION AT WIVENHOE DAM AND SOMERSET DAM

3.1 What is the Manual of Flood Mitigation and how was it developed?

The Manual of Flood Mitigation for Wivenhoe and Somerset dams in its current form was developed in 1992 during an extensive hydrological study of the Brisbane and Pine Rivers catchments by DPI, Water Resources. The final reports were subject to extensive internal review by the Water Resources Group before being reviewed by an independent review panel comprising Professor Colin Apelt, Head of Department, Department of Civil Engineering, University of Queensland and Mr Eric Lesleighter, Principal Hydraulic Engineer and Chief Engineer Water Resources, Snowy Mountains Engineering Corporation. Subsequently, the Manual was extensively reviewed during the Brisbane Valley Flood Damages Minimisation Study in 2006, with the latest comprehensive review of the Manual undertaken in 2009. Both of these reviews have included expert review panels comprising key stakeholders, with the most recent review involving representatives from DERM, BOM, BCC and SunWater.

The Manual of Flood Mitigation is prepared by Seqwater as the owner of the dam and approved and gazetted by the Chief Executive of DERM in accordance with the Water Supply Act 2008. The manual defines flood objectives procedures; roles and responsibilities; and staffing and operational requirements for flood events impacting on Wivenhoe and Somerset dams.

3.2 What is contained in the Manual?

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

- 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 primarily, this involves minimising inundation of the seven bridges below the dam upstream of Moggill);
- 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.

During an event, the operation of the dam transitions between the following four operating strategies depending of the circumstances at the time. These procedures associated with these strategies are explained in detail in the Manual.

- **Strategy W1** – Primary consideration is given to Minimising Disruption to Downstream Rural Life.
- **Strategy W2** – Transition Phase moving from Minimising Disruption to Protecting Downstream Urban Areas.
- **Strategy W3** – Primary consideration is to Protect of Urban Areas from Inundation.
- **Strategy W4** – Primary consideration is to protecting the structural safety of the Dam.

In addition to these strategies, historical records show that there is a significant probability of two or more flood producing storms occurring in the Brisbane River system within a short time of each other. Accordingly for each flood event, the aim is always to empty stored floodwaters within seven days after the flood peak has passed through the dams.

4 REGULATORY CONTEXT

Operational procedures for flood mitigation for a dam are contained in the Flood Mitigation Manual approved under sections 370 to 374 of the *Water Supply (Safety and Reliability) Act 2008* (Water Supply Act). Under section 370 of the Water Supply Act, Seqwater as the owner and operator of Wivenhoe and Somerset Dams is required to prepare a Flood Mitigation Manual. The Chief Executive (CE) of DERM (or his delegate) approves the Flood Mitigation Manual, and the approval is notified in the Queensland Government Gazette. Approval can be for a period of up to five years, after which the approval needs to be renewed. There are no decision-making criteria specified in the Water Supply Act for the CE to take into account when approving the Flood Mitigation Manual.

The Flood Mitigation Manual requires, amongst other matters:

1. Flood operations to be conducted in accordance with manual's provisions, unless Seqwater considers that it is necessary to depart from the procedures of the Flood Mitigation Manual to meet the flood mitigation objectives of the Flood Mitigation Manual. The Flood Mitigation Manual sets out a consultation and approval process through Seqwater's Chair and the CE for departures from the Flood Mitigation Manual. This discretion was not exercised in the January 2011 flood event.
2. Flood operations to be under the control of CE-approved engineers (who are highly qualified and experienced)
3. Annual reporting on the preparedness and status of the flood control system for flood operations, and the training of the personnel who manage the flood events.
4. Reporting on the flood operations during flood events.
5. Reviews after flood events such as the January 2011 event, and a Seqwater report containing details of the procedures used, the reasons for such and other pertinent information. Seqwater must forward this report to the CE within six weeks of the completion of a flood event.

Section 374 of the Water Supply Act protects the CE and Seqwater from liability for complying with the Flood Mitigation Manual. It states:

> *(1) The chief executive or a member of the council does not incur civil liability for an act done, or omission made, honestly and without negligence under this part.*
>
> *(2) An owner of a dam who observes the operational procedures in a flood mitigation manual, approved by the chief executive, for the dam does not incur civil liability for an act done, or omission made, honestly and without negligence in observing the procedures.*

During November 2010, Commonwealth, State and local government agencies developed a *Protocol for Communication of Flooding Information for the Brisbane River Catchment – including Floodwater Releases from Wivenhoe and Somerset Dams* to "*ensure the provision of consistent and robust information to the community*". This is separate from the Flood Mitigation Manual, is not legally binding and is not subject to regulatory approval/review.

Some DERM staff, because of their specialist skills, work in the Flood Operations Centre that Seqwater activates to manage such events in accordance with the Flood Mitigation Manual. The Flood Operations Centre is not involved in any of the regulatory decisions concerning the dams or are members of the Office of the Water Supply Regulator,

Department of Environment and Resource Management, which undertakes the CE's regulatory functions.

5 SEQWATER REPORT

It is recommended that the process and content for reports required for this event be:

- In the short term, utilise this report attached to this briefing note as the basis for communications and discussion.
- Prepare any Interim Reports as agreed to provide information and input as required.
- Seqwater prepare a Comprehensive Report as per the existing regulatory requirements of the Act and the gazetted manual and any requirements of the Dam Safety Regulator. This would be done within 6 weeks of the closure of the current event as per the manual. This timeframe is subject to any new mobilisation of the Flood Operations Centre. The Table of Contents would include:
    - Introduction
    - Flood Event Summary
    - Mobilisation and Staffing
    - Event Rainfall
    - Inflow and Release Details
    - Data Collection System Performance
    - Data Analysis Performance
    - Communication
    - Flood Management Strategies and Manual Compliance
    - Improvements in data collection systems, practices and processes.
    - improvements by interacting agencies
    - Review of factors impacting on the protection of urban areas
    - Recommendations & Conclusions
- The report would then be reviewed by the Dam Safety Regulator in conjunction with any peer review they require. The review should cover:
    - Were the provisions of the manual complied with?
    - What improvements to either facilities e.g. stream gauges, or work practices, are desirable to improve Sewater's ability to predict inflows into the dams.
    - Are improvements to either Seqwater's facilities or work practices desirable to improve Seqwater's ability to manage events? For example, investigations to raise the dam to improve its flood storage capacity, If so, what are they and their implications

- Are changes to the facilities or work practices of other organisations desirable to improve Seqwater's abilities to manage these events?
- whether it is worth investigating increasing the flood capacity of Wivenhoe
- whether the Brisbane River crossings which act, under some situations as a constraint on the releases from Wivenhoe, should be replaced by bridges. For example if the smallest could pass , for example, 2,500 cumecs, then this could enable higher releases under some circumstances.
- Whether the policy of draining the flood compartment within 7 days should be modified.
- Given the manual's order of priorities i.e. protection of the dam etc, are any changes in the flood release strategies for either dam desirable? If so, what are they, and their implications

- Based on this review, a review of the Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam would occur utilising an expert panel of review including representatives of DERM, Seqwater, BoM, affected Local Governments and other stakeholders as necessary.

seqwater

WATER FOR LIFE

JANUARY 2011 FLOOD EVENT

TABLE OF CONTENTS

1 INTRODUCTION

Wivenhoe Dam was constructed by the Queensland Government between 1977 and 1984. The dam is a 56 m AHD high and 2.3 kilometre long earth and rock embankment separated into two parts by a concrete gravity spillway. The spillway is controlled by 5 radial gates, each 12.0 metres wide by 16.0 m AHD high. Two saddle dam embankments are located on the left side of the reservoir.

The dam spillway capacity was upgraded in 2005. This was done primarily through the construction of a 164 metre wide secondary spillway through the right abutment of the existing dam. This spillway contains three erodible earth fill fuse plug embankments that are initiated at different dam levels in excess of EL 75.6.

The dam has two main functions by providing:

- A 1,165,000 ML storage at full supply level (FSL EL 67.0) providing an urban water supply for Brisbane and surrounding areas;

- Flood mitigation in the Brisbane River by providing a dedicated flood storage volume of 1,450,000 ML up to EL77 (this flood level was increased as part the 2005 upgrade to allow a water level of EL80m and a temporary flood storage volume of 1,966,000 ML with all fuse plugs initiated and the dam at the point of failure).

The dam has an EXTREME hazard classification under ANCOLD guidelines because of the significant development downstream in the Brisbane and Ipswich metropolitan areas, with the population at risk in the event of a dam failure numbering in the hundreds of thousands.

In accordance with the Queensland Regulatory program for dam spillway upgrades, a further upgrade of Wivenhoe Dam for dam safety reasons only is scheduled to occur prior to 2035 to enable the dam to safely pass the Probable Maximum Flood. This work will involve the reconstruction of Saddle Dam 2 as a fuse plug spillway.

Wivenhoe Dam is in excellent condition. Comprehensive Dam Safety reviews undertaken in accordance with ANCOLD guidelines have been undertaken in 1997 (Gutteridge, Haskins & Davey Pty Ltd), 2003 (Wivenhoe Alliance), 2006 (NSW Department of Commerce), 2009 (GHD) and September 2010 (Seqwater). The reports concluded that the design of the dam is in accordance with modern day standards and that there are no significant outstanding design or construction issues that require investigation.

2 WIVENHOE DAM FLOOD MITIGATION AND FLOOD OPERATIONS

2.1 Flood Mitigation

The Brisbane River catchment covers an area of approximately 14,000 square kilometres of which about half is below Wivenhoe Dam. Maximum overall flood mitigation effect is achieved by operating Wivenhoe Dam in conjunction with Somerset Dam. Although Somerset and Wivenhoe Dam reduce flooding in Brisbane City, major flooding can still occur. The Lockyer-Laidley Valley drains into the Brisbane River through Lockyer Creek that enters the Brisbane River just downstream of Wivenhoe Dam near Lowood. Another major tributary, the Bremer River, flows into the Brisbane River at Moggill. Wivenhoe Dam has no control over inflows into the Brisbane River from both these major tributaries.

Wivenhoe Dam mitigates downstream flooding by storing incoming flood water during a rainfall event and releasing these waters at a reduced flow rate downstream to minimise flood impacts. The timing of the releases is also manipulated so that the aim is for outflows from the dams to impact on downstream areas only after the peak inflows from the downstream major tributaries have passed. However, this aim cannot always be achieved in practice. This is because some large floods, such as the one currently being experienced, have the potential to overflow the dam's flood storage compartment. **Should this occur, the dam would fail and the resulting damage and loss of life would be at least 100 to 1000 times greater than that currently being experienced.**

Therefore the basis of all flood operation decision making is to ensure the dam never fails. This is the reason that the dam's flood storage compartment would never be intentionally fully filled as additional inflows after this point would result in a dam failure. Similarly, there will be uncertainty on future rainfall that could occur which could not be releases if there was insufficient flood storage which could not be stored or released.

Another factor that impacts on flood release decision making in large events are the levels at which the erodible fuse plugs are triggered. Loss of one or more fuse plugs severely limits the ability of the dam to mitigate the effects of future flood events that may occur prior to the fuse plug or plugs being reinstated. Reinstatement of a fuse plug following an event would take a minimum of 4 to 6 months and would require an extended period of relatively dry weather.

2.2 Flood Operations

A real time flood monitoring and forecasting system has been established in the Wivenhoe and Somerset Dam catchments. This system employs radio telemetry to collect, transmit and receive rainfall and stream flow information. The system consists of around 230 field stations that automatically record rainfall and/or river heights at selected locations in the dam catchments. Most of these field stations are owned by Seqwater with the remainder belonging to other agencies.

The rainfall and river height data is transmitted to Seqwater's Flood Operations Centre in real time. Once received in the Flood Operations Centre, the data is processed using a Real Time Flood Model (RTFM) to estimate likely dam inflows and evaluate a range of possible inflow scenarios based on forecast and recorded rainfall in the dam catchments. The RTFM is a suite of hydrologic computer programs that utilise the real time data to assist in the operation of the dams during flood events.

Seqwater engineers use the RTFM for flood monitoring and forecasting during flood events to operate the dams in accordance with a Manual of Flood Mitigation (the origin of and objectives and procedures contained in the Manual of Flood Mitigation are explained in the following section of this document). Releases of water from the dams are optimised to minimise the impacts of flooding in accordance with the objectives and procedures contained in a Manual of Flood Mitigation.

The RTFM and data collection network performed well During the January 2011 event, with no failures experienced that compromised the ability of Seqwater to operate the dam.

3 MANUAL OF FLOOD MITIGATION FOR WIVENHOE AND SOMERSET DAMS

The Manual of Flood Mitigation for Wivenhoe and Somerset Dams, in its current form, was developed in 1992 during an extensive hydrological study of the Brisbane and Pine Rivers catchments by DPI, Water Resources. The final reports were subject to extensive internal review by the Water Resources Group before being reviewed by an independent review panel comprising Professor Colin Apelt, Head of Department, Department of Civil Engineering, University of Queensland and Mr Eric Lesleighter, Principal Hydraulic Engineer and Chief Engineer Water Resources, Snowy Mountains Engineering Corporation.

Subsequently, the Manual was extensively reviewed during the Brisbane Valley Flood Damages Minimisation Study in 2006, with the latest comprehensive review of the Manual undertaken in 2009. Both of these reviews have included expert review panels comprising key stakeholders, with the most recent review involving representatives from DERM, BOM, BCC and SunWater.

The Manual of Flood Mitigation is prepared by Seqwater as the owner of the dam and approved and gazetted by the Chief Executive of DERM in accordance with the Water Supply Act 2008. The manual defines flood objectives procedures; roles and responsibilities; and staffing and operational requirements for flood events impacting on Wivenhoe and Somerset dams.

The primary objectives of the procedures contained in the flood manual are, in order of importance:

- 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 primarily, this involves minimising inundation of the seven bridges below the dam upstream of Moggill);
- 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.

During an event, the operation of the dam transitions between the following four operating strategies depending of the circumstances at the time. These procedures associated with these strategies are explained in detail in the Manual.

- **Strategy W1** – Primary consideration is given to Minimising Disruption to Downstream Rural Life. Under this strategy, the predicted water level is below 68.50 m AHD and the maximum release is 1,900m3/s.

- **Strategy W2** – Transition Phase moving from Minimising Disruption to Protecting Downstream Urban Areas. Under this strategy, the water level is predicted to be between 68.5 and 74.0 m AHD and the maximum release is less than 3,500m3/s.

- **Strategy W3** – Primary consideration is to Protect of Urban Areas from Inundation. Under this strategy, the water level is predicted to be between 68.5 and 74.0 m AHD but the maximum release is less than 4,000m3/s.

- **Strategy W4** – Primary consideration is to protecting the structural safety of the Dam. Under this strategy, the water level is predicted to exceed 74.0 m AHD and there is no limit to the maximum release. Consideration is given to managing flood releases to avoid fuse plug initiation if at all possible as this would compromise flood mitigation capacity in the short to medium term.

In addition to these strategies, historical records show that there is a significant probability of two or more flood producing storms occurring in the Brisbane River system within a short time of each other. Accordingly for each flood event, the aim is always to empty stored floodwaters within seven days after the flood peak has passed through the dams.

4 JANUARY 2011 FLOOD EVENT

4.1 Background

In the 25 days leading up to the current event, three flood events impacting on Wivenhoe Dam were experienced, with gate releases being made 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 impacted by bridge closures downstream of the dam to curtail releases as soon and as quickly as possible. Additionally the 2 January end date of the flood event prior to the current event meant that significant drain down of the dam prior to the onset of the current event that commenced on 6 January 2011, was not possible without major bridge inundation downstream of the dam and without exceeding minor flood levels in the lower Brisbane River.

Additionally, a flood event was also experienced in October 2010 that resulted in a release of 750,000ML from the dam. Accordingly drain down below the dam full supply level prior to the start of the first December event would not have been possible without significant bridge inundation and without exceeding minor flood levels (as defined by BOM and BCC) in the lower Brisbane River.

Regardless, significant drain down prior to the current event would have had little impact on the peak level in Wivenhoe Dam as shown in the table below. The reason for this is that this total event inflow volume of 2,600,000 ML is well in excess of the useable flood storage combined with the available water supply storages shown in the table.

The specific impact on the Lower Brisbane River of these reduced dam levels requires the use of a complex hydraulic model. The results of this modelling would still contain a degree of uncertainty as illustrated by the difficulties in estimating the final flood peak in Brisbane during the event. This is because the rapid closure of the gates after peak inflow was achieved resulted in significant water level reductions downstream and this is difficult to model accurately.

JANUARY 2011 FLOOD			
Starting Level		Peak Height	Capacity
%	m AHD	m AHD	%
100	67.0	74.97	191
95	66.5	74.93	191
90	65.8	74.88	190
75	64.0	74.63	187
50	60.0	74.11	180

It should be noted that the possible reductions shown above are based on a dual peaked flood hydrograph with a volume of about 2,600,000 ML which occurred during this event. A hydrograph with the same volume but a different distribution could result in a significantly lower reduction in peak water levels.
Flood operations at the dam are also highly dependent upon the flood inflow volume and a slight variation in the flood volume could significantly reduce the benefits associated with draining down the dam prior to a flood event.

4.2 Event Decision Making

The following table contains a summary of the key decisions points associated with the current event. As at 16 January 2011, the event remains in progress.

DATE AND TIME	FLOOD EVENT MILESTONE
07:00 06/01/2011 (Thursday)	Rainfall is experienced in the dam catchments that will result in flood releases, however Wivenhoe releases are delayed for 24 hours to allow Lockyer Creek flood flows to pass downstream and prevent the isolation of the community dependent of Burtons Bridge. The forecast is for 150mm over the next 24 hours.
15:00 07/01/2011 (Friday)	Wivenhoe releases commence, with operational strategy W1 in use. Rainfall for the next four days is estimated to be between 140mm and 300mm, with a forecast for rain easing on Tuesday 11 January 2011. All bridges downstream of the dam with the exception of Fernvale Bridge and Mt Crosby Weir Bridge are expected to be inundated for a number of days.

06:00 09/01/2011 (Sunday)	Moderate to heavy rain periods forecast until Tuesday, but both Wivenhoe and Somerset dam levels were falling slowly, with Somerset at 1.27 m AHD above FSL and Wivenhoe 1.58 m AHD above FSL.
15:30 09/01/2011 (Sunday)	Following significant rain during the day a meeting of Duty Engineers is held. The QPF issued at 16:00 indicates 50mm to 80mm over the next 24 hours. Based on this forecast, it is anticipated that dam levels can be held to a maximum of 3.50 m AHD above FSL in Somerset and 5.5 m AHD above FSL in Wivenhoe. However, by 19:00 it was apparent that both Fernvale Bridge and Mt Crosby Weir Bridge would be inundated by the combined dam releases and Lockyer Creek flows and that the operational strategy had progressed to W2.
06:30 10/01/2011 (Monday)	Rainfall continued during the night and based on rainfall on the ground it was apparent the operational strategy had progressed to W3.
06:30 10/01/2011 (Monday)	Rainfall continued during the day but based on rainfall on the ground, operational strategy W3 remained in use. However it was apparent that any further heavy rain would result in progression of the operational strategy to W4.
08:00 11/01/2011 (Tuesday)	Rainfall continued during the night with isolated heavy falls in the Wivenhoe Dam catchment area and based on rainfall on the ground it was apparent the operational strategy would soon progress to W4 with Wivenhoe Dam exceeding 8.00 m AHD above FSL. The objective now was to limit outflows and subsequent flood damage to urban areas, while ensuring the structural safety of the dam.
11:00 11/01/2011 (Tuesday)	Rapid inflows were experienced in Wivenhoe Dam, with the dam rising almost a metre in eight hours. Releases were increased until the dam level stabilised in accordance with Strategy W4. Computer models were not reflecting actual dam inflows due to intense point rainfalls in the immediate catchment around the dam. Falls are estimated to be similar to those experienced at both Toowoomba and Upper Lockyer the previous day and are falling outside and between existing rain gauges.
21:00 11/01/2011 (Tuesday)	Wivenhoe Dam peaked. Peak release of 7450 cumecs with a level of 0.7 metres below fuse plug trigger.
22:00 11/01/2011	Wivenhoe Dam releases were closed off as quickly as possible over the

(Tuesday)	next 11 hours, while ensuring water levels in the dam did not rise further and initiate a fuse plug embankment.
08:00 12/01/2011 (Wednesday)	Minimum possible release level reached, with inflows matching outflows. Further reductions in release rate would likely cause the dam level to rise.
21:00 13/01/2011 (Thursday)	The 7 day dam drain down is commenced as Lockyer Creek and Bremer River peaks pass the Lower Brisbane area. Maximum release target is the limit of damaging floods in Brisbane being 3500 cumecs.
09:00 17/01/2011 (Monday)	Drain down continues, with released expected to cease on Wednesday 19 January 2011 unless further rainfall is experienced.

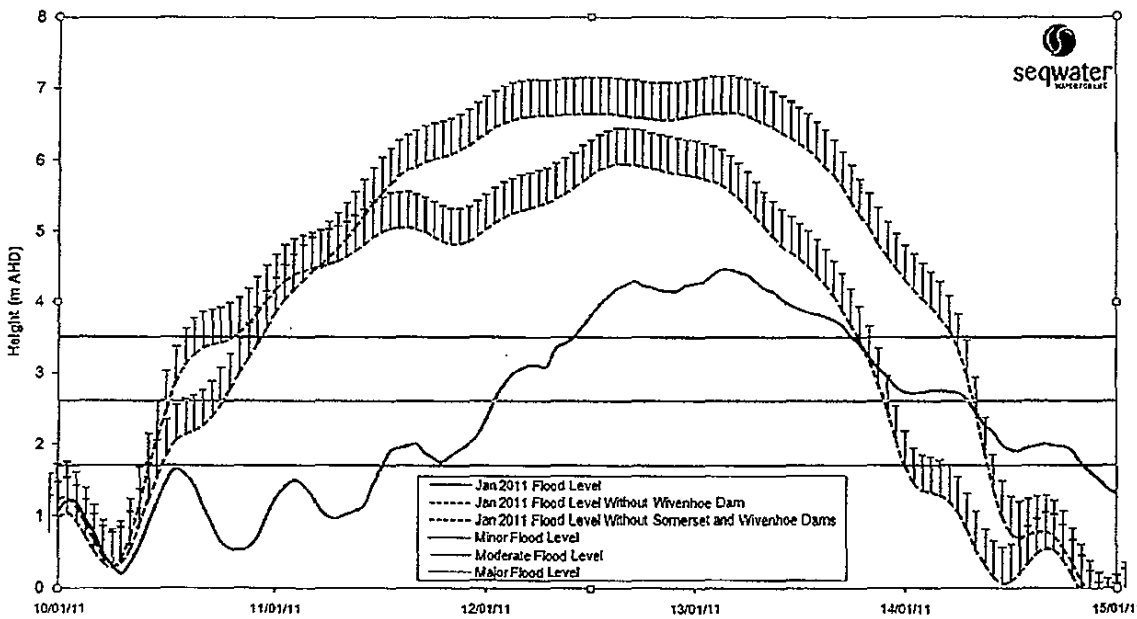
4.3 Flood Mitigation Benefits of Wivenhoe Dam

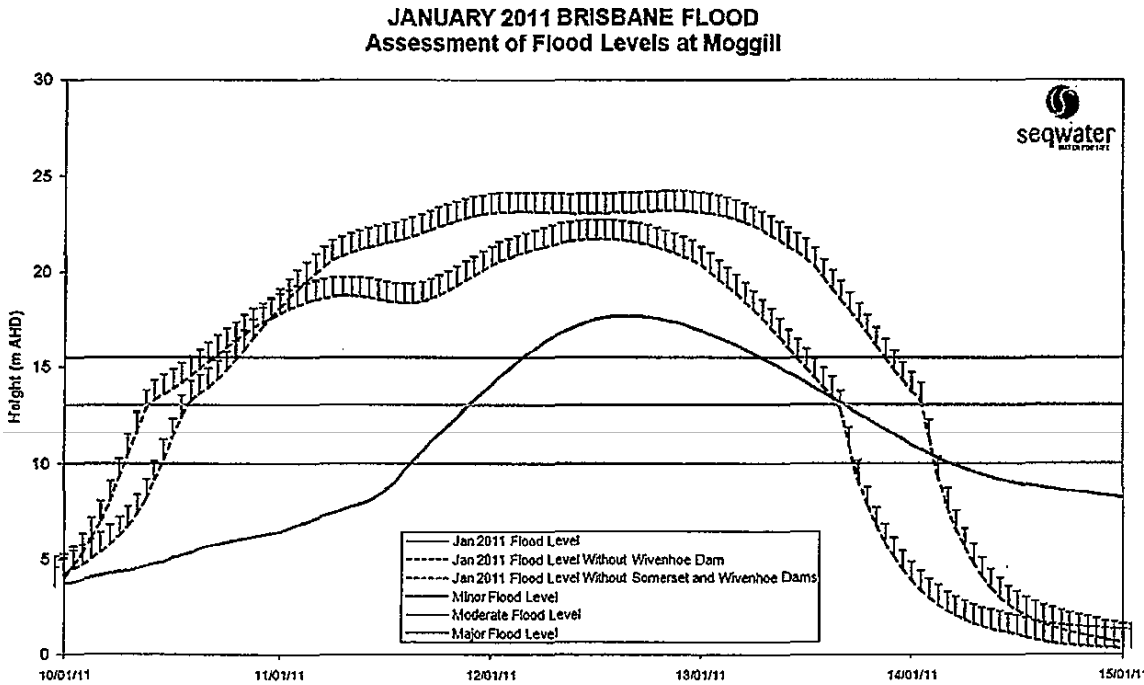
The following graphs demonstrate the significant benefits of Wivenhoe Dam in mitigating the current flood event, with reductions in flood peak of up to 2.5 metres in the City area and up to 5.5 metres in the Moggill area further upstream.

This equates to significant reduction in the potential for loss of life as well as saving in damages in the order of up to $1.6 billion based on current damage curves. Up to 13,000 more properties would have been impacted by the event without the Dam.

The time at which flood levels remained elevated above major levels has also been reduced by up to 3 days by the dam. This has significant benefits to impact on the population of the city, property damage and the recovery operation.

JANUARY 2011 BRISBANE FLOOD
Assessment of Flood Levels at Brisbane City





The strategy adopted to quickly close off releases once the peak in the dam had been reached and rain stopped falling certainly reduced the predicted flood peak by at least one metre in the lower Brisbane River area. This was carried out because the releases had stopped the dam from rising and careful monitoring allowed rapid reduction of releases while ensuring fuse plug initiation did not occur.

This notion is supported by BOM.

5 EVENT REVIEW

Under the Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam that are approved and gazetted by the Department of Environment and Resource Management, there is a regulatory requirement that a report must be prepared as per the below wording:

"Seqwater must prepare a report after each Flood Event. The report must contain details of the procedures used, the reasons therefore and other pertinent information. Seqwater must forward the report to the Chief Executive within six weeks of the completion of the Flood Event."

Such a report was prepared for the flood events of February and March 2010 and copies are available. A copy of the Table of Contents of that report is included as Appendix 1. For this event, the report would be a comprehensive summary of all procedures, actions, outcomes and processes during the event.

It is recommended that the process and content for reports required for this event be:

- In the short term, utilise this report attached to this briefing note as the basis for communications and discussion.
- Prepare any Interim Reports as agreed to provide information and input as required.
- Seqwater prepare a Comprehensive Report as per the existing regulatory requirements of the Act and the gazetted manual and any requirements of the Dam Safety Regulator. This would be done within 6 weeks of the closure of the current event as per the manual. This timeframe is subject to any new mobilisation of the Flood Operations Centre. The Table of Contents would include:
    - Introduction
    - Flood Event Summary
    - Mobilisation and Staffing
    - Event Rainfall
    - Inflow and Release Details
    - Data Collection System Performance
    - Data Analysis Performance
    - Communication
    - Flood Management Strategies and Manual Compliance
    - Improvements in data collection systems, practices and processes.
    - improvements by interacting agencies

- Review of factors impacting on the protection of urban areas
- Recommendations & Conclusions

- The report would then be reviewed by the Dam Safety Regulator in conjunction with any peer review they require. The review should cover:
  - Were the provisions of the manual complied with?
  - What improvements to either facilities e.g. stream gauges, or work practices, are desirable to improve Sewater's ability to predict inflows into the dams.
  - Are improvements to either Seqwater's facilities or work practices desirable to improve Seqwater's ability to manage events? For example, investigations to raise the dam to improve its flood storage capacity, If so, what are they and their implications.
  - Are changes to the facilities or work practices of other organisations desirable to improve Seqwater's abilities to manage these events?
  - whether it is worth investigating increasing the flood capacity of Wivenhoe
  - whether the Brisbane River crossings which act, under some situations as a constraint on the releases from Wivenhoe, should be replaced by bridges. For example if the smallest could pass , for example, 2,500 cumecs, then this could enable higher releases under some circumstances.
  - Whether the policy of draining the flood compartment within 7 days should be modified.
  - Given the manual's order of priorities i.e. protection of the dam etc, are any changes in the flood release strategies for either dam desirable? If so, what are they, and their implications
- Based on this review, a review of the Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam would occur utilising an expert panel of review including representatives of DERM, Seqwater, BoM, affected Local Governments and other stakeholders as necessary.

Appendix A

FINAL REPORT – FLOOD EVENTS AT WIVENHOE, SOMERSET AND NORTH PINE DAMS FOR FEBRUARY AND MARCH 2010

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LIST OF APPENDICES

LIST OF TABLES

Queensland Government

Ref CTS 19311/10

25 OCT 2010

Mr Gary Humphrys
Chair
SEQ Water Grid Manager
PO Box 16205
CITY EAST QLD 4002

Office of the
Minister for Natural Resources,
Mines and Energy and
Minister for Trade

Dear Mr Humphrys

I write in relation to seeking advice regarding options to and benefits of releasing water from key storages in anticipation of major inflows over the coming summer.

I understand that the key Water Grid storages are at 100 per cent of storage capacity going into the traditional wet season, with forecasts of higher than median rainfall and the prospect of multiple flood events.

I am also advised that our water supply is more secure than ever before, due to storages being full, key Water Grid projects completed and ongoing water efficiency.

I seek your urgent advice about whether this water security provides an opportunity to reduce the volume stored in key dams as a means of reducing the severity, frequency and duration of flooding in downstream areas.

In doing so, I note that recent releases from Wivenhoe Dam have resulted in significant inconvenience and isolation for residents in some downstream areas. With the catchments saturated, I understand that even quite minor rainfall events will result in further water releases and further inconvenience for these residents.

By end November 2010, I would appreciate your advice as to the available options and the likely benefits. At a minimum, you should review the operation of Wivenhoe, North Pine and Leslie Harrison dams. At least for Leslie Harrison Dam, this would be a return to standard operating procedures prior to the drought, when the dam was routinely drawn down to 95 per cent of capacity to minimise the impacts of storms on downstream residents.

I also seek your confirmation that these options would not significantly impact upon our current water security, measured as the probability of needing to reintroduce Medium Level Restrictions over the next five to ten years.

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Facsimile +61 7 3225 1828
Email nrmet@ministerial.qld.gov.au
ABN 65 959 415 158

Queensland Government

Office of the
Minister for Natural Resources, Mines and Energy and Minister for Trade

I emphasise that this is only a temporary measure, reflecting that dams are full prior to the commencement of the traditional wet season. I expect that your advice will include a clear date or trigger beyond which dams will be allowed to fill to their full supply level.

Thank you in advance for your assistance.

Should you have any further enquiries, please feel welcome to contact Mr John Bradley, Director General, Department of Environment and Resource Management on [redacted]

Yours sincerely

[redacted]

STEPHEN ROBERTSON MP

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TRIM ref: D/10/7953

24 December 2010

Hon Stephen Robertson MP
Minister for Natural Resources, Mines and Energy
and Minister for Trade
PO Box 15216
Brisbane Qld 4001

Dear Minister

I am pleased to respond to your letter of 25 October 2010 regarding options to and benefits of releasing water from key storages in anticipation of major inflows over the current wet season. Our advice follows, based on discussions with Seqwater.

Only four of the dams in South East Queensland region are gated, with the ability to release significant amounts of water in anticipation of major inflows. These are Wivenhoe, Somerset, North Pine and Leslie Harrison dams.

Detailed operational procedures have been approved for each of the gated dams. The dams will continue to be operated in accordance with these procedures. These procedures generally relate to the management of the dams and should be managed above Full Supply Level. This advice relates to the water security aspect of the management of the dams below Full Supply Level.

Based on information currently available, Seqwater has advised that releasing water to below Full Supply Level may provide some benefits in terms of reduced community and operational impacts during minor inflow events, such as has occurred over the past month. For medium and major flood events, it considers that pre-emptive releases will provide negligible benefits.

Informed by this advice, the SEQ Water Grid Manager has advised Seqwater that, from a water security perspective, it has no in-principle objection to minor releases from Wivenhoe, Somerset and North Pine dams to minimise the operational and community impacts of gate releases. Specifically, it has advised that it has no in-principle objection to:

- Wivenhoe and Somerset dams being drawn down to 95 per cent of their combined Full Supply Level
- North Pine Dam being drawn down to 97.5 per cent of its Full Supply Level.

The SEQ Water Grid Manager has assessed the water security implications of the release to be negligible, having no impact on our ability to meet the risk criteria specified in the System Operating Plan or our ability to meet our supply obligations to Grid Customers. From a water security perspective, the Queensland Water Commission has also confirmed that it does not have any objections to the potential release.

Please note that these arranges are intended to apply for the current wet season only, taking into account the level of storages and the rainfall forecasts over coming months.

For future wet seasons, the SEQ Water Grid Manager will continue to work with Seqwater to investigate the optimal arrangements. In particular, we propose to further investigate options that may reduce the frequency or duration of intermediate level flows (between 1,900 and 3,500 cubic metres per second). In addition, we recommend that the investigations with the Queensland Water Commission to examine the opportunity of raising the full supply level of Wivenhoe Dam for water supply be expanded to include options involving the release of the additional water once major inflows are forecast.

I trust that this advice is sufficient. If you have any questions, please do not hesitate to contact Mr Dan Spiller, Director Operations, by telephone on [redacted] or by email on [redacted]

Yours sincerely

[redacted]

Gary Humphrys
Chair

ATTACHMENT

Wivenhoe and Somerset dams

Wivenhoe Dam can store up to 1.15 million litres (ML) of drinking water. In addition, it has the capacity to store an additional 1.45 ML of flood water.

While large, the flood compartment can be filled within days. For example, following heavy rainfall in October 2010 Wivenhoe Dam received inflows equivalent to almost half of the flood storage compartment capacity in just a few days.

Several factors influence flood release strategies for Wivenhoe and Somerset dams.

First, rain events that have caused flooding have historically been prolonged events over several days, often with a second event occurring several days to a week after the first. As a result, the operational procedures for the dam are designed to ensure that all water held in the flood compartments is released within seven days of a rain event, ensuring that the flood compartment is available for any future inflows.

Secondly, the dam only controls flood waters from part of the Brisbane River catchment area. About 50 per cent of the catchment area of the Brisbane River is upstream of the Wivenhoe Dam wall, and can be potentially controlled by it. No flood mitigation structures exist for most of the potential run-off from the other 50 per cent of the catchment area.

Third, the Bureau of Meteorology has had limited success in plotting rainfall distribution accurately to assess where most flooding risk lies above or below the dam wall. Historical floods have demonstrated that flooding can occur from both. For example, the 1974 flood flows primarily occurred below the dam wall whilst the 1890's event occurred above the dam wall. As a result, when releasing water from Wivenhoe Dam it is very important to predict and monitor below the dam wall flows so as to understand combined river flows that cause flood impacts.

Taking these factors into account, the flood release strategy for Wivenhoe and Somerset dams has a hierarchy of objectives:

- Ensure the structural safety of the dam
- Provide optimum protection of urbanised areas from inundation
- Minimise disruption to rural life
- Retain full supply level after a flood event
- Minimise impacts to flora and fauna during the drain down phase.

Within this framework, flood releases from Wivenhoe Dam typically fall into two categories of flood events based on the impact they cause when combined with below the dam wall catchment runoff:

- Larger events typically involving combined river flows greater than 3,500 cubic meters per second measured at Moggill. These events would have flood impacts on

urban areas in Brisbane. This scale of release has not been required since Wivenhoe Dam was completed.

- Smaller events with combined river flows of less than 1,900 cubic meters per second measured at the Mt Crosby weir which can inundate up to seven rural bridges isolating up to 50 households and causing inconvenience to many more. There has been six of these events since 1984, when Wivenhoe Dam was completed.

Our assessment of the benefits of lowering dam storage levels to reduce flooding impacts is below for these two event types.

Large events

Seqwater has advised that releases of greater than 3,500 cubic metres per second (m3/s) from Wivenhoe Dam are likely to impact on urban areas in Brisbane. Events of this nature have not been experienced since Wivenhoe Dam was completed in 1984.

Seqwater has advised that:

- pre-emptive releases are likely to have negligible impacts on the extent of these impacts
- any impacts would require releases of at least 250,000 ML. This is equivalent to a release of about 16 per cent of the combined storage capacity of Wivenhoe and Somerset dams.

A pre-emptive release of this scale is not recommended, based on information currently available. The potential water security impacts are considered to be more significant than the negligible benefits. These potential security impacts include costs associated with the earlier or avoidable operation of the desalination facility at capacity, as well as the increased probability of triggering the implementation of a drought response plan.

More detailed investigation of opportunities to actively manage flood storage is recommended, including options to increase flood supply level on a temporary basis. These investigations need to be led by Seqwater, and involve the Bureau of Meterology, Councils and the SEQ Water Grid Manager.

In particular, t has been identified that it is worth investigating the impacts on downstream flooding for intermediate level flows (flows between 1900 and 3500 cm^3/s).

Seqwater will undertake extensive investigations for the Queensland Water Commission in early 2011 to examine the opportunity of raising the full supply level of Wivenhoe Dam for water supply. We will recommended that the scope of this work be widened to consider the benefits of pre-lowering storage levels based on mid range rainfall events and the reduced impacts to river levels and subsequent property impacts. It is noted that predicting rainfall intensity and location, even as events are about to occur has not been accurate, however the Bureau of Meteorology is improving its methods.

Smaller events

Pre-emptive releases from Wivenhoe Dam may reduce the impacts of minor gate releases (strategies W1A to W1E in the operational procedures).

Minor gate releases may result in the closure of up to six bridges, isolating up to 50 dwellings and inconveniencing many more. As stated in existing flood management plans, releases should be managed to minimise the impacts on these residents. Over the immediate term, Councils have requested that bridge closures be avoided over the Christmas to New Year period, if at all possible. In addition:

- There are resource implications involved in the activation of the flood control centre. Under flood management plans, the centre must be staffed by suitability qualified officers at all times during gate releases. There are currently only four quality duty engineers, who have staffed the flood centre for much of period since the initial release in October.
- Gate releases during the Christmas holiday period would result in closure of dams to water based activities, impacting on up to 150,000 people who are expected to use the recreational facilities over the holiday period.

The Water Grid Manager has advised Seqwater that, from a water security perspective, it would not object to water being released from Wivenhoe and Somerset dams to 95 per cent of storage capacity at any time until end March 2010.

Under this recommendation, storage levels could potentially be reduced by up to about 77,250 ML. This is equivalent to the amount of water released between 13 and 16 December 2010, through a single gate.

Pre-emptive releases will be managed so as to minimise the likelihood of gate releases due to small storms and local rainfall. Storage capacity will usually be reduced through a combination of:

- Extended gate releases, especially for strategy W1C. For comparison, up to 130,000 ML/day was released during in November and mid December 2010. At this rate, the additional releases could occur in about half a day.
- Ongoing gate releases of up to 30,000 ML/day, which do not isolate any residents but can inundate some lower bridges that cause inconvenience.
- Ongoing valve release of up to about 4,300 ML/day, which can be maintained without inundate any bridges.

Actual releases would be decided by Seqwater based on operational considerations and in accordance with its statutory and regulatory obligations.

Water security impacts

The water security impacts of releases will be zero if the dams fill over the remainder of the wet season. Current forecasts indicate that there is a high probability of this occurring:

- Heavy rainfall is forecast over the Christmas holiday period, as noted above.
- Over the remainder of the wet season, advice from the Bureau of Meteorology is that sea surface temperatures are likely to remain at levels typical of a La Niña event into the first quarter of 2011, with the majority of the models indicating the event will gradually weaken over the coming months.

The water security impacts will be minimal, even if there were no further inflows to the dams. Modelling indicates that the reduction would have a minimal impact on the probability of key water Grid storages falling to 40 per cent of capacity over the next five years.

North Pine and Leslie Harrison dams

North Pine and Leslie Harrison dams do not have flood mitigation potential. Once the dams have reached Full Supply Level, all water flows into the dam must be released to protect the structural safety of the dam.

Seqwater has advised that, without major releases, there are negligible benefits to reducing volumes stored in North Pine or Leslie Harrison dams for the purposes of reducing the extent or duration of any downstream flooding impacts.

For North Pine Dam, there may be some operational and community benefits to minor releases to below Full Supply Level in some circumstances. Any gate operation at North Pine Dam results in inundation of Youngs Crossing Road, which isolates a number of residents. These impacts are currently being minimised by releasing from North Pine Dam at night. With further rainfall forecast, Seqwater may choose to reduce the level to below Full Supply Level in order to reduce the frequency of night releases or the likelihood of releases being required during the day.

For this dam, the SEQ Water Grid Manager has advised Seqwater that, from a water security perspective, it would not object to water being released to 97.5 per cent of storage capacity at any time until end March 2010.

For Leslie Harrison Dam, gate operations do not impact on public roads and generally only inconvenience the general public during large flood events. There is no scope to reduce this inconvenience through small pre-emptive releases. Accordingly, no in-principle approval be made for pre-emptive releases from this dam.

P.O. Box 205, BELROSE WEST NSW 2085
[redacted]
ABN: 56154707619
brian cooper consulting

12 January 2011

Mr. Barry Dennien
CEO, SEQ Water Grid Manager
PO Box 16205
City East QLD 4002

Dear Barry,

This letter report:

- presents my final findings on a review of the operation of Wivenhoe Dam (including controlled releases) for compliance against the Flood Mitigation Manual for the period 12 December 2010 to date (Flood Event), and;
- provides advice on the prudence and appropriateness of the decisions and actions taken during the Flood Event regarding the operation of Wivenhoe Dam in light of the Flood Mitigation Manual's requirements and the circumstances of the Flood Event.

The report follows on from my preliminary report sent to you earlier today. The findings and advice are provided on the basis of information provided by SEQ Water Grid Manager which comprised the Flood Mitigation Manual and Technical Situation Reports. The latter were daily (sometimes twice daily) reports for the subject period. They gave a log of rainfall over the dam catchments and the downstream river (Lockyer Ck. and Bremer R.) catchments; inflows to Somerset and Wivenhoe Dams; storage levels; releases from the dams; details of the operation of gates and other outlets (gate openings/discharges); proposed changes in operating strategies and impacts on the various access crossings downstream of Wivenhoe Dam. In reviewing the Technical Situation Reports, I prepared a spreadsheet (see separate attachment of Excel spreadsheet *Tech Reports – Summary*, summarising the reports so that a timeline of the Flood Event could be seen at a glance. This provided a good overview of the Flood Event as it unfolded and showed what information may or may not have been included in a particular report. The Queensland Director Dam Safety (Water Supply) informed me that the Flood Operation Logs contain much more detailed information including details of the communications that were carried out and some of the more detailed information that is not necessarily included in the Technical Situation Reports. I have been provided with a draft of the "*Protocol for the Communication of Flooding Information for the Brisbane River Catchment – Including Floodwater Releases from Wivenhoe and Somerset Dams*" developed in October/November last year and currently being used. The Technical Situation Reports appear to have been an outcome of that Protocol.

The various requirements and required actions detailed in the Flood Mitigation Manual are summarised in the Table given in Attachment A. The Table also gives my comments (where appropriate) on whether there is evidence from the information presented to me, that there is satisfactory compliance with these requirements and actions.

The main aspects of the Flood Mitigation Manual are the various strategies for operating Wivenhoe Dam and Somerset Dam as well as a number of requirements relating to flood operations personnel, flood preparedness and flood training.

At Wivenhoe Dam there are four main strategies for operating the dam (W1 to W4) and at Dam there are three (S1 to S3). These strategies are hierarchical and are based on a number of flood objectives. These in descending 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 (FSL) at the conclusion of the Flood Event, and;
- Minimise impacts to riparian flora and fauna during the drain down phase of the Flood Event.

Normal procedures require a return to FSL within 7 days of the flood event peak passing through the dams so that the potential effects of closely spaced Flood Events can be allowed for.

It is apparent from the Technical Situation Reports that emphasis has been given to communicating changes in flood operations strategies with local authorities and the Bureau of Meteorology (BOM).

Until the last day or so, Wivenhoe Dam has been below EL74.0 and accordingly, would be operating under Strategy W1 i.e. make releases such that bridges downstream of the dam do not have to be closed prematurely. For a few days at the end of December and for the last day or so before yesterday's big rise, Strategy W2 would be in place (restrain releases from Wivenhoe Dam such that Brisbane River flows are maintained within the upper limit of non-damaging floods at Lowood (3,500 m3/s)). At various times during the Flood Event some of the downstream bridges have been closed. However, it is evident that action has been taken to vary dam releases such that various bridges could be re-opened as soon as possible. This appears to have been done in accordance with the flood operating strategies. The operations then moved onto Strategy W4 when the storage in Wivenhoe Dam reached about EL 73.5 (before the W4 trigger level of EL 74) when yesterday's heavy rain came on and it was assessed that there was a chance that the first (central) fuse plug could be triggered. It was then a matter of juggling the radial gate openings in an attempt to circumvent any fuse plug triggering. A graph of storage levels for Wivenhoe and Somerset Dams (from information taken from the Technical Situation Reports) showing the limits for the various Wivenhoe Dam flood strategies is given in Attachment A. It is apparent from this graph, that the appropriate flood operation strategies were adopted. The Technical Situation Reports indicate that proposed changes in strategy were appropriately communicated with appropriate authorities in accordance with the new Communication Protocol.

Summary:

The Technical Situation Reports comply with the requirements of the new Communication Protocol. However, I feel that there could be more consistency in the information presented. There seem to be gaps in information presented such as storage levels (see spreadsheet and graph in Attachment A). It would be useful to specify the minimum information required to be presented in the Technical Situation Reports (storage levels, inflows, recent/current rainfall, forecast rainfall, releases from dams, estimated flows from downstream tributaries, current flood operating strategy for each dam and proposed change in strategy, gate and regulator operations, state of downstream road crossings etc). Most of the minimum information is already given, but not in a consistent manner. As a means of reviewing processes followed during a flood, it would be useful to present a timeline of the flood event showing graphs of storage levels and other data that can be easily presented in a graphical manner.

I am informed by the Queensland Director Dam Safety (Water Supply) that the various requirements of the Flood Mitigation Manual relating to requirements for flood operations personnel, flood preparedness and flood training have been adhered to. There are a number of other requirements however, that I am not able to say whether they were satisfied as I had insufficient information. These requirements (see Table in Attachment A) should be subject to a separate audit.

It appears to me that the decision to implement Strategy W4 was a prudent one. While it would cause some damage in the Brisbane River downstream, its implementation, considering forecast rainfalls and projected flows in Lockyer Ck. And the Bremer River, would allow reduction of the storage level in

Wivenhoe Dam. This reduction in storage level would hopefully provide a sufficient buffer that would minimise the chance of a fuse plug triggering in the auxiliary spillway. Triggering of the first (central) fuse plug would cause a sudden increase of flow of some 2,000m^3/s from Wivenhoe Dam. This increase in flow would cause significantly more flooding in the lower Brisbane River than that caused by early implementation of Strategy W4.

Conclusions:

The strategies as set out in the Flood Mitigation Manual have been followed, allowing for the discretion given to making variations in order to maximise flood mitigation effects. The actions taken and decisions made during the Flood Event appear to have been prudent and appropriate in the context of the available knowledge available to those responsible for flood operations and the way events unfolded.

There are a number of requirements where there was insufficient time given the urgency of this review, to source the necessary information for me to demonstrate compliance. However, satisfaction or otherwise of these requirements would have had little impact on the operation of the two dams during this particular Flood Event. It is intended that they be audited when time permits, after the Flood Event.

There are aspects of the Technical Situation Reports that could be improved and these have been discussed above.

Regards,

[redacted]

Brian Cooper

ATTACHMENT A

Action Requirements extracted from the Flood Mitigation Manual:

Action	Comment
The Flood Mitigation Manual contains the operational procedures for Wivenhoe Dam and Somerset Dam for the purposes of flood mitigation and must be used for the operation of the dams during flood events.	Appears to have been done
Sufficient numbers of suitably qualified personnel are available to operate the dams if a Flood Event occurs.	Director of Dam Safety is satisfied
The level of flooding as a result of emptying stored floodwaters after the peak has passed is to be less than the flood peak unless accelerated release is necessary to reduce the risk of overtopping.	See Note 1
A regular process of internal audit and management review must be maintained by Seqwater to achieve improvements in the operation of the RTFM.	See Note 1
Seqwater must maintain a log of the performance of the data collection network. The log must include all revised field calibrations and changes to the number, type and locations of gauges. Senior Flood Operations and Flood Operations Engineers are to be notified of all significant changes to the Log.	See Note 1
Seqwater must maintain a log of the performance of the RTFM. Any faults to the computer hardware or software are to be noted and promptly and appropriately attend to.	See Note 1
Seqwater must ensure that all available data and other documentation is appropriately collected and catalogued for future use.	See Note 1
Seqwater must ensure that information relevant to the calibration of its field stations is shared with appropriate agencies.	See Note 1
Seqwater must liaise and consult with these agencies with a view to ensuring all information relative to the flood event is consistent and used in accordance with agreed responsibilities: • Bureau of Meteorology (issue of flood warnings for Brisbane River basin); • Department of Environment and Resource Management (review of flood and discretionary powers); • Somerset Regional Council (flood level information for upstream of Somerset Dam and upstream and downstream of Wivenhoe Dam); • Ipswich City Council (flood level information for Ipswich), and; • Brisbane City Council (flood level information for Brisbane City).	Required also by draft of Communications Protocol. Technical Situation Reports infer compliance
Seqwater must report to the Chief Executive by 30 September each year on the training and state of preparedness of operations personnel.	See Note 1
Seqwater must provide a report to the Chief Executive by 30 September each year on the state of the Flood Monitoring and Forecasting System and Communication Networks.	See Note 1

Action	Comment
After each significant flood event, Seqwater must report to the Chief Executive on the effectiveness of the operational procedures contained in this manual.	It is too early for this action to be implemented. Will be implemented when the Flood Event is finished
Prior to the expiry of the approval period, Seqwater must review the Manual pursuant to provisions of the Act.	It is too early for this action to be implemented
Strategies are changed in response to changing rainfall forecasts and stream flow conditions to maximise the flood mitigation benefits of the dams.	Technical Situation Reports indicate that this is done
When determining dam outflows within all strategies, peak outflow should generally not exceed peak inflow.	Information from Seqwater indicates that the requirement was satisfied
Protocol for use of discretionary powers (i.e. who gets told)	Director of Dam Safety is satisfied – I don't know whether Seqwater CEO or Chairperson approved – See Note 1

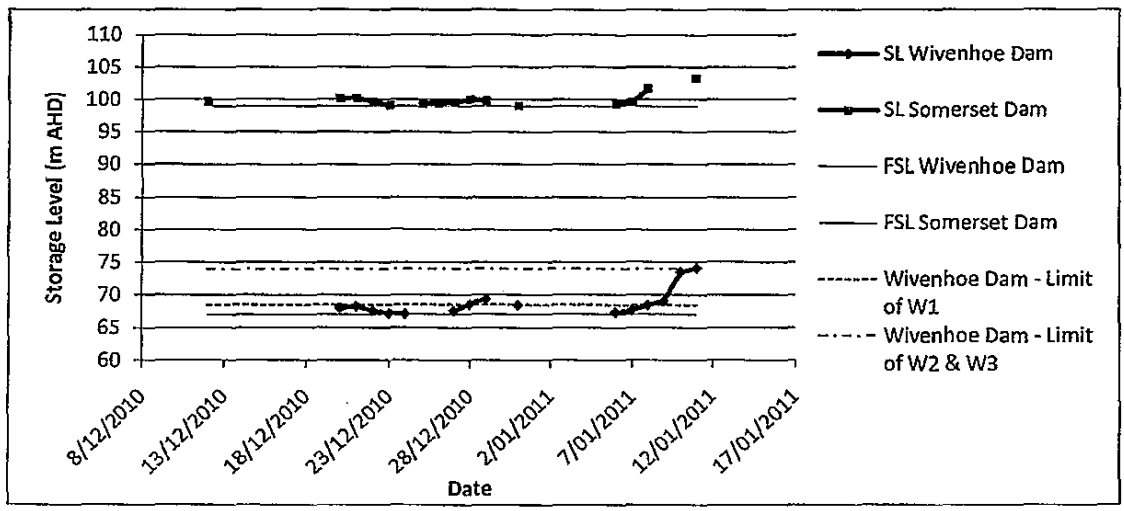
Note1: For a number of the above actions, given the short time frame for the review on compliance of actual flood operations with the Flood Mitigation Manual, it was not possible to source some of the information required to confirm that requirements had been fulfilled. These actions will be audited separately, when time permits.

Action	Comment
Flood Strategies for Wivenhoe Dam:	
The intent of Strategy W1 is to not to submerge the bridges downstream of the dam prematurely (see Appendix I). The limiting condition for Strategy W1 is the submergence of Mt Crosby Weir Bridge that occurs at approximately 1,900 m^3/s . For situations where flood rains are occurring on the catchment upstream of Wivenhoe Dam and only minor rainfall is occurring downstream of the dam, releases are to be regulated to limit, as much as appropriate in the circumstances, downstream flooding.	Technical Situation Reports indicate that every attempt was made to keep the specified road crossings open
The intent of Strategy W2 is limit the flow in the Brisbane River to less than the naturally occurring peaks at Lowood and Moggill, while remaining within the upper limit of non-damaging floods at Lowood (3,500 m^3/s). In these instances, the combined peak river flows should not exceed those shown in the following table:	Technical Situation Reports indicate that Wivenhoe Dam releases were made considering concurrent flows in the Bremer River & Lockyer Ck. To delay damaging floods as long as possible
The intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 m^3/s, noting that 4000 m^3/s at Moggill is the upper limit of non-damaging floods downstream. The combined peak river flow targets for Strategy W3 are shown in the following table. In relation to these targets, it should be noted that depending on natural flows from the Lockyer and Bremer catchments, it may not be possible to limit the flow at Moggill to below 4000 m^3/s. In these instances, the flow at Moggill is to be kept as low as possible.	
The intent of Strategy W4 is to ensure the safety of the dam while limiting downstream impacts as much as possible. This strategy normally comes into effect when the water level in Wivenhoe Dam reaches EL74.0 m AHD. However the Senior Flood Operations Engineer may seek to invoke the discretionary powers of Section 2.8 if earlier commencement is able to prevent triggering of a fuse plug. There are no restrictions on gate opening increments or gate operating frequency once the storage level exceeds EL74.0 AHD, as the safety of the dam is of primary concern at these storage levels.	Technical Situation Reports indicate that Wivenhoe Dam releases were such as to delay adopting this strategy as long as possible
Where possible, total releases during closure should not produce greater flood levels downstream than occurred during the flood event.	Technical Situation Reports indicate that this requirement was satisfied
The aim should always be to empty stored floodwaters stored above EL 67.0m within seven days after the flood peak has passed through the dams.	Technical Situation Reports indicate that

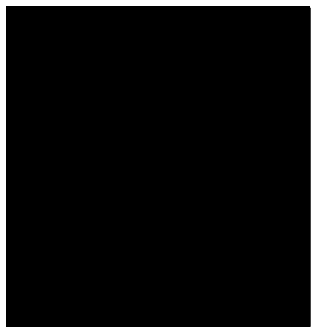
Action	Comment
	emphasis was given to satisfying this requirement
Flow in the spillway to be as symmetrical as possible with the centre gates opened first.	Technical Situation Reports indicate that this was done
The bottom edge of the radial gates must always be at least 500mm below the release flow surface.	See Note 1 above

Action	Comment
Flood Strategies for Somerset Dam:	
The intent of Strategy S1 (Somerset Dam Level expected to exceed EL 99.0 and Wivenhoe Dam not expected to reach EL 67.0 (FSL) during the course of the Flood Event) is to return the dam to full supply level while minimising the impact on rural life upstream of the dam. Consideration is also given to minimising the downstream environmental impacts from the release.	Technical Situation Reports indicate that this was done
The intent of Strategy S2 (Somerset Dam Level expected to exceed EL 99.0 and Wivenhoe Dam level expected to exceed EL 67.0 (FSL) but not exceed EL 75.5 (fuse plug initiation) during the course of the Flood Event). This to maximise the benefits of the flood storage capabilities of the dam while protecting the structural safety of both dams. The Flood Mitigation Manual contains a graph that shows the intended interaction of the Wivenhoe Dam and Somerset Dam storage levels.	Technical Situation Reports indicate that this was done – little information on the operation of the radial gates at Somerset Dam. How the graph was followed not really demonstrated
The intent of Strategy S3 (Somerset Dam Level expected to exceed EL 99.0 and Wivenhoe Dam level expected to exceed EL 75.5 (fuse plug initiation) during the course of the Flood Event) is to maximise the benefits of the flood storage capabilities of the dam while protecting the structural safety of both dams.	Not relevant at this stage
The safety of Somerset Dam is the primary consideration and cannot be compromised and its peak level cannot exceed EL 109.7.	Maximum level only EL103.3

Wivenhoe & Somerset Dams – Storage Level Behaviour (as presented in Technical Situation Reports)



Date	Time	TSR	Wivenhoe Dam Release (m^3/s)				Gate No.	Opening (m)	Sto
			Regulators	Hydro	Gates	Total			
12/12/2010	1400	W1							
13/12/2010	1300	W2		10	290	300			
15/12/2010	1800	W3							
16/12/2010	1600	W4			0				
17/12/2010	1200	W5							
17/12/2010	1800	W6	Closed		Opening Op. Initiated				
	1830			13	50	63	3	0.5	
18/12/2010	0700	W7							
19/12/2010	0700	W8			350	350	3	3.5	
19/12/2010	1800	W9			300	300	3	3	
20/12/2010	0700	W10							
20/12/2010	0900	W11							88. aft
20/12/2010	0900	W12							pe cu
21/12/2010	0730	W13				peak 3,280 (0500)			[11 slo cu [10 slo to
22/12/2010	0830	W14							
22/12/2010	1800	W15			Closing sequence				Wh wil FSL op lev
23/12/2010	0800	W16			All gates expected to be closed by 1500				
23/12/2010	1430	W17			350		3	3.5	67.
24/12/2010	0630	W18			All gates expected to be closed by 1300				wh clo
24/12/2010	1330	W19	4,200Mł/d by from reg. & Hydro		Radial gate ops ceased @ 1300		3	zero	
25/12/2010	0930	W20							
26/12/2010	0800	W21							
27/12/2010	0800	W22							
28/12/2010	0700	W23			347 (initially) then back to 46				
29/12/2010	0700	W24							69. aim FSL 69. yes
30/12/2010	0700	W25			Wivenhoe+Lockyer = 1,600m^3/s				(2.3 thi
31/12/2010	0700	W26			Wivenhoe+Lockyer = 1,600m^3/s				68.
		W27							
06/01/2011	1200	W28			Commence opening RG @ 1200 & ramp up to 300m^3/s by 2200				67.
07/01/2011	0700	W29							67.
07/01/2011	1500	W30			Release started 1500 to be incr. slowly to ~1,200m^3/s by 1400 tomorrow				
08/01/2011	0700	W31			~890		All (5) RG's open		68. ste
09/01/2011	0700	W32				1,343			Cur (fal
		W33							
09/01/2011	2100	W34				1,420			Cur
		W35							
		W36							
		W37							
11/01/2011	0630	W38			2,750 since 1930 on 10/1/2011		All (5) gates		73. 25
11/01/2011	1200	W39				3,970			74. ris



Brian Cooper

Dams Engineer

Qualifications & Affiliations

Short courses on finite element analysis, embankment dam engineering, earthquake engineering. Published technical papers – ICOLD. ANCOLD and I.E. Aust. Attended dam safety course at USBR (Denver, USA) in 2002

Bachelor of Engineering (B.E. Hons), 1968 and Master of Engineering Science (M.Eng.Sc.), 1971

University of New South Wales

Graduate Diploma of Engineering Management, 1994 Deakin University

F.I.E. Aust.,C.P.Eng. RPEQ

Expertise

Brian has approximately 40 years experience in investigation and design of major dams, weirs and hydraulic structures, having started his career designing farm dams and small irrigation schemes. He retired from NSW Department of Commerce in 2005. Brian now works as a private consultant specialising in dams engineering and fish passage at dams and weirs. He has a special interest in risk assessment and computer modelling in general and the seismic analysis of dams in particular. Engineering software (concrete dam stability analysis and flood routing) written by Brian is still used extensively in the Dams & Civil Group of the Department of Commerce. He also has particular experience with concrete dams and the use of post tensioned ground anchors for strengthening those dams. He was a member of the Australian National Committee on Large Dams (ANCOLD) Working Group that developed guidelines for 'Design of Dams for Earthquakes' and a member of the Working Group that revised the guidelines for 'Risk Assessment for Dams'. He has been a guest lecturer for a number of years (most recently in 2009) on concrete dam engineering for the University of NSW post graduate Embankment Dam Engineering Course, and on the history of dams in NSW at Sydney University.

He has been the project director and project manager for a number of feasibility studies, design reviews, site investigations and detail design consultancies for major dams and weirs including the direction and co-ordination of all specialist services including dambreak studies, preparation of dam safety emergency plans and risk assessments. He is currently an expert reviewer for a number of Australian water authorities and consultants (State Water Corporation (NSW), Hydro Tasmania, SunWater (Queensland), Brisbane City Council, Goulburn-Murray Water, Goulburn Valley Water, WA Water Corporation, Southern Rural Water (Victoria), URS, GHD, Hobart Water, NT PowerWater, and TrustPower (NZ)). He has also worked as a sub-consultant for a number of consulting firms (URS, MWH, GHD).

Brian is the Engineers Australia representative for the NSW Dams Safety Committee (the dam safety regulator in NSW) and is currently the Chairman of that organisation. He has been a member of the Murray Darling Basin Authority's Fish Passage Task Force which advises inter alia on the installation of fishways on the Murray River as part of the Living Murray Program.

Brian is a registered engineer in Queensland (RPEQ No. 6819). He started his own consulting business in 2008, advising on dam safety, dam design and analysis, dam risk assessments and dam upgrades as well as fish passage for dams. He is providing specialist advice through *Brian Cooper Consulting* as a sole trader.

resumé

Professional Experience

2008 to Present: Principal of Brian Cooper Consulting

2010

Five yearly comprehensive dam safety inspection of Carcoar Dam (double curvature arch dam).
Internal reviewer to URS (Melbourne) on concept design of regulator structures and associated fishways for the Hipwell Road project for watering the Gunbower Forest
Specialist adviser to Melbourne Water – valve behaviour on Sugarloaf Dam pipeline, structural behaviour of pumping station floor slab and pump bases at Cardinia Dam Pumping Station
Commenced work as member of ANCOLD working group re-writing the Earthquake Guidelines – responsible for re-writing sections relating to concrete dams.
Continuing involvement with Alluvium in the design of the weir upgrade and the new fishway for Booligal Weir.
Continuing external peer review services to State Water Corporation for the detail design of new auxiliary fuse plug spillways for Copeton and Chaffey Dams, detail design of raising and post tensioned strengthening of Keepit Dam, detail design of upgrade works for Wyangala Dam, finite element analysis of Carcoar Dam (double curvature arch dam).
Further work with GHD (Perth) on risk assessment for Serpentine Dam.
Continuing involvement with Hydro Tasmania, as Chair of external review panel for Catagunya Dam.

2009

Part of URS' comprehensive inspection team for Melbourne Water's Maroondah Dam.
Part of URS' business risk assessment team for Southern Rural Water's Cowwarr and Maffra Weirs.
Part of Alluvium's design team upgrading Booligal Weir and providing a fishway at the weir, for State Water Corporation.
Part of GHD's design team for Lower Fitzroy River Infrastructure Project designing fishways for Rookwood and Eden Bann Weirs near Rockhampton in Queensland.
Project Manager on behalf of SA Water and reviewer for study into vibration of a crane rail beam at Lock 5 on the River Murray.
Expert reviewer for State Water Corporation for 3D finite element analysis of Carcoar Dam (double curvature arch dam).
Internal reviewer for URS on Laanecoorie Dam Upgrade.
Expert reviewer for State Water Corporation for risk assessments for Oberon and Rydal Dams.
Member of GHD's Serpentine Dam risk assessment team for WA WaterCorp.
Expert reviewer for SunWater in Queensland for the comprehensive risk assessment undertaken for Fairbairn Dam and Coolmunda Dam.
Expert reviewer for State Water Corporation for major upgrade works at Keepit, Copeton, Chaffey and Wyangala Dams.
Appointed as Chairman of the NSW Dams Safety Committee (the dam safety regulator in NSW).
Provided external peer review for Goulburn Valley Water, on Nine Mile Creek Dam Upgrade.
Internal reviewer for URS (Adelaide) for Lake Victoria Outlet Regulator options studies.
Provided advice to URS (Melbourne) on the Mildura Weir Fishway design.
Member of expert panel advising State Water Corporation on revised dam surveillance regime.
Part of Ecosmart bid team - prepared concept designs for fish passage facility at proposed Wyaralong Dam in Queensland.
Continuing expert review role for Catagunya Dam upgrade.

2008

Started as a private specialist dams consultant - *Brian Cooper Consulting.*
Worked through the URS Corporation for the USBR and the USACE in developing a risk toolbox for lined spillways.
Advised TrustPower in New Zealand on replacement of post tensioned anchors at Mahinerangi No. 1 Dam.
Adviser to State Water Corporation and to URS on further upgrade works for Hume Dam.
Provided specialist advice to WA Water Corporation on Wellington Dam post tensioning.
Peer reviewer on behalf of URS for Warren Dam in South Australia.
Part of URS team carrying out portfolio risk assessment of Melbourne Water's dams.
Member of Expert Review Panel for Darwin River and Manton Dams for NT PowerWater.

1987 to 2008: Dams & Civil Section of NSW Department of Public Works and Services/NSW Department of Commerce.

2008	Carried out detailed 3D finite element analysis of radial gate at Wyangala Dam spillway for State Water Corporation. Continuing review role for Tillegra Dam. Continuing review role for Hinze and Lake Manchester Dams in Queensland and Catagunya Dam in Tasmania. Prepared options report on Burrendong Dam spillway modifications for State Water Corporation.
2007	Continuing roles on Lake Manchester, Hinze, Catagunya and Redbank Ck. Dams. Internal peer reviewer for NSW Dept. of Commerce regarding design of Tillegra Dam. Advised State Water on feasibility of fish passage facilities at a number of their major irrigation dams. Expert reviewer for GHD on a flood retarding basin in south west Sydney. Part of expert panel for River Murray Water risk assessments for Hume and Dartmouth Dams, Torrumbarry and Yarrowonga Weirs and Lake Victoria. Re-elected as Deputy Chairman of the Dams Safety Committee
2006	Project director for 3D finite element analysis of Bendora Dam (double curvature arch dam) Chair of external peer review panel for upgrading of Lake Manchester Dam (concrete gravity dam) in Queensland Internal peer reviewer and senior consultant for the raising of Hinze Dam (earth and rockfill embankment) in Queensland Project director for preliminary and detailed design of Redbank Creek Dam (single curvature arch dam) upgrading Project director for Keepit Dam fish passage investigations Part of expert panel for URS undertaking portfolio risk assessment for dams owned by River Murray Water External peer reviewer for Hydro Tasmania for Catagunya Dam (concrete gravity dam) upgrading; Project director for 3D finite element analysis of Upper Cordeaux No. 2 Dam (single curvature arch dam owned by SCA) for BHP Billiton
2005	Project design engineer for dam related aspects of Nepean Dam Deepwater Access Project: Pipeline crossing end of spillway; outlet works for end of pipeline Project design engineer for Avon Dam Deepwater Access Project: tunnel design through rockfill buttressing; new low level outlet works
2004	Internal reviewer to URS Australia for Pykes Ck Dam Investigations (Southern Rural Water, Victoria) Internal reviewer to URS Australia for Lower Reservoir Dam (Hobart Water, Tasmania) Member of expert review panel for the Melton Dam upgrade design (Southern Rural Water, Victoria)
2003/04	Designer for retrofitting multi-level offtake for Tallowa Dam (Sydney Catchment Authority). Member of the Independent Technical Expert Panel for the Eildon Dam Upgrading in Victoria for Goulburn-Murray Water. Currently the design director for the Wivenhoe Dam Alliance carrying out the flood capacity upgrading for Wivenhoe Dam in Queensland – included directing major computational fluid dynamics modelling investigations of existing spillway
2003	Carried out options study for environmental upgrading works at Keepit Dam (selective withdrawal facility, additional outlet works and fish passage) Carried out assessment of spillway capacity for Hume Dam using computational fluid dynamics modelling (by a sub-consultant) Carried out detail design for anchoring Bellfield Dam (Victoria) Intake Tower Carried out detailed finite element analysis of Keepit Dam radial gates
2002	Carried out review of large farm dam with seepage problems. Directed computational fluid dynamics modelling of drum gate and radial gates at Warragamba Dam together with structural analysis of gates (modelling carried out by sub-consultant) to ensure gates can handle more

rigorous operating conditions
Adviser to the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) on civil engineering matters related to the replacement reactor project at Lucas Heights
Expert reviewer for Goulburn-Murray Water for remedial works at Cairn Curran Dam in Victoria
Project Director for Lerderderg Weir safety review and risk assessment for Southern Rural Water (Victoria). Carried out finite element analysis of radial gate

2001

Project Director for design of further remedial works at Hume Dam.
Technical director on behalf of NPWS for quantitative risk assessment for Snowy Mountains roads
Chairman of the committee producing a geotechnical response plan for the Alpine Way in the Snowy Region for NPWS
Carried out non-linear finite element analysis (earthquake loading) for outlet tower at Bellfield Dam for Wimmera-Mallee Water (Victoria)
Joined the MDBC's Fish Passage Reference Group and reviewed fishway designs
Consultant to DLWC for their portfolio risk assessment of thirty dams
Provided advice on the post tensioning system at Waitakere Dam in New Zealand.

Director of Dam Surveillance Group responsible for the surveillance of DLWC dams and participant of a number of 5 yearly surveillance inspections
Project Director of review of DLWC Intake Towers Earthquake Stability Review
Directed DPWS input into the Earthquake Stability of the structural elements of Yarrawonga Weir as sub-consultant to URS Australia – included detail design of anchoring system for the weir. Also provided design advice on design of stone columns to provide protection against liquefaction of alluvial foundations.
Member of the expert panel for the risk assessment studies being undertaken for Goulburn-Murray Water
Project Director for safety review and preliminary design of remedial options for Blowering Dam (DLWC)
Acted as reviewer for a number of projects carried out by URS (incl. Cardinia Dam outlet tower, Bellfield Dam embankment/spillway)
Directed functionality study (including business risk assessment) for Yallourn Weir for Southern Rural Water (Victoria)

2000

Project Director for design of further investigations and remedial works at Hume Dam.
Safety reviews for Bamarang and Flat Rock Dams
Director of Dam Surveillance Group responsible for the surveillance of DLWC dams and participant of a number of 5 yearly surveillance inspections
Project Director for earthquake studies on intake towers and appurtenant works at DLWC dams
Consultant to DLWC to manage their portfolio risk assessment
Project Director for a number of dambreak studies and preparation of dam safety emergency plans
Member of the consulting team carrying out risk assessments for Goulburn-Murray Water (Victoria) for Eppalock Dam
Carried out review of Earthquake Stability Review of the Outlet Tower at Eppalock Dam in Victoria for G-MW.
Reviewed URS Australia designs for Alpine Way remedial works

1999

Project Director of earthquake studies on Wyangala Dam
Project Director for design of further remedial works at Hume Dam. Included design of ground improvement works (stone columns) for protecting alluvial foundations against liquefaction
Peer reviewer of Leslie Dam (Queensland) Safety Report.
Peer reviewer of DLWC's Screening Level Risk Assessment

1998

Project Director for portfolio risk assessment for six dams owned by a Southern Rural Water in Victoria.
Directed structural analysis of spillway gates on Narracan Dam for Southern Rural Water
Project Director for concept design and DD&C contract documentation for Warragamba Dam auxiliary spillway. Dam to be upgraded the dam to cater for increased inflow flood estimates. Upgrading works estimated to cost $135M. An auxiliary spillway is to be constructed adjacent to the existing dam - involves excavating some 2,000,000m³ of rock and constructing concrete lining, training walls, fuse plug embankments, large scale cement stabilised sandstone fill, a multi

span bridge across the spillway, post tensioned ground anchors for dissipator/training walls, modifications of existing spillway gates. Design involved extensive physical hydraulic model testing.

1997 Feasibility options study for remediation of Redbank Ck. Dam near Mudgee (NSW) Karapiro Dam, New Zealand - Part of international consulting team reviewing this concrete arch dam's security and determining appropriate remedial options (mass concrete buttressing). Director of risk assessment studies for Tenterfield Dam

1993-1997 Hume Dam Investigations - Project Manager of Investigation and Design Studies for the embankments at the dam. Work involves:

- review of the stability of the embankments under static and earthquake loadings
- investigation of liquefaction
- potential of embankments' foundations
- development of stabilising options
- development of options to provide increased flood security including provision of new auxiliary spillways and modifications to existing works

- detail design and documentation of stabilising works for the embankments including a key trench into the dam's foundations, stabilising berms, slurry wall cut-offs, drainage/filter curtains and strengthening of critical gravity training walls with both horizontal and vertical post tensioning.

- part of advisory and review team for the risk assessment of the dam and its components.

1990-1996 Warragamba Dam Upgrading for Sydney Water Corporation - Project Manager of Investigation Concept Design Studies for upgrading the dam to cater for increased inflow flood estimates and provide substantial flood mitigation. Upgrading works estimated to cost $280M. The existing dam was to be strengthened with mass concrete buttressing – some 600,000m³.

1996 Project Director for Safety Review (including Finite Element Analysis) of Wellington Dam

1993-1996 Hume Dam Gates for Department of Water Resources - Project Manager for the design of new maintenance baulks and emergency closure gates. Involves development of proposals for underwater installation.

1995 Redbank Creek Dam and Lithgow No. 2 Dam for NSW Public Works Dams Surveillance - Project Manager for safety reviews and finite element analysis of two 15m high arch dams. Clarrie Hall Dam for NSW Public Works Dams Surveillance - Project Manager for dambreak studies.

1994 Burrinjuck Dam Gates for NSW Department of Water Resources - Project Manager for the design of new control and emergency closure gates. Involves underwater installation. Karangi Dam for Coffs Harbour City Water Project - Project Manager for dambreak studies.

1993 Mardi Dam for Wyong Council - Project Manager for safety review of earth embankment.

1988-1990 Nepean Dam Remedial Works for Sydney Water Corporation - Project Manager for investigation studies, design development and detail design. Work involved:

- initial flood security studies and development of options
- co-ordination of hydraulic model studies
- detail design and contract documentation for modified spillway, large size post-tensioned ground anchors and rockfill buttressing.

1987-1989 Boggabilla Weir for NSW Department of Water Resources - Project Manager for detail design and contract documentation of a large gated re-regulation weir with fishway. Involved liaison with fisheries expert in developing optimum geometry for fish ladder.

Chaffey Dam for NSW Department of Water Resources - Project Manager for upgrading of dam. Work involved:

- development of options and preliminary design
- finite element analyses for raised morning glory spillway
- stability analyses for raised earth/rockfill embankment
- co-ordination of hydraulic model studies for raised spillway.

1969-1987: ***Water Resources Commission of NSW (WRC) (now Department of Land and Water Conservation).***

1986-1987 Flood Security studies for WRC - Project Design Engineer for investigation into flood security of Chaffey and Glennies Creek Dams. Involved co-ordinating dambreak studies, development of remedial options, economic risk studies.

1985-1987 Hume Dam Strengthening for WRC - Project Design Engineer for detail design and contract documentation. Work included:

- design of large size post-tensioned ground anchors including development of appropriate grouting procedures
- design of structural modifications to the concrete gravity dam
- design of a new road bridge over the dam.
- establishing the rationale for replacing the existing post tensioning system

Contact

Tel: [redacted]
Mobile: [redacted]

resumé [redacted]

SEQ Water Grid

Talking Points

TRIM reference: D/11/	Enquiry received:
Purpose: Wivenhoe Dam release	

Impacts of Wivenhoe and Somerset dams

- Wivenhoe and Somerset dams reduced the flood peak by 2.5 metres in the City and 5.5 metres at Moggill.
- Without the dams, up to 13,000 more houses would have been flooded. They prevented up to $1.6 billion of damages.
- Without the dams, major flooding would have lasted for three days.
- Wivenhoe and Somerset dams controlled 2.6 million megalitres of floodwater. This is 1.1 million megalitres more than in 1974.
- The dams controlled these floodwaters, providing time for peak flows from the Lockyer and Bremer to pass.
- Total flow in the Brisbane River in 1974 was 9,500 cubic metres per second. The estimated flow from this event would have been 13,000 cubic metres per second if Wivenhoe did not exist.

Operation of Wivenhoe and Somerset dams

- The dams were operated strictly in accordance with the approved Operational Procedures.
- The Operational Procedures were developed by Australia's best hydrologists, including:
    - Professor Colin Apelt, Head of Department, Department of Civil Engineering, University of Queensland
    - Mr Eric Lesleighter, Principal Hydraulic Engineer and Chief Engineer Water Resources, Snowy Mountains Engineering Corporation.
- Professor Apelt is Chair of the Brisbane City Council flood taskforce.

Flood report

- There is a regulatory requirement that Seqwater prepare a flood report.
- By regulation. the report will be submitted within six weeks of the gates closing.

- The report will be a comprehensive summary of all procedures, actions, outcomes and processes during the event. It will consider factors impacting on the protection of urban areas.
- The report will be reviewed by the Dam Safety Regulator and independent experts.
- The report and its review will be submitted to the Government and inform a review of the Operational Procedures.
- The review of Operational Procedures will utilise an expert panel, including representatives of the Bureau of Meteorology and Councils.

Rainfall forecasts

- Dam operations were based on forecasts provided by the Bureau of Meteorology.
- The rainfall during the event exceeded all forecasts.
- Rainfall was local and intense, as demonstrated by the tragic events in Toowoomba.

CTS No. 00741/11

Water Grid Manager and Seqwater
MINISTERIAL BRIEFING NOTE

[redacted]
Adviso... ☐ OK
Dated 31/1/11
☐ Approved ☐ Not Approved ☐ Noted
☐ Further information required
Minister [redacted]
Dated 1/2/11

TO: **Minister for Natural Resources, Mines and Energy and Minister for Trade**

SUBJECT: **Tugun Desalination Plant Operations**

RECEIVED
MINISTERIAL OFFICE
27 JAN 2011

☐ MINISTER
☐ POL ADV
☐ MEDIA ADV
☐ PARL SEC
☐ ADMIN
☐

TIMEFRAME

- Noting of this brief is non urgent.

RECOMMENDATION

It is recommended that the Minister **note**:

- that increased raw water turbidity is expected to constrain production from the Mt Crosby Water Treatment Plants for at least four weeks.
- that the Tugun Desalination Plant will be required to continue to produce at between one third and two thirds of capacity.
- the Tugun Desalination Plant standby trials will commence once Mt Crosby Water Treatment Plants resume normal production amounts for an extended period of time.

BACKGROUND

- The Tugun Desalination Plant started standby trials in December 2010, with the trials scheduled to continue throughout January 2011. These trials included a process by which the Tugun Desalination Plant would operate at one third capacity for one day, then shut down for up to three days, before re-commencing production for another day. This cycle would be repeated for up to two weeks at a time.
- Mount Crosby Water Treatment Plants (East and West Bank) typically supply approximately 500,000 persons within the Brisbane and Ipswich region.

CURRENT ISSUES

Raw water

- Due to heavy rainfall during the recent flood event, there are very high levels of sediment suspended in Wivenhoe Dam's drinking water storage compartment. These dam conditions are unprecedented. Water quality is worse than what is flowing from the Lockyer Valley.
- From next week, roughly 1,000 tonnes per day of sediment is expected to flow past Mt Crosby Weir every day.
- As a result of the high sediment levels in the Brisbane River, poor raw water quality is evident.

Mt Crosby Water Treatment Plants

- The Mount Crosby Water Treatment Plants are effectively removing these high levels of sediment and the highly discoloured appearance of the river water.
- The poor raw water quality has resulted in a reduced production capacity at Mount Crosby Water Treatment Plant (MCWTP).
- Also as a result of high sediment levels, the Mount Crosby treatment process is currently generating significant quantities of water treatment residues which need to be thickened and disposed of.

Rec'd - ODG 21 JAN 2011

Author	Cleared by	Cleared by	Recommended:
Name: Jade Simmons Position: Sr Correspondence Officer Tel No: [redacted] Date: 20 January 2011	Name: Dan Spiller Position: Director, Operations Tel No: [redacted]	Name: Barry Dennien Position: CEO, SEQWGM Tel No: [redacted] noted 22/1/11	Name: John Bradley Director-General, DERM Tel No: [redacted] Date:

Rec-ODDG 21 JAN 2011

File Ref: [redacted] 1/11

- MCWTP has the capacity to thicken and dispose of a normal quantity of residue and has emergency storage for residues. However, if current levels of residue productions persist, these storage areas will be filled in four to eight weeks.
- The Department of Environment and Resource Management (DERM) has approved an initial release of excess water treatment residues from Mt Crosby Eastbank Water Treatment Plant to the Brisbane River. This release amounts to less than two per cent of sediment currently flowing in river.
- Additional water treatment residue capacity is being investigated as a priority.

Water balance

- In order to supply water to central South East Queensland, several actions have been undertaken, including increasing supply from the Tugun Desalination Plant to two thirds capacity.
- Further actions to mitigate the reduced supply from Mt Crosby Water Treatment Plants include maximising transfers through the Southern Regional Water Pipeline, increasing production of Molendinar Water Treatment Plant to capacity, maximising North Pine Water Treatment Plant production and transfers through Northern Pipeline Interconnector.

RESOURCE/IMPLEMENTATION IMPLICATIONS

- Savings in 2010-2011 were not factored in to the recently announced changes to the bulk water price path. However, there were reduced savings in 2010-2011.
- Increased operation of the Tugun Desalination Plant over December and January has cost approximately $1.2 million.

PROPOSED ACTION

- The Tugun Desalination Plant will continue increased production levels until the Mt Crosby Water Treatment Plants resume normal production amounts for an extended period of time.
- While Tugun Desalination Plant continues increased production, the standby trials will be postponed.

OTHER INFORMATION

- *Consultation: Continued consultation has been undertaken with Seqwater, LinkWater and WaterSecure to ensure all aspects of the South East Queensland Water Grid are working together. DERM has been consulted on the possibility of disposing larger amounts of residue into the Brisbane River.*
- *Key Communication Messages: A draft media release has been formulated regarding the Tugun Desalination Plant's support for supplying water to Brisbane and Ipswich regions is at* ***Attachment A.***

MINISTER'S COMMENTS

ATTACHMENTS

Attachment A: Draft media release – Climate resilient assets keep water supply flowing

Author	Cleared by	Cleared by	Recommended:
Name: Jade Simmons Position: Sr Correspondence Officer Tel No: [redacted] Date: 20 January 2011	Name: Dan Spiller Position: Director, Operations Tel No: [redacted]	Name: Barry Dennien Position: CEO, SEQWGM Tel No: [redacted]	Name: John Bradley Director-General, DERM Tel No: [redacted] Date:

File Ref:

SEQ Water Grid

Media Release

Climate resilient assets keep water supply flowing

The Tugun Desalination Plant continues to make an important contribution to the water supply for Brisbane.

Switched up to full power at the height of the flood emergency, the facility has since been operating at two thirds capacity, bolstering the supply outputs from Brisbane's flood impacted water treatment plants.

Water Grid spokesperson Barry Dennien said the desalination plant is playing an integral role in maintaining water quality across South East Queensland.

"Although we have all of our water treatment plants operating, the high sediment levels in the Brisbane River mean that production is reduced.

"To highlight this, there are currently up to 1,000 tonnes of dirt flowing over the Mt Crosby Weir per day.

"This is where the desalination plant becomes a vital component of the emergency response for South East Queensland.

"We are able to utilise this asset, which can guarantee as much as 3,000 litres of impeccable water per second, when others struggle," said Mr Dennien.

The Water Grid's Western Corridor Recycled Water Scheme has also been switched on to the emergency response.

It has been providing purified recycled water for the critical wash down and clean up phase, freeing up potable water in those areas hardest hit by the floods.

Last year, the State Government announced plans to place the Tugun Desalination Plant into standby mode and to de-mobilise parts of the Western Corridor Recycled Water Scheme.

These actions allowed for these plants to be able to swing into an emergency response while at the same time enabling the Water Grid to take full advantage of the wet season.

"These climate resilient assets have performed perfectly for our emergency response and have allowed us enormous flexibility in handling the flood crisis, stated Mr Dennien.

Water supplies for Ipswich, Brisbane, Gold Coast and Sunshine Coast are currently safe and secure, despite the severe flooding.

SEQ Water Grid

Media Release

The plant will now move to standby mode in February or March, when Mt Crosby Water Treatment Plant returns to normal production.

This will have no impact on the reductions to bulk water prices that were announced in December 2010.

For more details on the desalination plant go to www.watergrid.com.au

ENDS

About the SEQ Water Grid: Established in June 2008, the SEQ Water Grid represents one of Australia's largest investments in water infrastructure and is a world class asset in water management in both times of drought and deluge.

Through a network of climate resilient water sources, treatment facilities, new two-way pipes and existing pipelines, the SEQ Water Grid gives the South East Queensland region the ability to support water demands, water quality, economic prosperity and lifestyle - regardless of climate change and population growth.

For further information on the Water Grid: www.watergrid.com.au

For further details contact the Water Grid Communications Unit on:

Ph: [redacted] **| Mobile:** [redacted] **| Email:** [redacted]

CTS No. 01190/10

Advisor .....OK Dated / /
Approved/Not Approved/Noted **Further information required** Minister ..... Dated / /

SEQ Water Grid Manager
MINISTERIAL BRIEFING NOTE

TO: **Minister Robertson**

FROM: **Barry Dennien, Chief Executive Officer**
SEQ Water Grid Manager

SUBJECT: **Water Grid operational status**

Noted / **Further information required** DG DERM ..... Dated / /

TIMEFRAME

- This briefing note is intended to provide more detail regarding Water Grid operations, prior to the Cabinet meeting on 31 January 2011.

RECOMMENDATION

It is recommended that the Minister:

- **note** that supply has been restored to the few areas in South East Queensland (SEQ) that lost supply;
- **note** the ongoing and emerging issues impacting on the operation of the Water Grid will continue for some months; and
- **note** the exceptional efforts from staff from all Water Grid entities resulted in the majority of water supplies being available throughout the event, with few exceptions.

BACKGROUND

- Recent significant rainfall events and flood events across South East Queensland (SEQ) have impacted the operation and performance of many of the components of the Water Grid.
- On 26 January 2011, the flood related emergency was de-escalated to a Level 3 emergency. This decision followed the boiled water notices for the Lockyer and Somerset areas being lifted and a quality water supply being maintained across the Water Grid. The Level 3 Emergency will be maintained until the Lowood Water Treatment Plant dry well raw water pump has been repaired and is operating satisfactorily (refer below). Lowood was the only township where the water supply was not able to be brought back on line within the 48 hours following the flood event.
- While this emergency has been de-escalated, there remain a range of ongoing operational issues and constraints. These issues are expected to persist for some weeks to come and will be managed as part of the normal operation of the Water Grid. Key issues and responses are outlined below for information.
- These flood related issues and constraints are in addition to normal operational considerations, including management of water quality incidents and the risk of algal blooms in key storages.
- These issues will continue to be monitored and assessed, contributing to the work load of key staff in bulk water supply entities.

CURRENT ISSUES

Water treatment residue management

- Sediment and organic content in raw water has increased significantly, particularly in the Brisbane River. Raw water is also highly coloured.
- Early indications are that these conditions are likely to persist for several months, with the dams potentially taking up to a year to return to normal conditions.
- Due to poor raw water quality, chemical dosing requirements have increased along with the

quantities of water treatment residues which need to be thickened and disposed.

- The greatest impacts are at the Mt Crosby and North Pine water treatment plants. At Mt Crosby, about 10 times more water treatment residue is being produced than is normal.
- Both plants have emergency storage for residues to allow later processing after a rainfall event. However, at current levels of residue production and if river sediment and colour levels persist, all emergency storage will be filled in six to 12 weeks.
- Due to these issues, the Water Grid is being operated to reduce production requirements from the Mt Crosby and North Pine water treatment plants – with increased volumes being transferred into central SEQ from the Gold Coast and Sunshine Coast water treatment plants.
- The desalination facility continues to operate at two-thirds of capacity. This production together with increased production from Molendinar Water Treatment Plant allows about 90 to 95 megalitres per day to be transferred to central SEQ, while also meeting slightly increased demands on the Gold Coast.
- It is envisaged that this mode of operation will continue into February.
- In addition:
    - approval was received to release increased volumes of treatment residue material to the Brisbane River as a temporary measure to increase the time over which the emergency storage capacity will last; and
    - Seqwater is hiring mobile dewatering equipment and investigating other options to increase sludge handling capacity at the Mt Crosby and North Pines water treatment plants.

Other water treatment plants

- The Lowood Water Treatment Plant supplies the entire Lockyer Valley. The raw water pumping station was extensively damaged during the flood.
- The dry well has now been recommissioned, with pump repairs in progress. Repairs to the wet well cannot commence until the river levels drop. A diesel raw water pump is being used while repairs are in progress.
- A number of other water treatment plants in the Somerset and Lockyer Valley areas were damaged during the flood, including at Jimna, Kilcoy and Somerset. In most cases, electrical components were damaged.
- While the electrical and control systems are restored, Seqwater is operating the plants in manual mode with staff manning the plants daily.
- The Caboolture,Woodford and South Maclean water treatment plants remain offline due to high levels of turbidity in the raw water sources. The cessation of supply from these plants during high turbidity events is part of normal operating practice. Communities serviced bv all three water treatment plants can also be supplied by the Grid as an alternative.
- Leslie Harrison Dam, due to wet weather, has turned over several times, causing dissolved organics in the water. This water quality is proving difficult to treat, however supply is being maintained and further supply options assessed.

Bulk transport

- The Bundamba offtake from the Southern Regional Water Pipeline was submerged and is not currently operational. LinkWater is undertaking an assessment of the damage sustained and the repairs necessary. It is a minor issue as supply to Ipswich is being maintained via Mt Crosby Water Treatment Plant, which is the major supply route for water to the Ipswich area.
- The Bundamba pumping station that assists the supply of the Southern Regional Water Pipeline when operating in its southerly flow mode has also been extensively damaged. Repairs have begun at the site to restore communications, however further repairs are required before the pump station can be ready for a return to service.
- Assessments are currently being undertaken to inspect and assess the operation of infrastructure in areas that were inundated. This includes inspection of creek crossings for physical damage and of valve pits to determine the risk of ingress of pooled water via air valves.

Western Corridor Recycled Water Scheme

- The flood has affected multiple sites across the Western Corridor Recycled Water Scheme.
- The Bundamba Advanced Water Treatment Plant will be unable to operate at capacity for at least three months, due to damage to the wastewater treatment plants that provide feedwater to the plant. Queensland Urban Utilities has provided formal advice that it is unable to supply from the Oxley, Wacol, Bundamba and Goodna wastewater treatment plants on account of flood damage.
- Supply is also contingent upon the condition of connecting pipelines, which have potentially been affected by landslips in the Goodna area. Detailed geotechnical assessments are underway.
- In the meantime, a temporary cross-connection has been installed to enable supply to the Swanbank power station from the Gibson Island and Luggage Point advanced water treatment plants. Supply has re-commenced.
- Supply to the Tarong power station is not possible at this time, due to damage to pumps owned by Tarong Energy Corporation (TEC). TEC is currently investigating the extent of damage and timeframe for recommencement of supply.
- In addition, there is electrical and potentially physical damage to components at a wide range of sites. This damage is currently being assessed.

Other damage assessment

- Seqwater is assessing the condition of assets such as dams and weir for damage from flood waters.
- Damage to the gauging network is also being assessed, and a rectification plan developed. This assessment is a high priority, due to the possibility of another major flood event over the remainder of the wet season. A coordinated strategy is required, as gauging stations are also owned by the Department of Environment and Resource Management and Councils.

RESOURCE/IMPLEMENTATION IMPLICATIONS

- Budget implications for the current financial year are currently being assessed.

MINISTER'S COMMENTS

CTS No. 01326/11

SEQ Water Grid Manager
MINISTERIAL BRIEFING NOTE

TO: **Minister Robertson**

FROM: **Barry Dennien, CEO,**
SEQ Water Grid Manager

SUBJECT: **Ministerial visit to**
Mt Crosby Water Treatment Plant –
East Bank pumping station

Advisor .....OK Dated / /
Approved/Not Approved/Noted **Further information required** Minister ..... Dated / /

Noted / **Further information required** DG DERM ..... Dated / /

TIMEFRAME

- Approval/Noting of this briefing note is required prior to the Ministers visit to Mt Crosby Water Treatment Plant – Eastbank pumping station, on Tuesday 1 January 2011, to be held at 9.00 am.

RECOMMENDATION

It is recommended that the Minister:

- **note** the information provided in this brief, prior to the Ministers visit to Mt Crosby Water Treatment Plant – Eastbank pumping station, on Tuesday 1 January 2011.

BACKGROUND

- It is the SEQ Water Grid Managers' understanding that the Minister first requested to visit Mt Crosby Water Treatment Plant shortly after the recent flood event.
- The Mt Crosby Water Treatment Plants Eastbank and Westbank, supply approximately 500,000 persons in the Ipswich and Brisbane areas.

CURRENT ISSUES

- During the recent flooding event, both the Eastbank and Westbank's of Mt Crosby Water Treatment Plants were isolated by flood waters.
- Flood damage to the plants included the Westbank intake structure and Eastbank pump station. Repair crews were transported to and from the plant to undertake repairs. These staff worked under very difficult conditions (limited light, high humidity, mud and oily conditions) to bring pumps into operation.
- Due to the isolation, there were no chemical deliveries for several days and plant operations relied on held stock and limit production.
- Staff were isolated on-site during the event, working long hours under challenging conditions.
- Seqwater initially had staff isolated at both plants (including two chemical deliver drivers) and relied on helicopters to drop operators in and out.
- Communications during the event were compromised with no landlines, computer access and limited mobile access.
- Had the river level been higher during the peak, Energex and Seqwater made preparations to cut the power supply to the pump stations.
- As a result of high sediment levels, the Mount Crosby treatment process is currently generating significant quantities of water treatment residues which need to be thickened and disposed of.
- The Mount Crosby Water Treatment Plant has the capacity to thicken and dispose of a normal quantity of residue and has emergency storage for residues. However, if current levels of residue productions persist, these storage areas will be filled in six to12 weeks.

Contact: Barry Dennien, CEO, SEQ Water Grid Manager
Telephone: [redacted] Mobile: [redacted]
File Number:

Date: 31/01/2011

- The department of Environment and Resource Management has approved an initial release for excess water treatment residues from Mt Crosby Eastbank Water Treatment Plant to the Brisbane River. This sediment amounts to less than 2 per cent of sediment currently flowing in the river.
- Additional water treatment residue capacity is being investigated as a priority.

RESOURCE/IMPLEMENTATION IMPLICATIONS

- There are no resource/implementation implications

MINISTER'S COMMENTS

ATTACHMENTS

- List all attachments referred to in Brief

Department of Environment and Resource Management – Parliamentary Briefing Note	
To	Minister Robertson
Prepared for	Parliamentary sittings 15-17 February 2011

WIVENHOE 25 per cent REDUCTION

KEY POINTS

- Seqwater has recommended to the Government that the water level in Wivenhoe Dam be temporarily reduced to 75 per cent of full supply.
- The recommendation was based on Seqwater modelling which involved 90 permutations of 9 different flood events.
- The modelling has been peer reviewed by external experts.
- The recommendation follows advice from the Water Grid Manager that such a reduction would not impact on the drinking water security of the region and acknowledges the region remains in the middle of the wet season.
- Dam inflows from the January event were almost double that of the 1974 flood and have established another flood benchmark
- This water release will not impact tides and therefore will not affect Brisbane city and suburbs. It is an interim measure for the remainder of the summer.
- It is also expected that the water released will be recouped in the coming years.

Contact: Mike Foster
Telephone: [redacted]
Date: 17 February 2011

CTS No. 02066/11

Approved: [Insert title of Dir/ED/GM/RSD]
Approved: Debbie Best, DDG WEO
Approved: Director-General

RESPONSE

- Seqwater has recommended to the Government that the water level in Wivenhoe Dam be temporarily reduced to 75 per cent of full supply.
- The recommendation was not made lightly. It is a recommendation which balances drinking water security and flood mitigation.
- The recommendation follows Seqwater modelling and is a precaution given the second strongest La Nina pattern in history and its influence on the current wet season.
- Seqwater had advised that a reduction in Wivenhoe Dam's storage level to 75 per cent of Full Supply provides appreciable flood mitigation benefits ahead of any major rain events that may occur during the remainder of the current wet season.
- The inflow into Wivenhoe Dam from this January flood event was almost double that of the 1974 flood. Water was flowing into the Dam 50 per cent faster than it was in 1974.
- That data has now been considered in Seqwater's modelling. This modelling has been peer reviewed by external experts, and involved 90 permutations of 9 different flood events.
- The SEQ Water Grid Manager has advised that there would be no objection from a water security perspective to the temporary reduction. ~~e, reducing Wivenhoe to 75 per cent would be manageable, with the recently completed Wyaralong Dam now~~

Contact: Mike Foster
Telephone: [redacted]
Date: 17 February 2011

CTS No. 02066/11

Approved: [Insert title of Dir/ED/GM/RSD]
Approved: Debbie Best, DDG WEO
Approved: Director-General

~~full five years earlier than expected and storing 103,000 megalitres, which is able to be connected to the Water Grid when required.~~

- Later this week, Seqwater will commence a steady controlled gate release from Wivenhoe Dam, discharging around 30,000 megalitres per day over about nine days.
- There are seven bridges immediately below Wivenhoe. This release will affect only three – Twin Bridges, Savages Crossing and Colleges Crossing. These three bridges will be closed to traffic during the release period. There are alternative routes available in each of these communities.
- These releases will not impact tides and therefore will not affect Brisbane city and suburbs.
- It is also important to remember this is an interim measure for the remainder of the summer.
- The longer term approach will be shaped by the Commission of Inquiry's outcomes.

BACKGROUND

- Background documents attached

Contact: Mike Foster
Telephone: [redacted]
Date: 17 February 2011
CTS No. 02066/11

Approved: [Insert title of Dir/ED/GM/RSD]
Approved: Debbie Best, DDG WEO
Approved: Director-General

Department of Environment and Resource Management – Parliamentary Briefing Note	
To	Minister Robertson
Prepared for	Parliamentary sittings 15-17 February 2011

WIVENHOE DAM operations in relation to the January 2011 flood event

KEY POINTS

- Wivenhoe and Somerset Dams can only help manage the flood waters from the Upper Brisbane, which comprises of approximately 50% of the total Brisbane River catchment.
- Based on the Brisbane City Council flood damage model, without Wivenhoe Dam, up to 13,000 more houses may have been flooded and major flooding may have lasted up to three days longer. It is estimated Wivenhoe Dam may have prevented up to $1.6 billion of damages.
- Wivenhoe and Somerset Dams are required to operate during a flood event strictly in accordance with Manual of Operational Procedures for Flood Mitigation, which is approved by the Office of the Dam Safety Regulator.
- The Government announced Commission of Inquiry will examine the management of Wivenhoe Dam during the flood event and whether any operational improvements are required into the future.

RESPONSE

Contact: Mike Foster
Telephone: [redacted]
Date: 10 February 2011
CTS No.

Approved: Peter Borrows, CEO Seqwater
Approved:
Approved:

- From 13 December 2010 to 11 January 2011, South East Queensland experienced unprecedented rainfall, which resulted in a number of controlled flood gate releases from Wivenhoe, Somerset and North Pine Dams.
- The rainfall over this period culminated in the January 2011 flood event.
- During the event Seqwater advises Wivenhoe and Somerset dams helped to manage flood waters from the upper Brisbane catchment by controlling the release of 2,650,000 million ML of flood water. This is 1,240,000 million ML more than the 1974 floods.
- Seqwater estimates that the management of Wivenhoe Dam during the flood event resulted in reduction of flood peak of up to 2.5 metres in the Brisbane CBD.
- Seqwater is required to operate Wivenhoe, Somerset and North Pine dams in accordance with a range of regulatory requirements including the flood mitigation strategies contained within the Manuals of Operational Procedures for Flood Mitigation.
- Seqwater has a Dam Safety Management Program approved by the State's Dam Safety Regulator, as well as a Flood Control Centre.
- The Manuals and their operating procedures have been reviewed by some of Australia's best water experts and are

based on detailed hydrological analysis and technical assessments of dam safety.

- The Government announced a Commission of Inquiry on 17 January 2011 to examine the management of Wivenhoe Dam over this period and whether any operational improvements are required into the future.
- Seqwater is required by the Office of the Dam Safety Regulator to provide a detailed report within six weeks of the January flood event.
- This report, once finalised, will also be provided to the Commission of Inquiry.
- Seqwater is also currently undertaking a process to identify whether any damage has been sustained to its infrastructure as a result of the flood event. As part of this process, and as a matter of urgency, dam and weirs are being inspected by independent experts to determine the structural integrity of that infrastructure.
- Seqwater has advised that the structural integrity of Wivenhoe, Somerset and North Pine Dams remains intact.
- Seqwater is currently undertaking small operational releases from both Somerset and Wivenhoe.
- The Grid 12 dams are currently at 100% combined capacity with Wivenhoe, Somerset and North Pine Dams all at about

100% capacity. **(dam levels to be updated on Tuesday 15 February 2011 am)**

- On Sunday 13 February I announced the State Government had received and accepted a recommendation from Seqwater to temporarily reduce Wivenhoe Dam levels to 75% of the Full Supply Level (FSL) for the remainder of the wet season.
- The recommendation balanced the region's drinking water security and flood mitigation and was based on Seqwater modelling which was peer reviewed by external experts.

BACKGROUND

Ability for Wivenhoe and Somerset dams to manage floods in the Brisbane River

- There are 4 major catchments that impact on flooding in Brisbane (Upper Brisbane, Lockyer; Bremer and local creeks).
- The contribution of each of these individual catchments depends on where the rain falls.

Impacts of Wivenhoe and Somerset Dams

- During the January 2011 flood event, it is estimated that Wivenhoe Dam reduced the flood peak by up to 2.5 metres in the Brisbane CBD.
- During the flood event controlled 2,650,000 mega litres (ML) of floodwater passed through Wivenhoe and Somerset Dams. This is 1,240,000 ML more than in 1974.
- Highest flow rate in the Brisbane River in the city in 1974 has historically been accepted as 9,500 cubic metres per second (this may be reassessed at some stage).
- The estimated flow from this event may have been up to 4,500 cubic metres per second greater if Wivenhoe Dam did not exist.

Operation of Wivenhoe and Somerset dams

- Detailed Operational Procedures for flood mitigation have been developed by leading water experts over many years.
- The clear decision making process in the Manual has been established since 1992. Subsequently, the Manual was reviewed during the Brisbane Valley Flood Damages Minimisation Study in 2006, with the latest comprehensive review of the Manual undertaken in 2009. Both of these reviews have included expert review panels comprising key stakeholders, with the most recent review involving representatives from DERM, BOM, BCC and SunWater.

Rainfall forecasts

Contact: Mike Foster
Telephone: [redacted]
Date: 10 February 2011
CTS No.

Approved: Peter Borrows, CEO Seqwater
Approved:
Approved:

- There is a significant element of uncertainty in rainfall forecasting, even though the Bureau of Meteorology uses the best technology available, and highly-qualified and experienced experts.
- Wivenhoe and Somerset dam operations were based on forecasts provided by the Bureau of Meteorology and observed rain on the ground.
- The rainfall during the critical period of this event significantly exceeded the Bureau of Meteorology forecasts.

Large releases earlier

- Releasing large volumes of water over the weekend prior to the 11 January 2011 event would have had major impacts on the rural communities of the Brisbane Valley. Bridges would have been cut and communities would have been isolated with little notice.
- Such a release of large volumes of water at that time would have not been accordance with the strategies detailed in the Manual.
- Over the weekend, neither rainfall forecasts nor the observed rain on the ground indicated that urban areas would be impacted.

Increases above 200% (level of fuse plugs)

- Wivenhoe Dam is not designed to overtop. If it did, the dam would fail and the resulting damage and loss of life could be as much as 100 to 1,000 times greater than that currently being experienced.
- To prevent overtopping, the dam has been designed with fuse plugs, the first one opens when it reaches just more than 200% of the FSL.
- Once opened, the rate of release through these plugs cannot be varied. Although through the use of the flood gates, by either increasing or decreasing gate releases, the total volume being released from the dam can be varied.
- The plugs continue to release water at this rate until the dam reduces to full supply level.
- Seqwater managed to control the flood releases during the January 2011 event to avoid initiating the fuse plugs
- The fuse plugs would take four to six months of dry weather to repair, and severely restrict the capability to manage further flood events during this period.
- In accordance with the Manual, flood operations are managed to ensure a flood buffer still exists to allow for possibilities of further extensive inflows.

Department of Environment and Resource Management – Parliamentary Briefing Note	
To	Minister Robertson
Prepared for	Parliamentary sittings 8-10 March 2011~~15-17 February 2011~~

WIVENHOE 25 PER CENT REDUCTION

KEY POINTS

- Seqwater has recommended to the Government that the water level in Wivenhoe Dam be temporarily reduced to 75 per cent of full supply.
- The recommendation was based on Seqwater modelling which involved 90 permutations of nine different flood events.
- The modelling was ~~has been~~ peer reviewed by external experts.
- The recommendation follows advice from the SEQ Water Grid Manager that such a reduction would not impact on the drinking water security of the region and acknowledges the region remains in the middle of the wet season.
- Dam inflows from the January event were almost double that of the 1974 flood and have established another flood benchmark
- The scheduled release pattern ~~Releases~~ started from 6.00 am Sunday, 20 February 2011 ~~and ended~~ and ceased 3.00 pm Wednesday, 2 March 2011.
- This water release did~~will~~ not impact tides and therefore did~~will~~ not affect Brisbane city and suburbs. It is an interim measure for the remainder of the summer.

Contact: Mike Foster
Telephone: [redacted]
Date: 17 February 2011

Approved: ~~[Insert title of Dir/ED/GM/RSD]~~
Approved: ~~Debbie Best, DDG WEO~~
Approved: ~~Director-General~~

CTS No. 023482066/11

- Three of the seven bridges below Wivenhoe Dam were closed by local government for the duration of the releases and have now been re-opened. These include Twin Bridges, Savages Crossing and Colleges Crossing. In each case there are alternative routes available to the community
- It is also expected that the water released will be recouped in the coming years.

RESPONSE

- The scheduled release pattern ~~Water releases~~ to reduce Wivenhoe Dam's Full Supply Level ~~(FSL)~~ commenced Sunday, 20 February 2011 at 6.00 am and ceased~~with the gates closed~~ at 3.00 pm Wednesday, 2 March 2011.
- The release period of nine days had to be extended by almost 36 hours due to storm activity across the Wivenhoe catchment and the Brisbane River catchment below the dam on Monday, 21 February 2011.
- As a result, Wivenhoe Dam release rates were reduced for a 24 hour period, to allow flows down the Lockyer to sufficiently pass.

In addition, Wivenhoe Dam received inflows of up to ~~xxxx~~40,~~35~~,000 megalitres~~ML~~ (or the equivalent of about ~~xxxx~~43 per cent capacity) from the surrounding catchment.

Contact: Mike Foster
Telephone: [redacted]
Date: 17 February 2011

Approved: ~~[Insert title of Dir/ED/GM/RSD]~~
Approved: ~~Debbie Best, DDG WEO~~
Approved: ~~Director-General~~

CTS No. 0234820~~66~~/11

-

- The releases reduced Wivenhoe Dam to just above 76% Full Supply Level, which equates to a reduction of approximately 280,000 megalitres~~ML~~.
- Smaller releases are continuing to take the dam down to 25 per cent and manage minor ongoing inflows into Somerset and Wivenhoe dams.
- Significant public communication, including print and radio advertisements, occurred prior to the release being undertaken. Regular ~~Daily~~ media updates were also been provided for the duration of the release period.
- The releases were undertaken after consultation with the Somerset Regional Council, Ipswich Regional Council and Brisbane City Council,
- The release flow rates adopted were deliberately designed to ensure that no ~~downstream bridges were closed which would have resulted in~~ communities and residents ~~being~~ were cut off.
- The~~All~~ three bridges impacted by the release – Twin Bridges, Savages Crossing and Colleges Crossing – have been re-opened to traffic. In each case there were alternative routes available to the community over the duration of the release.
- The decision ~~recommendation~~ to reduce Wivenhoe Dam's Full Supply Level was not made lightly. It is a

Contact: Mike Foster
Telephone: [redacted]
Date: 17 February 2011

Approved: ~~[Insert title of Dir/ED/GM/RSD]~~
Approved: ~~Debbie Best, DDG WEO~~
Approved: ~~Director-General~~

CTS No. 023482066/11

strategy~~recommendation~~ which balances drinking water security and flood mitigation.

—The release strategy was aimed at creating an additional flood buffer zone for the rest of the wet season quickly and with as minimal impact on the community as possible.

•

•

~~•Seqwater has recommended to the Government that the water level in Wivenhoe Dam be temporarily reduced to 75 per cent of full supply.~~

~~•The recommendation was not made lightly. It is a recommendation which balances drinking water security and flood mitigation.~~

~~•The recommendation follows Seqwater modelling and is a precaution given the second strongest La Nina pattern in history and its influence on the current wet season.~~

~~•Seqwater had advised that a reduction in Wivenhoe Dam's storage level to 75 per cent of Full Supply provides appreciable flood mitigation benefits ahead of any major rain events that may occur during the remainder of the current wet season.~~

Contact: Mike Foster
Telephone: [redacted]
Date: 17 February 2011
CTS No. 023482066/11

Approved: ~~[Insert title of Dir/ED/GM/RSD]~~
Approved: ~~Debbie Best, DDG WEO~~
Approved: ~~Director-General~~

- ~~The inflow into Wivenhoe Dam from this January flood event was almost double that of the 1974 flood. Water was flowing into the Dam 50 per cent faster than it was in 1974.~~
- ~~That data has now been considered in Seqwater's modelling. This modelling has been peer reviewed by external experts, and involved 90 permutations of nine different flood events.~~
- ~~The SEQ Water Grid Manager has advised that there would be no objection from a water security perspective to the temporary reduction.~~
- ~~Later this week, Seqwater will commence a steady controlled gate release from Wivenhoe Dam, discharging around 30,000 megalitres per day over about nine days.~~
-
- ~~There are seven bridges immediately below Wivenhoe. This release will affect only three – Twin Bridges, Savages Crossing and Colleges Crossing. These three bridges will be closed to traffic during the release period. There are alternative routes available in each of these communities.~~
- ~~These releases will not impact tides and therefore will not affect Brisbane city and suburbs.~~
- It is also important to remember this is an interim measure for the remainder of the summer.
- The longer term approach will be shaped by the Commission of Inquiry's outcomes.

Contact: Mike Foster
Telephone: [redacted]
Date: 17 February 2011

Approved: ~~[Insert title of Dir/ED/GM/RSD]~~
Approved: ~~Debbie Best, DDG WEO~~
Approved: ~~Director-General~~

CTS No. 023482066/11

BACKGROUND

- ~~Background documents attached~~
-

Contact: Mike Foster
Telephone: [redacted]
Date: 17 February 2011

CTS No. 023482066/11

Approved: ~~[Insert title of Dir/ED/GM/RSD]~~
Approved: ~~Debbie Best, DDG WEO~~
Approved: ~~Director General~~

Ufer Cathy

From:	Williamson Liliana on behalf of DLO EWU
Sent:	Wednesday, 16 March 2011 11:45 AM
To:	Corro Minister ERM
Cc:	Williams Lynette
Subject:	FW: I/11/0126- Meeting with Phil Hennessey, SEQ Water Grid Chair re Decentralisation to Ipswich
Follow Up Flag:	Follow up
Flag Status:	Yellow
Attachments:	img-3151548-0001.pdf; I110126 due 22 March- Meeting with Phil Hennessey, SEQ Water Grid Chair re Decentralisation to Ipswich.docx

Dear MECU Folks,

Could you please organise a meeting brief for a meeting with Phil Hennessey, the SEQ Water Grid Chair to discuss Decentralisation to Ipswich on Tuesday, 29 March 2011.

Lynette, Minister Robertson's Office has requested that Departmental Representatives be nominated to attend this meeting. Are you able to advise of an appropriate departmental representative for this meeting?

Please provide approved brief to the Minister's office by **COB Tuesday, 22 March 2011.**
Kind regards,

Liliana Williamson
Departmental Liaison Officer (Water Utilities)
Office of the Minister for Energy and Water Utilities
Department of Environment and Resource Management
Telephone: ([redacted]QNET: 47077
Mobile: [redacted]
Email: liliana.williamson@derm.qld.gov.au
Web: www.derm.qld.gov.au

SEQ Water Grid

RECEIVED

ACTION
ACK LTR
INFO / MIN FILE
To Dept For:
BRIEF
REPLY
ACTION
INFO / FILE

1 March 2011

The Honorable Rachel Nolan
Minister for Finance and The Arts
GPO Box 149
BRISBANE QLD 4001

The Honorable Stephen Robertson
Minister for Energy and Water Utilities
PO Box 15216
CITY EAST QLD 4002

Dear Ministers

Decentralisation to Ipswich – Water Grid Entities

The water grid entities have been in discussions with the Department of Public Works and Justice and Attorney General for the last twelve months in relation to the decentralisation to Ipswich.

In late December 2010, these agencies provided an update on the proposed redevelopment of a site at Ipswich and a possible timetable of actions.

As you are aware, access to necessary facilities and resources was put to the test in the flood crisis. As a result of these events, the Chairs have requested that the working group, comprising of Executives from each the water grid entities, conducts a thorough capability review to determine the resources and facilities necessary to enable the Water Grid to operate continuously in such events.

This review will focus on the needs for 24/7 access, IT and power supply, the ability of staff to be able to attend work during an extreme weather event and accessibility for Ministerial and agency meetings and updates.

The Chairs would appreciate the opportunity to meet with you both to discuss these matters once the review is finalised.

Yours faithfully

[redacted]

Phil Hennessy Chair Seqwater | **David Gray** Chair WaterSecure | **Gary Humphrys** Chair SEQ Water Grid Manager | **Steve Roberts** Chair LinkWater

[redacted]

OFFICE OF THE MINISTER FOR ENERGY & WATER UTILITIES

BRIEF REQUEST

MO I/1X/XXXX	**I/11/0126**
DUE DATE	**22 March**
MEETING / FUNCTION TITLE	**Meeting with Phil Hennessey, SEQ Water Grid Chair re Decentralisation to Ipswich**
DATE & TIME	**29 March @ 11am**
DEPT'L OFFICER REQUIRED	**Yes**
WHO IS BRIEF FOR	**Minister**
SPEECH REQUIRED	**No**

IMPORTANT INSTRUCTIONS

- Refer to attachments for background information and other instructions
- If speech is provided - speech notes and brief to also be forwarded to NRMET@ministerial.qld.gov.au
- Attachments should include the original meeting request or event invitation but should not include function proformas, speech notes or administrative email chains

Department of Environment and Resource Management – Parliamentary Briefing Note

To Minister Robertson

Prepared for Parliamentary sittings 22-24 ~~8-10~~ March 2011

28

WIVENHOE 25 PER CENT REDUCTION

KEY POINTS

- Following the January 2011 flood event, Seqwater ~~has~~ recommended to the Government that the water level in Wivenhoe Dam be temporarily reduced to 75 per cent of full supply.
- The recommendation was based on Seqwater modelling which involved 90 permutations of nine different flood events.
- The modelling was peer reviewed by external experts.
- The recommendation followeds advice from the SEQ Water Grid Manager that such a reduction would not impact on the drinking water security of the region and acknowledges the region remains in the middle of the wet season.
- Dam inflows from the January event were almost double that of the 1974 flood and have established another flood benchmark
- The scheduled release pattern started from 6.00 am Sunday, 20 February 2011 and ceased 3.00 pm Wednesday, 2 March 2011.
- This water release did not impact tides and therefore did not affect Brisbane city and suburbs. Water was released as an interim measure for the remainder of the summer season.

Contact: Mike Foster
Telephone: [redacted]
Date: 11~~4~~March~~7 February~~ 2011
CTS No. 039172348/11

Approved: DDG, WEO
Approved:
Approved:

- Three of the seven bridges below Wivenhoe Dam were closed by the local government for the duration of the releases and were ~~have now been~~ re-opened shortly afterwards. These included Twin Bridges, Savages Crossing and Colleges Crossing. In each case there were~~as~~ alternative routes available to the community.
- It is also expected that the water released will be recouped in the coming years.
- Minor releases from Wivenhoe Dam are continuing, to manage current inflows and bring the dam down to the targeted 75 per cent of full supply level.
- Twin Bridges are currently closed due to these releases, however, alternative routes are available.

RESPONSE

- The scheduled release pattern to reduce Wivenhoe Dam's Full Supply Level commenced Sunday, 20 February 2011 at 6.00 am and ceased at 3.00 pm Wednesday, 2 March 2011.
- The release period of nine days was~~had to be~~ extended by almost 36 hours due to storm activity across the Wivenhoe catchment and the Brisbane River catchment below the dam on Monday, 21 February 2011.

Contact: Mike Foster
Telephone: [redacted]5
Date: 11~~1~~March~~7 February~~ 2011
CTS No. 039172348/11

Approved: DDG, WEO
Approved:
Approved:

- As a result, Wivenhoe Dam release rates were reduced for a 24 hour period, to allow flows down the Lockyer to sufficiently pass.

- In addition, Wivenhoe Dam received inflows of up to 40,000 megalitres (or the equivalent of about 4 per cent capacity) from the surrounding catchment.

- Significant public communication, including print and radio advertisements, occurred prior to the release being undertaken. Regular media updates were also provided for the duration of the release period.

- The releases were undertaken after consultation with the Somerset Regional Council, Ipswich Regional Council and Brisbane City Council,

- The release flow rates adopted were deliberately designed to ensure that no communities and residents were cut off.

- The three bridges impacted by the release – Twin Bridges, Savages Crossing and Colleges Crossing – were ~~have been~~ re-opened to traffic shortly afterwards. In each case, there were alternative routes available to the community over the duration of the release.

- Minor releases associated with the normal operation of Wivenhoe Dam are continuing, to manage current inflows and maintain the dam at the targeted 75 per cent of full supply level.

Contact: Mike Foster
Telephone: [redacted]
Date: 11~~4~~March~~7 February~~ 2011
CTS No. 039172348/11

Approved: DDG, WEO
Approved:
Approved:

- Twin Bridges are currently closed due to these releases; however, alternative routes are available.
-

- The decision to reduce Wivenhoe Dam's Full Supply Level was not made lightly. It is a strategy which balances drinking water security and flood mitigation.
- The release was recommended by Seqwater after its recent hydrology analysis and was a precaution given the second strongest La Nina pattern in history continues to influence the current wet season.

- Seqwater made its recommendation recognising the extreme January 2011 event that left the catchments soaked and the water tables full
- The release strategy was aimed at creating an additional flood buffer zone for the rest of the wet season quickly and with as minimal impact on the community as possible.
- It is also important to remember this is an interim measure for the remainder of the summer season.
- The release represents an abundance of caution.
- The longer term approach will be shaped by the Commission of Inquiry's outcomes.

BACKGROUND

-

Contact: Mike Foster
Telephone: [redacted]
Date: 11~~1~~March~~7 February~~ 2011
CTS No. 03917~~2348~~/11

Approved: DDG, WEO
Approved:
Approved:

Department of Environment and Resource Management – Parliamentary Briefing Note

To Minister Robertson

Prepared for Parliamentary sittings 22-24~~8-10~~ March 2011

29

WIVENHOE DAM - Operations in Relation to the January 2011 Flood Event

KEY POINTS

- Wivenhoe and Somerset Dams can only help manage the flood waters from the Upper Brisbane River, which comprises approximately 50 per cent of the total Brisbane River catchment.
- Based on the Brisbane City Council flood damage model, without Wivenhoe Dam, up to 14,000 more houses may have been flooded and major flooding may have lasted up to three days longer. It is estimated Wivenhoe Dam may have prevented up to $5 billion of damages.
- Wivenhoe and Somerset Dams are required to operate during a flood event strictly in accordance with the Manual of Operational Procedures for Flood Mitigation, which is approved by the Office of the Dam Safety Regulator.
- The Government announced Commission of Inquiry will examine the management of Wivenhoe Dam during the flood event and whether any operational improvements are required into the future.

Contact: Mike Foster
Telephone: [redacted]
Date: 11 March~~10 February~~ 2011
CTS No. 032902~~333~~/11

Approved: Peter Borrows, CEO Seqwater
Approved:
Approved:

- Seqwater has provided a report on the January flood event to the Dam Safety Regulator and the Commission of Inquiry. This report is publically available on the Department of Environment and Resource Management website.
- Minor releases from Wivenhoe Dam are continuing, to manage current inflows and bring the dam down to the targeted 75 per cent of full supply level.

RESPONSE

- From 13 December 2010 to 11 January 2011, south east Queensland experienced unprecedented rainfall, which resulted in a number of controlled flood gate releases from Wivenhoe, Somerset and North Pine Dams.
- The rainfall over this period culminated in the January 2011 flood event.
- During the event Wivenhoe and Somerset dams helped to manage flood waters from the upper Brisbane catchment by controlling the release of 2,650,000 million megalitres of flood water. This is 1,240,000 million megalitres more than the 1974 floods.
- Seqwater estimates that the management of Wivenhoe Dam during the flood event resulted in an approximate two metre reduction to the flood peak in the Brisbane CBD.

- Seqwater is required to operate Wivenhoe, Somerset and North Pine dams in accordance with a range of regulatory requirements including the flood mitigation strategies contained within the Manuals of Operational Procedures for Flood Mitigation.
- Seqwater has a Dam Safety Management Program approved by the State's Dam Safety Regulator, as well as a Flood Control Centre.
- The Manuals and their operating procedures have been reviewed by some of Australia's best water experts and are based on detailed hydrological analysis and technical assessments of dam safety.
- The Government announced a Commission of Inquiry on 17 January 2011 to examine the management of Wivenhoe Dam over this period and whether any operational improvements are required into the future.
- Seqwater has now provided a detailed report on the January event to the Dam Safety Regulator.
- This report will also be provided to the Commission of Inquiry.
- Seqwater is also currently undertaking a process to identify whether any damage has been sustained to its infrastructure as a result of the flood event. As part of this process, and as a matter of urgency, dams and weirs are being inspected by

independent experts to determine the structural integrity of that infrastructure.

- Seqwater has advised that the structural integrity of Wivenhoe, Somerset and North Pine Dams remains intact.

BACKGROUND

Ability for Wivenhoe and Somerset dams to manage floods in the Brisbane River

- There are four major catchments that impact on flooding in Brisbane (Upper Brisbane, Lockyer; Bremer and local creeks).
- The contribution of each of these individual catchments depends on where the rain falls.

Impacts of Wivenhoe and Somerset Dams

- During the January 2011 flood event, it is estimated that Wivenhoe Dam reduced the flood peak by up to 2.5 metres in the Brisbane CBD.
- During the flood event controlled 2,650,000 megalitres of floodwater passed through Wivenhoe and Somerset Dams. This is 1,240,000 megalitres more than in 1974.
- Highest flow rate in the Brisbane River in the city in 1974 has historically been accepted as 9,500 cubic metres per second (this may be reassessed at some stage).
- The estimated flow from this event may have been up to 4,500 cubic metres per second greater if Wivenhoe Dam did not exist.

Operation of Wivenhoe and Somerset dams

- Detailed Operational Procedures for flood mitigation have been developed by leading water experts over many years.
- The clear decision making process in the Manual has been established since 1992. Subsequently, the Manual was reviewed during the Brisbane Valley Flood Damages Minimisation Study in 2006, with the latest comprehensive review of the Manual undertaken in 2009. Both of these reviews have included expert review panels comprising key stakeholders, with the most recent review involving representatives from the Department of Environment and Resource Management (DERM), Bureau of Meteorology (BOM), Brisbane City Council (BCC) and SunWater.

Rainfall forecasts

- There is a significant element of uncertainty in rainfall forecasting, even though the Bureau of Meteorology uses the best technology available, and highly-qualified and experienced experts.
- Wivenhoe and Somerset dam operations were based on forecasts provided by the Bureau of Meteorology and observed rain on the ground.
- The rainfall during the critical period of this event significantly exceeded the Bureau of Meteorology forecasts.

Large releases earlier

- Releasing large volumes of water over the weekend prior to the 11 January 2011 event would have had major impacts on the rural communities of the Brisbane Valley. Bridges would have been cut and communities would have been isolated with little notice.

- Such a release of large volumes of water at that time would not have been in accordance with the strategies detailed in the Manual.
- Over the weekend, neither rainfall forecasts nor the observed rain on the ground indicated that urban areas would be impacted.

Increases above 200 per cent (level of fuse plugs)

- Wivenhoe Dam is not designed to overtop. If it did, the dam would fail and the resulting damage and loss of life could be as much as 100 to 1,000 times greater than that currently being experienced.
- To prevent overtopping, the dam has been designed with fuse plugs, the first one opens when it reaches just more than 200 per cent of the FSL.
- Once opened, the rate of release through these plugs cannot be varied. Although through the use of the flood gates, by either increasing or decreasing gate releases, the total volume being released from the dam can be varied.
- The plugs continue to release water at this rate until the dam reduces to full supply level.
- Seqwater managed to control the flood releases during the January 2011 event to avoid initiating the fuse plugs.
- The fuse plugs would take four to six months of dry weather to repair, and severely restrict the capability to manage further flood events during this period.
- In accordance with the Manual, flood operations are managed to ensure a flood buffer still exists to allow for possibilities of further extensive inflows.

CTS No. 05204/11

SEQ Water Grid
MINISTERIAL BRIEFING NOTE

Advisor	OK
Dated	/ /
Approved Not Approved Noted	
Further information required	
Minister.....	
Dated	/ /

TO: **Minister for Environment and Resource Management, and**
Minister for Energy and Water Utilities

SUBJECT: North Pine Dam

REQUESTED BY
- This Brief has been requested by the Minister's Office by 30 March 2011.

TIMEFRAME
- Noting of this brief is non urgent. The MECS due date is 30 March 2011.

RECOMMENDATION
It is recommended that the Ministers:
- **note** that the SEQ Water Grid Manager, Seqwater, Department of Environment and Resource Management (DERM) and the Queensland Water Commission (QWC) have received correspondence from the Chief Executive Officer (CEO) of Moreton Bay Regional Council (MBRC), in relation to North Pine Dam water release strategies.
- **note** that the correspondence received from the CEO of MBRC requests that the matter, with respect to the Wivenhoe and Somerset Dams water release strategies, be considered with respect to North Pine Dam.
- **note** that the matters broadly raised by Cr David Dwyer in correspondence addressed to the Premier **(attachment A)** is broadly similar to the matters raised by the CEO of MBRC **(attachment B)**.
- **note** that Seqwater has engaged with MBRC to ascertain the benefits or otherwise of the downstream impacts of lowering the Full Supply Level (FSL) of North Pine Dam.

BACKGROUND
- Unlike Wivenhoe Dam, North Pine Dam has been designed as drinking water storage with no significant flood storage compartment above FSL.
- North Pine Dam is part of the primary urban water supply for South East Queensland. Its current FSL is contained in the Moreton Resource Operations Plan (ROP), which was developed by DERM in accordance with the *Water Act 2000*.
- Seqwater is currently obliged under its Flood Mitigation Manual for North Pine Dam, approved by the Dam Safety Regulator, to ensure that the dam storage is retained at FSL at the conclusion of a flood event.
- Following flood and release events, Seqwater is required to provide a report on the operations of dam during the event to the Dam Safety Regulator. On 11 March 2011, Seqwater finalised its report into the January 2011 flood event at North Pine Dam and it was provided to both the Regulator and the Commission of Inquiry into the Queensland floods.
- The report, which has been published on the Department of Environment and Resource Management website, concluded that:
  - During the January 2011 flood event, North Pine Dam was operated in accordance with the Manual.
  - The January 2011 flood event was the largest flood in the recorded flood history of the region.

Author	Cleared by	Cleared by	Recommended:
Name: Jade Simmons Position: Snr Correspondence Officer Tel No: [redacted] Date: 30 March 2011	Name: Barry Dennien Position: CEO SEQWGM Tel No: [redacted] Name: Position: Tel No:	Name: Position: Tel No: Name: Position: Tel No:	Name: John Bradley Director-General, DERM Tel No: [redacted] Date:

File Ref:

- North Pine received record inflows over the January flood event.
- The safety of the North Pine Dam was maintained at all times during the event and the dam did reduce downstream flows.
- During the event Seqwater, as required, provided information to the MBRC and other relevant agencies on flood releases being made from the Dam.

- When water is released from North Pine Dam during a release event, Young's Crossing Road, below the dam wall, is often inundated.
- After consultation with the MBRC, where possible, gate operations to release water from North Pine Dam are conducted at night, to ensure minimal disruption to the surrounding area with the closure of Young's Crossing Road. MBRC has responsibility for road closures and advising residents.

CURRENT ISSUES

- The SEQ Water Grid Manager, Seqwater, DERM and the Queensland Water Commission have received correspondence from the CEO of MBRC, in relation to the issue broadly raised by Cr David Dwyer in correspondence to the Premier, dated 3 February 2011 **(attachment A).**
- DERM is preparing a response to the CEO of MBRC, offering the opportunity for council to discuss the matter further with the Director General of DERM.
- The correspondence from the CEO of MBRC to the Water Grid Manager states that Council is seeking a review of the water level management and water release strategies and processes for North Pine Dam, particularly when the dam is full or at a high level during actual and forecast prolonged wet periods.
- The correspondence also details that after the January flood event, MBRC resolved, during their Coordination Meeting of 15 February 2011, *'that the Chief Executive Officer write to the Chair of the Queensland's Floods Commission of Inquiry requesting that the matters under consideration with respect to the Wivenhoe and Somerset Dams water release strategies be considered with respect to North Pine Dam'.*
- After receipt of MBRC's correspondence, the SEQ Water Grid Manager wrote to Seqwater, enquiring if any consideration is being given to improving North Pine Dam's flood mitigation, similar to those considerations that were undertaken by Seqwater for Wivenhoe and Somerset Dams **(attachment C).**
- In response to MBRC correspondence, Seqwater on 22 February 2011 sought clarification around the level of service required by MBRC in relation to flood immunity and offered to work with the MBRC on a range of modelling tasks to ascertain the benefits or otherwise of the downstream impacts of lowering the FSL of North Pine Dam
- MBRC has not yet formally responded to Seqwater correspondence, however through discussions with the MBRC, Seqwater has commenced a project to model flows and river levels.
- The initial modelling results, which are currently being peer reviewed, shows that the FSL would need to be reduced to 50% capacity for any appreciable reduction in peak water outflows for the January 2011 event. There was no significant reduction in peak outflows at the 80% FSL referred to in the Cr David Dwyer letter. The MBRC is yet to be briefed on these initial results.
- The second phase of the work will involve modelling the impact of different water outflows from North Pine Dam on river levels below the dam wall using modelling developed by the MBRC. MBRC has approved the use of the model by Seqwater.
- The third phase of the work will involve Seqwater working directly with MBRC to model the extent of property and residential flooding based on those river levels. Based on the results of this MBRC would then need to assess the implications of river levels, planning instruments and development approvals.

Author	Cleared by	Cleared by	Recommended:
Name: Jade Simmons Position: Snr Correspondence Officer Tel No: [redacted] Date: 30 March 2011	Name: Barry Dennien Position: CEO SEQW Tel No: [redacted]	Name: Position: Tel No:	Name: John Bradley Director-General, DERM Tel No: [redacted] Date:
	Name: Position: Tel No:	Name: Position: Tel No:	

File Ref:

- In relation to Wivenhoe Dam, the Director General of DERM approved the current temporary reduction in FSL of Wivenhoe through the approval of an interim program under the Moreton Resource Operations Plan (ROP).
- This was based on:
    - advice from the Water Grid Manager that the reduction in FSL would not affect the short term drinking water security for the region; and
    - The extreme nature of the January 2011 flood event
    - subsequent recommendation from Seqwater in respect of the flood mitigation benefits associated with the temporary reduction to 75%.

RESOURCE/IMPLEMENTATION IMPLICATIONS

- There are no resource or implementation implications.

PROPOSED ACTION

- Seqwater will continue to work with MBRC.
- Seqwater intends to provide advice to the Commission of Inquiry ahead of its interim report in August 2011 which will consider the region's flood preparedness ahead of the next wet season.
- For temporary water level changes to North Pine Dam, the SEQ Water Grid Manager will consider the impacts related to ability to comply with the risk criteria under the South East Queensland System Operating Plan.
- For permanent water level changes to North Pine Dam, the QWC will need to consider long-term water security impacts.

OTHER INFORMATION

- *Consultation:* N/a
- *Legislation:* N/a
- *Key Communication Messages:* N/a

MINISTER'S COMMENTS

ATTACHMENTS

- Attachment A – Correspondence dated 3 February 2011 to the Premier, from Cr David Dyer
- Attachment B - Correspondence dated 9 March 2011 to the Water Grid Manager, from CEO of MBRC
- Attachment C – Correspondence dated 14 March 2011 to Seqwater, from Water Grid Manager

Author	Cleared by	Cleared by	Recommended:
Name: Jade Simmons Position: Snr Correspondence Officer Tel No: [redacted] Date: 30 March 2011	Name: Barry Dennien Position: CEO SEQWG[redacted] Tel No: [redacted] Name: Position: Tel No:	Name: Position: Tel No: Name: Position: Tel No:	Name: John Bradley Director-General, DERM Tel No: [redacted] Date:

File Ref:

Department of Environment and Resource Management – Parliamentary Briefing Note

To Minister Robertson

Prepared for Parliamentary sittings ~~22-24~~ 5-7 April ~~March~~ 2011

33

WIVENHOE DAM - 25 PER CENT REDUCTION

KEY POINTS

- Following the January 2011 flood event, Seqwater recommended to the Government that the water level in Wivenhoe Dam be temporarily reduced to 75% of full supply.
- The recommendation was based on Seqwater modelling which involved 90 permutations of nine different flood events.
- The modelling was peer reviewed by external experts.
- The recommendation followed advice from the SEQ Water Grid Manager that such a reduction would not impact on the drinking water security of the region and acknowledges the region remains in the middle of the wet season.
- Dam inflows from the January event were almost double that of the 1974 flood and have established another flood benchmark
- The scheduled release pattern started from 6.00 am Sunday, 20 February 2011 and ceased 3.00 pm Wednesday, 2 March 2011.
- This water release did not impact tides and therefore did not affect Brisbane city and suburbs. Water was released as an interim measure for the remainder of the summer season.

Contact: Mike Foster
Telephone: [redacted]
Date: 11 ~~April~~ ~~March~~ 2011
CTS No. 04994~~3917~~/11

Approved: Barry Dennien, CEO, SEQWG ~~MDDG, WEO~~
Approved:
Approved:

- Three of the seven bridges below Wivenhoe Dam were closed by the local government for the duration of the releases and were re-opened shortly afterwards. These included Twin Bridges, Savages Crossing and Colleges Crossing. In each case there were alternative routes available to the community.
- There is a high probabilityIt is also expected that the water released will be recouped in the coming years.
- Following the end of the traditional wet season on March 31 2011, Seqwater advised the State Government it intended to allow Wivenhoe to return to 100% Full Supply Level.

This followed advice to Seqwater from the Water Grid Manager and the Queensland Water Commission.

Minor releases from Wivenhoe Dam are continuing, to manage current inflows and bring the dam down to the targeted 75% of full supply level.

- Twin Bridges are currently closed due to these releases, however, alternative routes are available.

RESPONSE

—Following the end of the traditional wet season Seqwater has advised the State that Wivenhoe Dam will now be allowed to return to 100% drinking water capacity. The Dam gates were closed on Friday 1 April 2011.

•

Contact: Mike Foster
Telephone: [redacted]
Date: 1~~4~~April~~March~~ 2011
CTS No. 04994~~3917~~/11

Approved: Barry Dennien, CEO, SEQWGM~~DDG, WEO~~
Approved:
Approved:

- As part of its normal management processes Seqwater will continue to monitor Dam levels and inflows and continue to liaise closely with the Bureau of Meteorology and other relevant government agencies.

- The temporary reduction in Wivenhoe Dam Fully Supply Level to 75% was precautionary and took into account the extreme nature of the January 2011 flood event that left the catchments soaked and the water tables full

- It was also based on advice from the SEQ Water Grid Manager that such a reduction would not impact on the drinking water security of the region and acknowledged the region at that stage remained in the middle of the wet season.

—The release strategy was aimed at creating an additional flood buffer zone for the rest of the wet season quickly and with as minimal impact on the community as possible.

•

~~•The scheduled release pattern to reduce Wivenhoe Dam's Full Supply Level commenced Sunday, 20 February 2011 at 6.00 am and ceased at 3.00 pm Wednesday, 2 March 2011.~~

~~•The release period of nine days was extended by almost 36 hours due to storm activity across the Wivenhoe catchment and the Brisbane River catchment below the dam on Monday, 21 February 2011.~~

Contact: Mike Foster
Telephone: [redacted]
Date: 14~~March~~April 2011
CTS No. 04994~~3917~~/11

Approved: Barry Dennien, CEO, SEQWG~~MDDG, WEO~~
Approved:
Approved:

- ~~As a result, Wivenhoe Dam release rates were reduced for a 24 hour period, to allow flows down the Lockyer to sufficiently pass.~~

- ~~In addition, Wivenhoe Dam received inflows of up to 40,000 megalitres (or the equivalent of about 4% capacity) from the surrounding catchment.~~

- ~~Significant public communication, including print and radio advertisements, occurred prior to the release being undertaken. Regular media updates were also provided for the duration of the release period.~~

- The releases were undertaken after consultation with the Somerset Regional Council, Ipswich Regional Council and Brisbane City Council,

- The release flow rates adopted were deliberately designed to ensure that no communities and residents were cut off.

- Significant public communication, including print and radio advertisements, occurred prior to the release being undertaken. Regular media updates were also provided for the duration of the release period.

- ~~The three bridges impacted by the release – Twin Bridges, Savages Crossing and Colleges Crossing – were re-opened to traffic shortly afterwards. In each case, there were alternative~~

~~routes available to the community over the duration of the release.~~

- ~~Minor releases associated with the normal operation of Wivenhoe Dam are continuing, to manage current inflows and maintain the dam at the targeted 75% of full supply level.~~
- ~~Twin Bridges are currently closed due to these releases; however, alternative routes are available.~~
- ~~The decision to reduce Wivenhoe Dam's Full Supply Level was not made lightly. It is a strategy which balances drinking water security and flood mitigation.~~
- ~~The release was recommended by Seqwater after its recent hydrology analysis and was a precaution given the second strongest La Nina pattern in history continues to influence the current wet season.~~
- ~~Seqwater made its recommendation recognising the extreme January 2011 event that left the catchments soaked and the water tables full~~
- ~~The release strategy was aimed at creating an additional flood buffer zone for the rest of the wet season quickly and with as minimal impact on the community as possible.~~
- ~~It is also important to remember this is an interim measure for the remainder of the summer season.~~
- There is a high probability that ~~It is expected that~~ the water released will be recouped in the coming years.

Contact: Mike Foster
Telephone: [redacted]
Date: 11~~March~~April 2011
CTS No. 04994~~3917~~/11

Approved: Barry Dennien, CEO, SEQWGM~~DDG, WEO~~
Approved:
Approved:

- The Commission of Inquiry into the Queensland floods is now underway.

—The future management of the region's dams in relation to flood protection will be shaped by the Inquiry's outcomes.

~~The release represents an abundance of caution.~~

- ~~The longer term approach will be shaped by the Commission of Inquiry's outcomes.~~

Contact: Mike Foster
Telephone: [redacted]
Date: 14~~March~~ April 2011

CTS No. 04994~~3917~~/11

Approved: Barry Dennien, CEO, SEQWGM~~DDG, WEO~~
Approved:
Approved:

Department of Environment and Resource Management – Parliamentary Briefing Note	
To	Minister Robertson
Prepared for	Parliamentary sittings <insert dates >

CHANGES TO THE FULL SUPPLY LEVEL OF WIVENHOE DAM – Water Security Impacts

KEY POINTS

- I am advised that the temporary changes to the Operational Procedures for Wivenhoe Dam may bring forward the need to operate the desalination facility at full capacity at all times.
- The draw down is made possible because water supply to South East Queensland is secure over the short- and medium-term, due to storages being full, key projects completed and ongoing water efficiency.
- Our twelve key storages are currently at 100 per cent of combined storage capacity.
- They will fall to 86 per cent of combined capacity once Wivenhoe Dam is drawn down to 75 per cent of its Full Supply Capacity. This is higher than at the same time last year, when the storages were at XX.
- Compared to last year, our security is also improved by the Hinze Dam upgrade being almost complete, Wyaralong Dam being full years earlier than expected and _ per cent of the Northern Pipeline Interconnector Stage 2 having been laid.

RESPONSE

Contact:	Approved: [Insert title of Dir/ED/GM/RSD]
Telephone:	Approved: [Insert title of ADG or DDG]
Date:	Approved: Director-General
CTS No.	

- From a water security perspective, the major impact of the draw down is upon the operation of the desalination facility.
- As I announced in December last year, the desalination facility will be operated in standby mode when key Water Grid storages are above 60 percent of capacity – producing water only when it is needed, such as in response to turbid water that is currently flowing down the Brisbane River.
- This plan remains unchanged.
- However, the draw down increases the probability of key Water Grid storages falling to 60 per cent of combined capacity over the next five years – from about 5 to 9 per cent. Should this occur, the desalination facility will need to be operated at full capacity at all times. This will ensure a more secure supply, but with increased operating costs.
- As a temporary reduction, the draw down is less likely to bring forward the reintroduction of Medium Level restrictions and the use of purified recycled water to augment Wivenhoe Dam. I am advised that there is currently a 0.1 per cent probability of this occurring within the next five years. The draw down will increase this to 0.4 per cent.
- This advice applies to a temporary reduction only. The optimal arrangements for future wet seasons will be considered as part of the forthcoming Commission of Inquiry. The Queensland Water Commission will need to assess the long-term impacts of

any permanent changes to the Operational Procedures or Full Supply Level.

BACKGROUND

- Contains contextual material for background information only
  - Background dash point
- Font: 12pt, Arial, Single linespacing
- Brief should be concise, precise and focus on the facts

Confidential or personal information should only be included in the Background section, **if necessary**.
Please delete this box if there is no confidential information

Contact:
Telephone:
Date:
CTS No.

Approved: [Insert title of Dir/ED/GM/RSD]
Approved: [Insert title of ADG or DDG]
Approved: Director-General

HOT ISSUE BRIEFING NOTE

HOT ISSUE G.X	Rainfall, Wivenhoe Dam and 75 per cent FSL
Question	What is the effect of current and forecast rainfall on Wivenhoe Dam's 75 per cent full supply level?

Issue:

- Effect of current and forecast rainfall on Wivenhoe Dam and the recommended 75 per cent of full supply level.

Answer:

Wivenhoe Dam current releases

- Wivenhoe Dam spillway gates are currently being operated, releasing 30 cubic metres per second to manage the current inflows into Somerset and Wivenhoe dams.
- Rainfall over the past <insert timeframe> has contributed <insert megalitres> or 0.5 per cent of Wivenhoe Dam's full supply level.
- The releases are ensuring that Wivenhoe Dam is kept at the recommended 75 per cent of full supply level for the remainder of the wet season.
- No bridges or crossings downstream of Wivenhoe Dam will be affected by the current releases.
- Seqwater is continuing to work with the Bureau of Meteorology to monitor rainfall and forecast weather.
- Seqwater has an extensive monitoring network of 140 gauging stations across the catchment that monitors rainfall, streamflow and dam levels.

•

Wivenhoe Dam 75 per cent full supply level

- Seqwater has recommended to the Government that the water level in Wivenhoe Dam be temporarily reduced to 75 per cent of full supply level.
- The recommendation was based on Seqwater modelling which involved 90 permutations for nine different flood events.
- The modelling was peer review by external experts.
- The recommendation followed advice from the SEQ Water Grid Manager that such a reduction would not impact on the drinking water security of the region and acknowledges the region remains in the middle of the wet season. It is expected that the raw water released will be recouped in the coming years.
- The scheduled release pattern started from 6.00am Sunday, 20 February 2011 and ceased 3.00 pm Wednesday, 2 March 2011.
- The Flood Control Centre will mobilise during a flood event at North Pine, Somerset or Wivenhoe Dams. It operates 24 hours a day with teams of operators at each dam 24 hours a day managing releases.

HOT ISSUE BRIEFING NOTE

HOT ISSUE G.X	Wivenhoe Dam releases
Question	What is happening with the releases from Wivenhoe Dam?

Issue:

- Seqwater will now be extending the current release strategy for Wivenhoe Dam until close of business, Wednesday, 2 March 2011.
- By extending the timeframe of releases from Wivenhoe Dam, Twin Bridges, Savages Crossing and Colleges Crossing will be inundated for an additional 36 hours.

Answer:

- As of 9.00 am, Monday 28 February 2011, Wivenhoe Dam is 82.2 per cent of full supply level.
- Water releases to reduce Wivenhoe Dam to 75 per cent commenced Sunday 20 February 2011 at 6.00 am and was scheduled to continue for nine days.
- The release period of nine days has now been extended due to further rainfall and a reduction of release rates on Monday 21, February 2011.
- The 9 day release period to reduce Wivenhoe Dam to 75 per cent was always dependent on further rainfall across the dam and catchment as well as rainfall downstream.
- Storm activity across the Wivenhoe Dam catchment and Brisbane River catchment below the dam on Monday,

21 February 2011 impacted on the release strategy. Wivenhoe Dam release rates were reduced for a 24 hour period to allow flows down the Lockyer to sufficiently pass.

- In addition, Wivenhoe Dam has received inflows of up to 40,000 megalitres (or the equivalent of about four per cent capacity) from the surrounding catchment, with minor inflows continuing
- Seqwater estimates the inflows, combined with the need to reduce flow rates, has currently added at least 36 hours to the release strategy.
- The nine day release strategy was scheduled to be completed in the morning of Tuesday, 1 March 2011. By this stage, Seqwater estimates Wivenhoe Dam levels will between 79-80 per cent full supply level (depending on further inflows).
- The current full supply level of 82.2 per cent equates to a reduction of FSL of approximately 208,000 megalitres or 208 million litres of water.
- By continuing releases until close of business Wednesday, 2 March 2011, Seqwater estimates Wivenhoe Dam will be between 75-77 per cent of full supply level.
- The dam will be drawn down to as close as possible to 75% as possible and without releases coinciding with potential rainfall events and potential increased river flows downstream of Wivenhoe Dam.
- The current Bureau of Meteorology forecast is for 10-15 millimetres of rainfall until Thursday, 3 March 2011. Storm

activity is forecast from Friday, 4 March 2011 with 50-100 millimetres of rainfall forecast over the following four days until Tuesday, 8 March 2011.

- Based on the above forecast of storm activity and heavier rainfall by the end of the week, and after consultation with the Somerset Regional Council, Ipswich Regional Council and Brisbane City Council, Seqwater only intends to continue current releases until close of business, Wednesday, 2 March 2011 to allow bridges to open.

Future rainfall impacts until 31 March

- To maintain Wivenhoe Dam at around 75 per cent until 31 March, Seqwater may utilise a low release strategy of 50 cubic metres per second in the first instance if the further forecasted rainfall is received. This low release amount will allow Savages Crossing and Colleges Crossing to remain open
- The release amount is dependent on rainfall and subsequent inflows, and may be required to increase.

Reducing Wivenhoe Dam to 75 per cent

- Seqwater has recommended that the water level in Wivenhoe Dam be temporarily reduced to 75 per cent of full supply level.
- The release strategy to reduce Wivenhoe Dam to 75 per cent of its full supply level was aimed at creating an additional flood buffer zone for the rest of the wet season quickly and with as minimal impact on the community as possible.

- The reduction of Wivenhoe Dam will not impact on South East Queensland's water security because the Water Grid secures our water supply over the short, medium and long term.
- We expect that the water released will be recouped in the coming years.

Road closures

- Under the extended release strategy it is expected Twin Bridges and Savage's Crossing will no longer by inundated by Thursday, 3 March 2011 and College's Crossing no longer inundated by Friday, 4 March 2011.
- Local Councils are responsible for road closures as a result of spilling dams or controlled releases.

HOT ISSUE BRIEFING NOTE

HOT ISSUE G.X	SEQ Water Grid Dams
Question	What is happening with South East Queensland's Dams?

Issue:

- What dam gates are opened or will be today?
- What dams are spilling?

Answer:

Wivenhoe Dam

- A spillway gate at Wivenhoe Dam was opened just after 7pm on Saturday 9 October 2010.
- The gate was opened partially following a review of updated information from the Weather Bureau and monitoring of inflow data collated from the catchment.
- Wivenhoe Dam is still rising and Seqwater's Flood Control Centre will reassess the amount of water released today.
- Water is also being passed through the dam's hydro-electric generator for supply into the Grid. The remainder is contributing to environmental flows.

Somerset Dam

- The sluiceway and a cone valve were opened at Somerset Dam at approximately 10.00 pm on Saturday 9 October 2010.
- Water will continued to be released until the dam reaches full supply level.
- Released water from Somerset Dam flows into Wivenhoe and forms part of Wivenhoe Dam's controlled releases.

North Pine Dam

- Water is being released from North Pine Dam. Seqwater opened the gates at approximately 8 am today.
- Released water from the North Pine Dam is channelled into North Pine River, contributing to environmental flows.

Leslie Harrison Dam

- Leslie Harrison Dam in the Redlands area began controlled gate releases from 3.00am this morning.

Hinze Dam

- Seqwater is currently monitoring Hinze Dam, which is still under Stage 3 construction.
- It is likely that they will use the new emergency gates today when the dam reaches the trigger point to release water.
- Authority has been granted from DERM to operate controlled releases, to maintain the dam at the current full supply level.
- Released water from Hinze Dam will flow into Nerang River contributing to environmental flows.

Sunshine Coast dams

- All major dams on the Sunshine Coast are spilling. These dams are built with spillways rather than gates.
- Water spilling form the Sunshine Coast dams also flow into local waterways, contributing to environmental flows.

Road closures and safety

- Local Councils are responsible for road closures as a result of spilling dams or controlled releases.
- We recommend due to road safety that people avoid travel to dams and storages, particularly during the heavy weather and at night.

Flood Operations Centre

- Seqwater's Flood Operations Centre was activated over the weekend and will operate 24 hours a day.
- The Flood Operations Centre will continue to advise local and emergency authorities on potential impacts downstream as a result of the gated dam releases.

HOT ISSUE BRIEFING NOTE

HOT ISSUE G.X	SEQ Water Grid Dams
Question	What is happening with South East Queensland's Dams?

Issue:

- What dam gates are opened or will be today?
- What dams are spilling?

Answer:

Wivenhoe Dam

- A spillway gate at Wivenhoe Dam was opened just after 7pm on Saturday 9 October 2010.
- Approximately 23,000 megalitres per day is currently being released from Wivenhoe Dam's spillway gates.
- The gate was opened partially following a review of updated information from the Weather Bureau and monitoring of inflow data collated from the catchment.
- Wivenhoe Dam is still rising and Seqwater's Flood Control Centre will reassess the amount of water released today.
- Water is also being passed through the dam's hydro-electric generator for supply into the Grid. The remainder is contributing to environmental flows.

Somerset Dam

- The 4 gates and a cone valve were opened at Somerset Dam at approximately 10.00 pm on Saturday 9 October 2010.
- Water will continued to be released until the dam reaches full supply level.
- Released water from Somerset Dam flows into Wivenhoe and forms part of Wivenhoe Dam's controlled releases.

North Pine Dam

- Water is being released from North Pine Dam. Seqwater opened the gates at approximately 8 am today.
- Released water from the North Pine Dam is channelled into North Pine River, contributing to environmental flows.
- Closed later this afternoon or tomorrow morning

Leslie Harrison Dam

- Leslie Harrison Dam in the Redlands area began controlled gate releases from 3.00am Monday morning.
- The gates will be closed sometime today.

Hinze Dam

- Seqwater is currently monitoring Hinze Dam, which is still under Stage 3 construction.
- The new emergency gates were opened at 7.30am this morning when the dam reached the trigger point to release water.
- Authority has been granted from DERM to operate controlled releases, to maintain the dam at the current full supply level.
- Released water from Hinze Dam will flow into Nerang River contributing to environmental flows.

Sunshine Coast dams

- All Gold dams on the Sunshine Coast remain spilling and will do well into next week. These dams are built with spillways rather than gates.
- Water spilling form the Sunshine Coast dams also flow into local waterways, contributing to environmental flows.

Road closures and safety

- Local Councils are responsible for road closures as a result of spilling dams or controlled releases.
- We recommend due to road safety that people avoid travel to dams and storages, particularly during the heavy weather and at night.

Flood Operations Centre

- Seqwater's Flood Operations Centre was activated over the weekend and will operate 24 hours a day.
- The Flood Operations Centre will continue to advise local and emergency authorities on potential impacts downstream as a result of the gated dam releases.

HOT ISSUE BRIEFING NOTE

HOT ISSUE G.X	SEQ Water Grid Dams – as at 18 October 2010
Question	**What is happening with South East Queensland's Dams?**

Issue:

- What dam gates are closed?
- What dams are spilling?

Answer:

Wivenhoe Dam - Closed

- The spillway gates at Wivenhoe Dam commenced the closure sequence on Friday 15 October 2010, after being opened progressively on Saturday 9 October 2010 at 7.00pm.
- The final gate was closed at 9.00am Tuesday 19 October 2010. The closing sequence was designed to imitate the natural dropping of river levels while allowing for the opening of river crossings and recovery of stranded fish.
- Approximately 640,000 megalitres were released through Wivenhoe Dam's spillway gates, which includes Somerset Dam release amount, which is the equivalent of 262,000 olympic sized swimming pools or one Sydney Harbour.

Somerset Dam - Closed

- The 4 gates and a cone valve were opened at Somerset Dam at approximately 10.00 pm on Saturday 9 October 2010 and closed on Monday 18 October 2010.
- Approximately 277,000 megalitres were released through Somerset Dam's spillway gates and cone valve.
- Released water from Somerset Dam flows into Wivenhoe and forms part of Wivenhoe Dam's controlled releases.

North Pine Dam - Closed

- The spillway gates of North Pine Dam closed on Thursday 14 October 2010, after being open since Tuesday 12 October 2010.
- The gates were then opened on 16 October 2010 at 6.00am and closed at 4.00pm the same day.

- Approximately 61,500 megalitres were released through North Pine Dam's spillway gates.
- Released water from the North Pine Dam is channelled into North Pine River, contributing to environmental flows.

Leslie Harrison Dam - Closed

- The spillway gates of Leslie Harrison Dam in the Redlands area began controlled gate releases from 3.00am on 11 October 2010 and closed on the same day at 7.00 pm.
- The gates were then opened on 15 October 2010 at 8.30pm and closed on 16 October 2010 at 4.30pm.
- Approximately 4,700 megalitres were released through Leslie Harrison Dam's spillway gates.

Hinze Dam - Closed

- The new emergency gates were closed today 19 October 2010, after being opened on 12 October 2010 at 7.30am.
- Authority had been granted from DERM to operate controlled releases, to maintain the dam at the current full supply level.
- Released water from Hinze Dam flows into Nerang River contributing to environmental flows.

Sunshine Coast dams - Spilling

- All dams on the Sunshine Coast remain spilling. These dams are built with spillways rather than gates.

- Water spilling from the Sunshine Coast dams also flows into local waterways, contributing to environmental flows.

Road closures, flood safety and visitors

- Local Councils are responsible for road closures as a result of spilling dams or controlled releases.

- Approximately 60,000 residents visited Wivenhoe Dam during the spillway opening. We recommended due to road safety that people avoid travel to dams and storages, particularly during the heavy weather and at night.

Media

- The SEQ Water Grid Communications Unit fielded contact from various media in relation to storages across South East Queensland, including
    - Radio - 4BC, ABC Brisbane-Toowoomba-Gold Coast, Hot Tomato FM, Gold FM, 4ZZZ, Triple M, 4EB, 96.5 FM, River FM, B105, NOVA and QUT radio
    - Television – Channel 10 News, Channel 9 News and Today Show, Channel 7 News, WIN News, Weather Channel and ABC TV
    - Print – The Courier Mail, The Australian, Gold Coast Bulletin, Fassifern Guardian, Brisbane Times, Queensland Times, Inside QUT, Engineers Australia, The Toowoomba Chronicle, North West News, Somerset News, Brisbane Valley, Kilcoy Sun and Bayside Bulletin.

Fish Recovery

- Recovery of stranded fish from dam releases is underway.
- At Wivenhoe Dam, six (6) lungfish have been rescued as well as a number of other small fish of other species (3 other lungfish found dead). There are still some holes too deep for rescue work at this stage, so monitoring will continue this afternoon and tomorrow 20 October 2010.

Flood Operations Centre

- Seqwater's Flood Operations Centre was activated over the weekend of 9-10 October 2010 and operates 24 hours a day. The Flood Operations Centre demobilised this morning 19 October 2010.

- The Flood Operations Centre will continue to advise local and emergency authorities on potential impacts downstream as a result of the gated dam releases.

HOT ISSUE BRIEFING NOTE

HOT ISSUE G.X	Bulk Water Entities and the Commission of Inquiry
Question	What information are South East Queensland's bulk water entities providing to the Commission of Inquiry?

Issue:

- Actions of the Bulk Water Entities in relation to the Commission of Inquiry and provision of opening submissions (due today 11 March 2011).

Answer:

- Seqwater, SEQ Water Grid Manager, LinkWater and WaterSecure will be actively supporting the Commission and its endeavours wherever and whenever possible.
- Seqwater has been formally requested to provide data and documents related to the January flood event to the Commission of Inquiry.
- In addition to this request, Seqwater sought leave to appear before the Commission of Inquiry, which has been granted.
- As part of Seqwater's appearance before the Commission, two submissions will be provided;
  - a submission today, which will detail flood preparedness relevant to next summer's wet season
  - a submission by 4 April 2011, which will focus on addressing any other matters in the Inquiry's terms of reference.

- While no other Bulk Water Entities (WaterSecure, LinkWater and SEQ Water Grid Manager) have been requested to provide information, LinkWater and SEQ Water Grid Manager are proactively supplying a submission to the Commission today.
- The SEQ Water Grid Manager's submission will detail the roles and responsibilities of the organisation in the State's management of water supply in South East Queensland.
- LinkWater's submission covers flood preparedness for the 2011-12 summer with a further submission by 4 April 2011, which will focus on the longer term issues around flooding in South East Queensland.

HOT ISSUE BRIEFING NOTE

HOT ISSUE G.X	**Wivenhoe Dam levels**
Question	Why and the likelihood of Wivenhoe spilling and the operational risks and safety advice.

Issue:

Will Wivenhoe Dam spill? How are we prepared?

Answer:

Current dam levels

Wivenhoe Dam has reached 100 per cent for the first time since 2001.

Somerset Dam is full, with water being released in Wivenhoe Dam via the cone valves.

Across the Water Grid, key storages are at 98.5% of storage capacity, up from 95.8% last week.

Will the gates be opened?

It is likely that Seqwater will undertake controlled releases from Wivenhoe Dam via the cone valves in the bottom of the dam wall from Monday next week.

The gates will only be opened if the catchment area receives further substantial rainfall.

(Cone valves are structures built towards the bottom of a dam wall to allow for smaller controlled releases of water. Flood gates are large structures built into a dam wall allowing a maximum release of flood waters as required to maintain the integrity of the dam wall.)

Are we prepared for flood?

Wivenhoe has enormous flood capacity – almost the equivalent of three times Sydney Harbour (1.45 million megalitres). Put in context Wivenhoe has received 376,000 megalitres in flows for the year to date.

Seqwater has a Dam Safety Management Program to ensure that each of its dams is operated and maintained in a manner that is both safe and minimises the risks associated with a dam failure and managing flood events, including by working with local councils and emergency services.

The program has been endorsed and approved by the Dam Safety Regulator and met the standards required by the Queensland Dam Safety Management Guidelines and the international ANCOLD Guidelines on Dam Safety Management

The Flood Control Centre will mobilise during a flood event at North Pine, Somerset or Wivenhoe Dams. It operates 24 hours a day with teams of operators at each dam 24 hours a day managing releases.

Seqwater has an extensive monitoring network of 140 gauging stations across the catchment that monitors rainfall, streamflow and dam levels.

The $395 Hinze Dam upgrade is on track to be completed for the coming wet season, delivering improved flood protection for 3280 households on the Gold Coast.

Benefits of the Grid

The Grid enables us to choose the water use – meaning that it is the most secure water supply in Australia, in drought and when the dams are full.

Heavy rain often causes water quality issues. It drags nutrients and other compounds from the catchments into our water supplies.

With the Grid, we are better prepared for these events than ever before. We can isolate, or blend water from multiples sources.

We have already used the Grid on multiple times to minimise the impact of water quality issues.

- In March 2010, desalinated water was used in response to a taste and odour issue arising from Hinze Dam.
- On previous occasions, we transported desalinated water up the Southern Regional Water Pipeline to blend with water from the Mt Crosby water treatment plant. As a result, the peak concentrations of taste and odour compounds were significantly reduced.

Water Conservation measures

The Permanent Water Conservation Measures that were introduced on 1 December 2009 are aimed at maintain good water practices for the future.

The recently released *South East Queensland Water Strategy* shows that maintaining our consumption below 200 litres per person per day will defer the need for additional water supply infrastructure in all scenarios by at least five years.

Permanent Water Conservation Measures are low level requirements that recognise the value of water.

- Residents are able to hose their gardens, fill a play pool or wash a car.
- Gardens can be irrigated with efficient irrigation systems between 4.00 pm and 10.00 am on any day of the week, except Mondays.

- Residents are able to use a hand held hose or high pressure cleaning unit to clean cars, boats, caravans and residential buildings at any time.
- Residents can also fill or top up a play pool for children at a maximum of 500 litres.

Water Security

SEQ now has the most secure water supply in Australia, underpinning our lifestyle and economic prosperity.

However, having been so close to catastrophe before, we cannot leave our water security to chance.

Just remember, less than three years ago our dams were at less than 17% of capacity.

Desalination

The plant has resumed supply. It has already supplied more than 28 billion litres into the SEQ Water Grid, since February 2009.

The desalination facility underpins water security for South East Queensland. It will ensure that we can respond to population growth, future droughts, climate change and heavy weather.

The plant is a key part of the SEQ Water Grid's emergency response plan, supplying up to 20% of our current demand. It has already been used on multiple occasions to reduce taste and odour issues on the Gold Coast and in Brisbane.

The plant also provides the flexibility to quickly match production to demand, should other Grid assets becomes unavailable. For example, production could be increased if a water treatment plant is temporarily

shut-down for maintenance or if a major asset fails, such as occurred in May 2009 when a pipeline from Mt Crosby broke.

The desalination facility will be run as efficiently as possible, like all assets within the Water Grid. We will save money and electricity by operating at one-third of capacity. At this rate, the operating costs are only 2.5% of the total costs of the Water Grid.

Wivenhoe Dam operating level

Investigations have commenced into the extent to which the full supply level of Wivenhoe Dam could be raised, without raising the dam wall, while maintaining acceptable risk levels at the dam itself and inundated areas.

We will not take risks with flood safety.

The investigation will involve detailed investigations associated with upstream and downstream flooding, environmental considerations, impacts on infrastructure and lease resumptions.

Until the raising of the full supply level is fully assessed, flood waters will be cleared to the existing full supply level in accordance with the existing Flood Operations Manual developed by Seqwater and approved by the Dam Safety Regulator to ensure public safety is maintained.

HOT ISSUE BRIEFING NOTE

HOT ISSUE G.X	General – Gold Coast Mayoral site visit to Hinze Dam
Question	Will there be any issues with Ron Clarke visiting Hinze Dam on 1 February 2011

Issue:

- A site tour of Hinze Dam, arranged by Darren Stewart, the Gold Coast City Council representative on the Hinze Dam Alliance Leadership Group (ALG), will include Gold Coast Mayor Ron Clarke.
- The site tour is set to take place on the morning of Tuesday 1 February 2011.

Answer:

- The Gold Coast Mayoral site tour of Hinze Dam Stage 3 upgrade will not include media or other councillors.
- The Hinze Dam Stage Three upgrade was originally a Gold City Council initiative to increase the provision of flood mitigation for the Gold Coast area.
- There is an amount of work to complete Hinze Dam Stage 3, including finalising the completion of the main embankment, which is expected to be completed towards the end of February, but is weather dependant.
- Some general site infrastructure, including roads and the interpretive centre may not be complete until March.
- Whilst Stage 3 is not complete, the Dam Safety Regulator has signed off on 'first fill', so the dam now meets the three regulatory

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- Some general site infrastructure, including roads and the interpretive centre may not be complete until March.
- Whilst Stage 3 is not complete, the Dam Safety Regulator has signed off on 'first fill', so the dam now meets the three regulatory

compliance targets of flood mitigation, increased storage and increased yield.

- A senior Seqwater person will be attending the Mayoral site tour.

John Adcock

From: Dan Spiller
Sent: Monday, 27 December 2010 10:37 AM
To: [redacted]; Lance McCallum [redacted]); Tim Watts [redacted]
Geoff Stead ([redacted]
Debbie Best [redacted]
Cc: SEQWGM Media; [redacted] Rob Drury [redacted]
Damien Brown ([redacted]
Subject: Water Grid technical and media update: 27/12
Attachments: Technical Stuation Report W22.docx

All,

Updated Seqwater technical report attached.

Key points are:

- Above 50mm of rainfall in dam catchments over past 24 hours
- Wivenhoe and Somerset Dam reached 106% of combined capacity despite a single gate being opened yesterday morning
- The other four gates will be opened tonight or early tomorrow in order to empty the flood compartment. The release rate will be similar to the peak last week and in October
- Burtons Bridge will be inundated, initially due to Lockyer Valley flows. We are seeking to ensure that Council notifies residents who will be isolated - as per Councils agreement with us on Friday - and to delay closure until at least mid afternoon
- The increased releases will not reach Brisbane until Wednesday. By that time, peak tides will be at least 0.5 metres lower than last week. For comparison, dam releases contributed about 0.2 metres to peak river levels last week. Other factors impact on river levels and local flooding, including local rainfall
- Releases are also being made from North Pine, Hinze and Leslie Harrison dams, with some local impacts

Draft Water Grid media update for today is below. This will be issued in the next half hour.

Regards,
Dan

December 2010

Flood safety for South East Queensland over holiday season

Rainfall has resulted in increased releases from Water Grid dams.

About 50mm of rainfall has been recorded in the dam catchments over the past 24 hours.

Wivenhoe and Somerset dams have increased to 106% of combined capacity, despite continuing minor releases.

At Wivenhoe Dam, one of five gates was opened at 9am on Boxing Day. The remaining four gates will be opened late this afternoon or early tomorrow morning.

The gates are expected to remain open until at least Thursday, depending upon inflows.

With further rain forecast over coming days, it is important that the flood compartment be emptied.

Burtons Bridge is expected to be closed, with the status of other local bridges remaining unchanged.

Somerset Dam is now releasing approximately 12,000 megalitres per day into Wivenhoe Dam, with valves expected remain open until mid-week.

At North Pine Dam, a release commenced around 8pm last night and is expected to continue until at least early tomorrow morning. Youngs Crossing is inundated.

Releases from Hinze Dam also commenced last night. Weedons Crossing was inundated prior to the gate release.

A gate release is also continuing from Leslie Harrison Dam, but is expected to cease later on 27 December.

For recorded information on current dam releases in South East Queensland, members of the public are encouraged to call **1 800 613 122.**

Members of the public seeking information on local flooding impacts, including road closures, should contact the local council.

Recreation update

Both Wivenhoe and Somerset Dams are currently open for water-based recreation activities, however this may change at short notice depending on weather.

Billies Bay and river access at Atkinsons Crossing at Wivenhoe Dam remain closed.

All other recreational sites have reopened however this status may change at short notice depending on the weather.

While some low-lying camp grounds at Wivenhoe have been inundated due to rain, most camping facilities are open, though some are fully booked.

If further heavy rain occurs, it may be necessary for some camping grounds to close.

Please contact the operators of the various camping grounds for information regarding each site.

For further information on the Water Grid: www.watergrid.com.au

ENDS

John Adcock

From: Dan Spiller
Sent: Wednesday, 29 December 2010 8:29 AM
To: [redacted]
Cc: 'Rob Drury'; '[redacted]u'; SEQWGM Media; [redacted]
[redacted]u'
Subject: Water Grid technical report: 29/12
Attachments: Technical Stuation Report W24.docx

All,

Attached is the updated technical report. Key points are:

- Very little rainfall in the catchments over the past day
- Lockyer flows peaked around midday yesterday
- Increases from Wivenhoe Dam are now increasing, with all five gates now open to varying degrees. From later today, the release rate will be similar to during the October and early December events
- Releases will continue until the end of the week, with total releases in the order of 385,000 ML.

Hinze Dam will also continue releases until the end of the week. North Pine and Leslie Harrison dams have ceased releases.

Somerset Dam has been reopened to on-water activities. Wivenhoe Dam and some recreation facilities remain closed.

We are coordinating today's media update with Lauren Sims.

Please call me on [redacted] if you require any further information.

Regards,
Dan

TECHNICAL SITUATION REPORT

TSR Number	W24	Date of TSR release	29.12.2010	Time of TSR release	7.00am

Seqwater status of inflows and dam operations

Current status but could change based on inflows or rainfall.

Current objectives	• Drain flood compartment as quickly as possible (by about Sunday) without impacting Mt Crosby or Fernvale bridges.	
Strategy	• Continue increasing releases from current release as Lockyer drops up to maximum of 1500cumecs. • Twin Bridges, Savages, Burtons, Kholo and Colleges will be inundated until Sunday.	
Key considerations	Storage levels:	Above FSL
	Inflows:	Ongoing inflows plus yesterdays rain
	Rainfall:	
	Lockyer/Bremer:	Flows beginning to decrease
	Brisbane River:	Releases increasing from yesterday, other inflows downstream dropping away rapidly so releases will not impact on Brisbane River downstream. As per BoM advice, impact on tides minimal.

Rainfall

No rainfall has fallen in the past 12 hours to 0600 Wednesday with the exception of 2-4 mm in the upper Somerset Dam catchment.
The rainfall forecast issued by BOM at 1600 Tuesday indicated only 3-5 mm in the Somerset and Wivenhoe catchments and 5-10mm in the North Pine catchment for the next 24 hours. The current BOM forecast for SE Qld over the next few days is mostly fine with a few showers

However, catchments remain saturated and are primed for additional runoff in the event of rain.

Somerset Dam

A flood release through the regulator cone valves at the dam commenced at 0900 on Sunday 26 December 2010. Early Tuesday the regulators were closed and sluices progressively opened throughout the day. At 1800 Tuesday 2 sluices were open, releasing about 35,000 ML/day into Wivenhoe. A further two sluice gates where opened overnight in an attempt to bring the lake level down to 99.75 to enable recreational use of Somerset water activities to resume on Wednesday. At 1800, the lake level was 99.83m AHD and falling slowly. Two sluice gates will be closed by 12:00 29/12/2010 and two sluice gates are expected to remain open until Thursday and will be closed when the lake returns to the full supply level of 99m AHD. The total volume of water released since the event commenced on 26 December 2010 is 66,000ML, with the current projected total release volume for this event approaching 110,000ML (includes inflows still coming in).

Currently Somerset is at around 110% with 36,000ML above FSL.

Wivenhoe Dam

Radial gate operations for the current event commenced at 0900 on Sunday 26 December 2010. After scaling up to an initial release rate of 30,000ML/day, the release was scaled back Monday to the minimum radial gate release rate of 4,000ML/day to ensure that Burtons Bridge remained open and to reduce flooding impacts in the Brisbane River caused by flows from Lockyer Creek. Lockyer Ck outflow peaked at midday Tuesday and Wivenhoe gates were commenced to be re-opened at 1500 Tuesday, releasing on the back of the Lockyer recession. It is intended to gradually increase the Wivenhoe releases during Tuesday and Wednesday so that the combined release and Lockyer flow is maintained at about 1600m3/s (140,000 ML/day) in the mid Brisbane R. Note this is similar to the flows in the mid Brisbane in mid October and mid December 2010. This will be maintained until at least Saturday when it is expected that shut down procedure will commence. Gate closure sequencing will be such that the releases will mimic the natural pre-dam flows.

At 0600, the Wivenhoe water level was 69.26m AHD and rising slowly with the current release rate at 60,000ML/day. Inflows into the dam are subsiding and the lake will fall slowly once the release rate is scaled up 130,000 ML/day during Wednesday. It is aimed to return the dam to full supply level by Sunday. The total volume of water released since the event commenced on 26 December 2010 is 56,000ML, with the current projected total release volume for this event being in the order of 385,000ML (includes inflows from Somerset Dam).

Currently Wivenhoe is at 122.3% about 260,000ML above FSL.

Impacts of Wivenhoe Dam Releases

Twin Bridges, Savages Crossing, Colleges Crossing, Burtons Bridge and Kholo Bridge are currently closed and will remain so until at least Sunday. There is no current expectation that either Mt Crosby Weir Bridge or Fernvale Bridge will be impacted by the current event. At this stage, it is estimated that the flow at Burtons Bridge will fall below the bridge deck on Sunday morning.

Wivenhoe releases should have minimal impact on tides based on planned releases. BoM advice confirmed this. Impacts from Bremer and other inflows should have mostly passed by the time any release from Wivenhoe gets to downstream river reaches.

Seqwater Technical Officer name	Robert Drury
Seqwater Technical Officer position title	Dam Operations Manager
[redacted]	

BoM assessment

(consisting of references to latest Flood Warning for the Brisbane River and other relevant Bureau forecasts and warnings (e.g. weather/rain forecasts, Tropical Cyclone Warning etc) and other updates/comments if needed)

BoM has been advised.

BoM Technical Officer name	Peter Baddiley
BoM Technical Officer position title	

BoM Technical Officer contact details	[redacted]

Brisbane City Council (BCC) assessment

(to include predicted local inundation areas and depths of inundation based on the information)

Council has been advised and do not have a problem with the new strategy.

BCC Technical Officer name	Chris Lavin
BCC Technical Officer position title	Disaster Operations Manager
BCC Technical Officer contact details	[redacted]

Ipswich City Council (ICC) assessment (if required)

(to include predicted local inundation areas and depths of inundation based on the information)

Council has been advised and do not have a problem with the new strategy.

ICC Technical Officer name	Tony Trace
ICC Technical Officer position title	Local Disaster Response Coordinator
ICC Technical Officer contact details	[redacted]

Somerset Regional Council (SRC) assessment (if required)

(to include predicted local inundation areas and depths of inundation based on the information)

Council has been advised and do not have a problem with the new strategy.

SRC Technical Officer name	Tony Jacobs
SRC Technical Officer position title	Local Disaster Response Coordinator
SRC Technical Officer contact details	[redacted]

Collated and distributed by (Agency)

Contact Officer signature	
Contact Officer name	Rob Drury
Contact Officer position title	Dam Operations Manager

Next TSR due	**Date**	30.12.2010	**Time**		**or Event**	

Dan Spiller
Thursday, 30 December 2010 7:40 AM

To: [redacted]

Cc: [redacted] SEQWGM Media; [redacted]

Subject: Water Grid gate releases technical report: 30/12
Attachments: Technical Stuation Report W25.docx

All,

Attached is the updated technical report regarding gate releases. Key points are:

- All gates at Wivenhoe Dam are open, releasing at about 130,000 ML/day (about 140,000 ML/day with Lockyer Valley flows). This is similar to the peak release rate in October and early December
- Shutdown will commence Friday and be complete by Sunday, without further rainfall
- Local bridges and crossings likely to continue to be inundated until Sunday
- Downstream river levels continue to reduce with tides and reduced local flows.

Releases from North Pine and Leslie Harrison dams have ceased, pending any further rainfall. Hinze Dam releases will continue until the weekend.

Separately, extremely poor water quality in the Brisbane River caused operational issues for the Mt Crosby WTP yesterday. The WTP was back online by mid afternoon at reduced output. A number of other operational changes have been made, including operating the desalination facility and Southern Regional Water Pipeline at capacity. I will provide an update on these issues after 9.30am and continue to report as necessary.

Please call me on [redacted] if you require any further information.

Regards,
Dan

TECHNICAL SITUATION REPORT

TSR Number	W25	Date of TSR release	30.12.2010	Time of TSR release	7.00am

Seqwater status of inflows and dam operations

Current status but could change based on inflows or rainfall.

Current objectives	• Drain flood compartment as quickly as possible (by about Sunday) without impacting Mt Crosby or Fernvale bridges.	
Strategy	• Continue current releases of around 1500cumecs. • Twin Bridges, Savages, Burtons, Kholo and Colleges will be inundated until Sunday.	
Key considerations	Storage levels:	Above FSL
	Inflows:	Ongoing inflows
	Rainfall:	
	Lockyer/Bremer:	Flows continue to decrease
	Brisbane River:	Releases increased from yesterday, other inflows downstream dropping away rapidly so releases will not impact on Brisbane River downstream. As per BoM advice, impact on tides minimal.

Rainfall

There has been no significant rainfall in the North Pine, Somerset and Wivenhoe catchments since 09:00 on Wednesday 29 December 2010. The current BOM forecast for SE Qld over the next few days is mostly fine with a few light showers, although there is a chance of storms on Tuesday and Wednesday next week.

The catchments remain saturated and are primed for additional runoff in the event of rain.

Somerset Dam

At 06:00 Thursday 30 December 2010, two sluices remain open, releasing about 35,000 ML/d into Lake Wivenhoe and are expected to remain open until Thursday afternoon when the lake returns to the full supply level of 99.00m AHD. The total volume of water released since the event commenced on 26 December 2010 is 104,000ML, with the current projected total release volume for this event approaching 123,000ML.

Wivenhoe Dam

Releases were gradually increased during Wednesday and Thursday morning until the combined release and Lockyer flow reached about 1,600m3/s (140,000 ML/d) in the middle Brisbane River. (Note this is similar to the flows in the releases made in mid-October and earlier in December 2010). This release will be maintained until mid-day Friday 31 December 2010, when the shut down procedure will commence and gates are expected to be fully closed by Sunday morning 2 January 2010. The proposed gate closure sequence will be such that the releases will mimic the natural pre-dam

recessional flows.

Gauge board readings indicate that the Wivenhoe dam water level peaked at 69.33m at noon Wednesday 29 December 2010, about 2.3m above the full supply level. At this level, the dam was temporarily storing over 270,000ML of flood water. At 06:00 on Thursday 30 December 2010, the level had fallen slightly to 69.07m AHD and was releasing about 1,530m3/s (132,000ML/d). The total volume of water released from Wivenhoe dam since the event commenced on 26 December 2010 is 160,000ML, with the current projected total release volume for this event being in the order of 425,000ML (includes inflows from Somerset Dam).

Impacts of Wivenhoe Dam Releases

Twin Bridges, Savages Crossing, Colleges Crossing, Burtons Bridge and Kholo Bridge are currently closed due to inundation and will remain so until at least Sunday 2 January 2011. There is no current expectation that either Mt Crosby Weir Bridge or Fernvale Bridge will be impacted by this event. At this stage, it is estimated that the flow at Burtons Bridge will fall below the bridge deck on Sunday morning.

Wivenhoe releases should have minimal impact on tides based on planned releases. BoM advice confirmed this earlier in the week. Impacts from Bremer and other inflows should have mostly passed by the time any release from Wivenhoe gets to downstream river reaches.

Seqwater Technical Officer name	Robert Drury
Seqwater Technical Officer position title	Dam Operations Manager
[redacted]	[redacted]

BoM assessment

(consisting of references to latest Flood Warning for the Brisbane River and other relevant Bureau forecasts and warnings (e.g. weather/rain forecasts, Tropical Cyclone Warning etc) and other updates/comments if needed)

BoM has been advised.

BoM Technical Officer name	Peter Baddiley
BoM Technical Officer position title	
BoM Technical Officer contact details	[redacted]

Brisbane City Council (BCC) assessment

(to include predicted local inundation areas and depths of inundation based on the information)

Council has been advised and do not have a problem with the new strategy.

BCC Technical Officer name	Chris Lavin
BCC Technical Officer position title	Disaster Operations Manager
BCC Technical Officer contact details	[redacted]

Ipswich City Council (ICC) assessment (if required)

(to include predicted local inundation areas and depths of inundation based on the information)

Council has been advised and do not have a problem with the new strategy.

ICC Technical Officer name	Tony Trace
ICC Technical Officer position title	Local Disaster Response Coordinator
ICC Technical Officer contact details	[redacted]

Somerset Regional Council (SRC) assessment (if required)

(to include predicted local inundation areas and depths of inundation based on the information)

Council has been advised and do not have a problem with the new strategy.

SRC Technical Officer name	Tony Jacobs
SRC Technical Officer position title	Local Disaster Response Coordinator
SRC Technical Officer contact details	[redacted]

Collated and distributed by (Agency)

Contact Officer signature	
Contact Officer name	Rob Drury
Contact Officer position title	Dam Operations Manager

Next TSR due	**Date**		**Time**		**or Event**	Closing sequence or change in strategy

John Adcock

From: Dan Spiller
Sent: Thursday, 30 December 2010 10:08 AM
To: [redacted]
Cc: [redacted]; SEQWGM Media; [redacted]
Subject: RE: Water Grid gate releases technical report: 30/12

All,

Water Grid operations are now stable.

With the Mt Crosby WTP offline, key reservoirs in Brisbane and the Gold Coast were drawn down to low levels. Reservoirs in northern Brisbane and on the Gold Coast are now full. Some key reservoirs in south Brisbane remain at about 30% of capacity, and are only increasing slowly.

Key actions over the next 24 hours will be to:

- Increase storage in the south Brisbane reservoirs back to target levels
- Bring the second of the two Mt Crosby WTPs back on line. This is expected to take another 24 hours. About 20 ML of poor quality treated water is being discharged today (diluted by about 130,000 ML of releases from Wivenhoe Dam). The second WTP is not required to meet demand, but provides resilience to the Grid should problems emerge elsewhere.

With those actions, supply will be secure. From that time, we will focus on monitoring water quality - with the potential for increased taste and odour issues. In terms of water quality, QUU has advised that it did not receive any customer complaints from 24/12 to yesterday (when it compiled results).

The desalination facility has had a key role in the response to this water quality incident:

- The plant has been operating at full capacity since yesterday, and will continue to do so until this afternoon
- Production at capacity has enabled us to fill the Gold Coast reservoirs while also transferring water north at the capacity of the Southern Regional Water Pipeline
- From this afternoon, we will throttle back to two-thirds capacity and maintain that level of output until at least next week
- Ongoing operation at two-thirds capacity will enable us to reduce demand on the Mt Crosby and Molendinar WTPs, which have some water quality taste and odour issues. We can also blend with dam water
- This type of operation was envisaged in the recommendation to move to standby mode. We had two standby trials before Christmas, with a permanent move planned from mid January. We were very pleased by how quickly the facility was returned to full capacity yesterday.

Elsewhere, we are seeking to bring the Capalaba WTP back online today. This has been complicated by the water quality in the dam degrading overnight. However, the plant is not essential - with the area currently being supplied from NSI. Trial water will be discharged.

Please call me on [redacted] if you have any queries or require any further information.

Regards,
Dan

From: Dan Spiller
Sent: Thursday, December 30, 2010 7:40 AM
To: [redacted];
[redacted];
[redacted];
[redacted]
Cc: [redacted]; SEQWGM Media; [redacted];
[redacted]
Subject: Water Grid gate releases technical report: 30/12

All,

Attached is the updated technical report regarding gate releases. Key points are:

- All gates at Wivenhoe Dam are open, releasing at about 130,000 ML/day (about 140,000 ML/day with Lockyer Valley flows). This is similar to the peak release rate in October and early December
- Shutdown will commence Friday and be complete by Sunday, without further rainfall
- Local bridges and crossings likely to continue to be inundated until Sunday
- Downstream river levels continue to reduce with tides and reduced local flows.

Releases from North Pine and Leslie Harrison dams have ceased, pending any further rainfall. Hinze Dam releases will continue until the weekend.

Separately, extremely poor water quality in the Brisbane River caused operational issues for the Mt Crosby WTP yesterday. The WTP was back online by mid afternoon at reduced output. A number of other operational changes have been made, including operating the desalination facility and Southern Regional Water Pipeline at capacity. I will provide an update on these issues after 9.30am and continue to report as necessary.

Please call me on [redacted] if you require any further information.

Regards,
Dan

John Adcock

From: Dan Spiller
Sent: Friday, 31 December 2010 7:50 AM
To: [redacted]; Lance McCallum [redacted]; Tim Watts [redacted] Geoff Stead ([redacted] Ken Smith [redacted] Debbie Best [redacted]
Cc: [redacted]; Rob Drury [redacted] SEQWGM Media; Damien Brown [redacted] Madgwick.DarrenT@police.qld.gov.au
Subject: Water Grid gate releases: 31/12
Attachments: Technical Stuation Report W26.docx

All,

Attached is todays technical situation report for releases from Wivenhoe Dam. Key points are:

- About 130,000 ML/day is currently being released, through all five gates
- Gates will begin closing from late tonight or early tomorrow. Final closure is planned for Sunday
- Total releases for this release will be about 450,000 ML.

Hinze Dam will continue releases until next week. Leslie Harrison and North Pine dams have ceased releases.

Unless there is a change to the operating plan, we will provide the next report on Sunday once Wivenhoe Dam gates are closed.

I will provide a seperate report about Water Grid operations after a 9am teleconference.

Please call me if you have any queries.

Regards,
Dan Spiller

TECHNICAL SITUATION REPORT

TSR Number	W26	Date of TSR release	31.12.2010	Time of TSR release	7.00am

Seqwater status of inflows and dam operations

Current status but could change based on inflows or rainfall.

Current objectives	• Drain flood compartment as quickly as possible (by about Sunday) without impacting Mt Crosby or Fernvale bridges.	
Strategy	• Continue current releases of around 1500cumecs. • Twin Bridges, Savages, Burtons, Kholo and Colleges will be inundated until Sunday.	
Key considerations	Storage levels:	Above FSL
	Inflows:	Ongoing inflows
	Rainfall:	
	Lockyer/Bremer:	Flows continue to decrease
	Brisbane River:	Releases not changing greatly, other inflows downstream dropping away rapidly so releases will not impact on Brisbane River downstream. As per BoM advice, impact on tides minimal.

Rainfall

There has been no significant rainfall in the North Pine, Somerset and Wivenhoe catchments since 0900 on Wednesday 29 December 2010. The current BOM forecast for SE Qld over the next few days is mostly fine with a few light showers, although there is a chance of storms on Tuesday and Wednesday next week.

The catchments remain wet and are likely to generate additional runoff in the event of rain.

Somerset Dam

At 0500 on Friday 31 December 2010, the lake level was 99.01m AHD falling from a peak of 100.0m AHD reached around noon Tuesday 28 December 2010. Two regulators are currently operating and will remain open until the lake returns to the full supply level of 99.00m AHD. The total volume of water released since the event commenced on 26 December 2010 is 126,000 ML, with the current projected total release volume for this event approaching 130,000ML.

Wivenhoe Dam

Releases were gradually increased during Wednesday and Thursday morning until the combined release and Lockyer flow reached about 1,600m3/s (140,000 ML/d) in the middle Brisbane River. (Note this is similar to the flows in the releases made in mid-October and earlier in December 2010). Flow measurement carried out by the Department of Environment and Heritage during Thursday has confirmed this flow. This release will be maintained until late Friday 31 December 2010, when the shut down procedure will commence and gates are expected to be fully closed by Sunday 2 January 2010.

The proposed gate closure sequence will be such that the releases will mimic the natural pre-dam recessional flows.

At 0500 on Friday 31 December 2010, the level had fallen slightly to 68.40m AHD and was releasing about 1,550m3/s (132,000ML/d). The total volume of water released from Wivenhoe dam since the event commenced on 26 December 2010 is 293,000ML, with the current projected total release volume for this event being in the order of 450,000ML (includes inflows from Somerset Dam).

Impacts of Wivenhoe Dam Releases

Twin Bridges, Savages Crossing, Colleges Crossing, Burtons Bridge and Kholo Bridge are currently closed due to inundation and will remain so until at least Sunday 2 January 2011. There is no current expectation that either Mt Crosby Weir Bridge or Fernvale Bridge will be impacted by this event. At this stage, it is estimated that the flow at Burtons Bridge will fall below the bridge deck on Sunday morning.

Wivenhoe releases should have minimal impact on tides based on planned releases. BoM advice confirmed this earlier in the week. Impacts from Bremer and other inflows should have mostly passed by the time any release from Wivenhoe gets to downstream river reaches.

Seqwater Technical Officer name	Robert Drury
Seqwater Technical Officer position title	Dam Operations Manager
[redacted]	

BoM assessment

(consisting of references to latest Flood Warning for the Brisbane River and other relevant Bureau forecasts and warnings (e.g. weather/rain forecasts, Tropical Cyclone Warning etc) and other updates/comments if needed)

BoM has been advised.

BoM Technical Officer name	Peter Baddiley
BoM Technical Officer position title	
BoM Technical Officer contact details	[redacted]

Brisbane City Council (BCC) assessment

(to include predicted local inundation areas and depths of inundation based on the information)

Council has been advised and do not have a problem with the new strategy.

BCC Technical Officer name	Chris Lavin
BCC Technical Officer position title	Disaster Operations Manager
BCC Technical Officer contact details	[redacted]

Ipswich City Council (ICC) assessment (if required)

(to include predicted local inundation areas and depths of inundation based on the information)

Council has been advised and do not have a problem with the new strategy.

ICC Technical Officer name	Tony Trace
ICC Technical Officer position title	Local Disaster Response Coordinator
ICC Technical Officer contact details	[redacted]

Somerset Regional Council (SRC) assessment (if required)

(to include predicted local inundation areas and depths of inundation based on the information)

Council has been advised and do not have a problem with the new strategy.

SRC Technical Officer name	Tony Jacobs
SRC Technical Officer position title	Local Disaster Response Coordinator
SRC Technical Officer contact details	[redacted]

Collated and distributed by (Agency)

Contact Officer signature	
Contact Officer name	Rob Drury
Contact Officer position title	Dam Operations Manager

Next TSR due	**Date**		**Time**		**or Event**	Final closing of gates

John Adcock

From: Dan Spiller
Sent: Friday, 31 December 2010 9:47 AM
To: [redacted]; Lance McCallum [redacted]); Tim Watts [redacted] Geoff Stead [redacted] Ken Smith [redacted]; Debbie Best [redacted]
Cc: [redacted]; Rob Drury [redacted]); SEQWGM Media; Damien Brown [redacted];
Subject: Water Grid operational update

All,

Operation of the Water Grid is now stable, and reservoir levels are recovering.

The second of the two Mt Crosby WTPs is expected to be operational by midnight tonight, from which time supply from North Pine WTP and the Southern Regional Water Pipeline will be reduced.

All reservoirs on the Gold Coast are now full, meaning that production from the desalination facility has been reduced to one-third. The desalination facility remains at a high level of readiness, should there be further issues.

Please contact me on [redacted] should you require any further information.

Dan

From: Dan Spiller
Sent: Friday, 31 December 2010 7:49 AM
To: [redacted]; Lance McCallum [redacted]); Tim Watts [redacted]; Geoff Stead [redacted]); [redacted]; Ken Smith [redacted]); Debbie Best [redacted]; Rob Drury [redacted]); SEQWGM Media; Damien Brown [redacted]); [redacted]; [redacted]
Subject: Water Grid gate releases: 31/12

All,

Attached is todays technical situation report for releases from Wivenhoe Dam. Key points are:

- About 130,000 ML/day is currently being released, through all five gates
- Gates will begin closing from late tonight or early tomorrow. Final closure is planned for Sunday
- Total releases for this release will be about 450,000 ML.

Hinze Dam will continue releases until next week. Leslie Harrison and North Pine dams have ceased releases.

Unless there is a change to the operating plan, we will provide the next report on Sunday once Wivenhoe Dam gates are closed.

I will provide a seperate report about Water Grid operations after a 9am teleconference.

Please call me if you have any queries.

Regards,
Dan Spiller

Gina O'Driscoll

From: Barry Dennien
Sent: Monday, 10 January 2011 11:46 AM
To: Lance McCallum [redacted]
Subject: FW: Wivenhoe Dam release strategy
Attachments: Technical Situation Report W37.docx

Importance: High

Lance

As discussed

Barry

Dear CEOs

This teleconference at 12.30pm today is to update you on the current Wivenhoe flood release strategy.

In preparation for this meeting we are intending to send out a Technical Report closer to 12.30pm that will detail the strategy.

Dial in details are:
Phone: [redacted]
Pin: [redacted]

If you wish to contact me regarding this teleconference, please phone my office on [redacted] or mobile [redacted].

Carl and Rob,

Attached is the Technical Situation Report drafted by Seqwater following consultation with BoM and Councils.

Key points are:

- There is continuing heavy rainfall in catchments. Total inflows over the event will be at least 1,500,000 ML and probably above 2,100,000 ML.
- As a result, Wivenhoe Dam is above 140% of capacity and Somerset is above 150%, with both rising fast.
- As specified in the approved Operational Procedures, the primary objective is now to minimizing the risk of urban inundation (release strategy W2). This involves larger releases now, minimizing the risk of even larger releases later (were the flood compartment to reach high levels).
- Consistent with this release strategy, dam releases have increased to 2,000 cubic metres per second (172,000 ML/day). It is expected to increase to 2,600 cubic metres per second by midday tomorrow.
- As specified in the approved Operational Manual, we are targeting maximum flow in the Brisbane River of 3,500 cumecs at Moggill. This is the levels above which urban inundation begins.
- For comparison, flows would be up to 12,000 cumecs without the dams.

Seqwater has previously had verbal conversations with Council staff regarding impacts. However, given the significance of this event, and consistent with the draft protocol, we are seeking formal Council input to this version. This advice would relate to the impact of releases, based on the type of scenario analysis that you described this morning.

Our preference would be to finalise the report, including your input, before or at the 12.30 teleconference with Council CEOs and the BoM. This timing means that it can underpin all media messaging this afternoon.

I appreciate your assistance. Please call me if I can be of any assistance.

Regards,
Dan

Daniel Spiller
Director, Operations
SEQ Water Grid Manager
Phone: [redacted]
Email: [redacted]
Visit: Level 15, 53 Albert Street Brisbane
Post: PO Box 16205, City East QLD 4002
ABN: 14783 317 630

TECHNICAL SITUATION REPORT

TSR Number	W36	Date of TSR release	10.1.2011	Time of TSR release	8am

Seqwater status of inflows and dam operations

Current status but could change based on inflows or rainfall.

Current objectives	• Continue increasing releases to discharge flood waters but keep impact downstream to minimum.	
Strategy	• All bridges are now inundated .	
Key considerations	Storage levels:	Above FSL
	Inflows:	Inflows expected around 1,500,000ML which is close to 1974 event.
	Rainfall:	Continuing
	Lockyer/Bremer:	Monitoring their inflows
	Brisbane River:	Impact as below.

Rainfall

Moderate to heavy rainfall has been recorded in the Upper Brisbane and Stanley Rivers in the last 12 hours with totals up to 90 mm. Totals for the last 24 hours range from 100 to 325mm.

Mt Glorious recorded 100 mm in the last 12 hours.

Rainfall of similar magnitudes is expected in the 12 to 24 hours around the downstream catchments as the system tracks south.

A severe weather warning remains current for heavy rainfall in the dam catchment areas.

North Pine Dam (Full Supply Level 39.60 m AHD)

The dam level was 39.97 m and steady. Five gates are open releasing 475 m3/s. The inflow into the dam since the commencement of the event is 52,000 ML. Estimated event volume is 72,000 ML assuming no further rainfall. Gate operations will continue until at least Tuesday 11 January 2011.

Somerset Dam (Full Supply Level 99.00 m AHD)

The dam level at 05:00 was 102.84 m AHD and rising (storing 193,000 ML above FSL) Peak inflow to the dam is estimated to be about 4,200 m3/s based on observed rainfall and could be as high as 5,000m3/s with additional forecast rainfall. Five sluice gates are open releasing about 1,100m3/s (95,000Ml/d) into Wivenhoe Dam. At this stage the dam lake level will reach about 103.5 mAHD on Monday afternoon. Areas around Kilcoy will continue to be adversely affected.

Since the commencement of the event on 02/01/2011approximately 142,000ML has been released from the dam into Wivenhoe, with an event total of the order of 520,000ML expected. This is expected to increase due to the forecast rain in the next 24 to 48 hours. At this stage, releases will continue until at least Thursday.

Wivenhoe Dam (Full Supply Level 67.00 m AHD)

River levels upstream of the dam have peaked and are falling slowly with significant inflow being generated from the intense heavy rainfall. Flows in the Brisbane River at Gregor's Ck have peaked at 7,350m3/s at 23:00 on Sunday 9 January. This peak is bigger than January 1974 and February 1999 at this location.

The dam level is rising quickly, with the current level being 70.77m AHD (storing 450,000 ML). Estimated peak inflow to the dam just from the Upper Brisbane R is around 8,800m3/s and, at this stage, the dam will reach at least 73.3 m AHD during Tuesday morning. Given the rapid increase in inflow volumes, it was necessary to start to increase the release from Wivenhoe during Monday morning.

The objective for dam operations will be to minimise the impact of urban flooding in areas downstream of the dam and, at this stage, the aim is to keep combined flows in the lower Brisbane to 3,500m3/sec if possible. Consistent with the approved Operating Procedures, these target combined flows may need to be increased to 4,000m3/s, and potentially higher. In either case, this is significantly less than the current estimated combined pre-dam peak inflow of 12,000 m3/s.

Fernvale Bridge approaches and Mt Crosby Weir Bridge have been inundated and both bridges are now closed.

The current release rate from Wivenhoe Dam is around 2,000m3/s (172,000ML/day). Gate opening will continue to be increased during Monday and the release is expected to increase to at least 2,600m3/s in the next 12 to 24 hours and further depending on downstream flows..

Since the commencement of the event on 02/01/2011 approximately 275,000ML has been released from the dam, with an event total approaching 1,600,000ML without further rain and as much as 2,100,000ML with forecast rainfall of (both including Somerset outflow). At this stage, releases will continue until at least Sunday 16th January 2011.

Impacts downstream of Wivenhoe Dam

The projected Wivenhoe Dam releases combined with Lockyer flows and local runoff will mean that all crossings downstream of Wivenhoe (Twin Bridges, Fernvale, Savages Crossing, Burtons Bridge, Kholo Bridge, Mt Crosby Weir and Colleges Crossing) will be adversely impacted until at least Saturday 15 January in varying degrees.

Water levels in the lower Brisbane R will be impacted by the combined flows of Lockyer Ck, Bremer River, local runoff and releases from Wivenhoe Dam. If the predicted rainfall eventuates in the downstream tributary catchments the resultant combined flows in the lower Brisbane may exceed the threshold of damaging discharge in the urban areas within the next 24 to 48 hours. Currently the estimate peak flow in the lower Brisbane River will be the highest since Wivenhoe Dam was completed in 1984 but still well below flows the 1974 levels

Somerset Regional, Ipswich City and Brisbane City Councils have been advised of the updated Wivenhoe operating strategy.

Outlook

Heavy rainfall continues throughout South East Queensland and the situation could deteriorate rapidly over the next 24 hours. The flood operation centre will continue to monitor the situation and provide every six hours until the situation stabilizes.

Seqwater Technical Officer name	Robert Drury

Seqwater Technical Officer position title	Dam Operations Manager
[redacted]	[redacted]

BoM assessment

(consisting of references to latest Flood Warning for the Brisbane River and other relevant Bureau forecasts and warnings (e.g. weather/rain forecasts, Tropical Cyclone Warning etc) and other updates/comments if needed)

BoM has been advised.

BoM Technical Officer name	Peter Baddiley
BoM Technical Officer position title	
BoM Technical Officer contact details	[redacted]

Brisbane City Council (BCC) assessment

(to include predicted local inundation areas and depths of inundation based on the information)

Council has been advised of the current status.

BCC Technical Officer name	Chris Lavin
BCC Technical Officer position title	Disaster Operations Manager
BCC Technical Officer contact details	[redacted]

Ipswich City Council (ICC) assessment (if required)

(to include predicted local inundation areas and depths of inundation based on the information)

Council has been advised of the current status.

ICC Technical Officer name	Tony Trace
ICC Technical Officer position title	Local Disaster Response Coordinator
ICC Technical Officer contact details	[redacted]

Somerset Regional Council (SRC) assessment (if required)

(to include predicted local inundation areas and depths of inundation based on the information)

Council has been advised of the current status.

SRC Technical Officer name	Tony Jacobs
SRC Technical Officer position title	Local Disaster Response Coordinator

SRC Technical Officer contact details	[redacted]

Collated and distributed by (Agency)

Contact Officer signature	
Contact Officer name	Rob Drury
Contact Officer position title	Dam Operations Manager

Next TSR due	Date	11.1.2011	Time		or Event	Change in strategy

Gina O'Driscoll

From: Water Grid Emergency Manager [redacted]
Sent: Monday, 24 January 2011 12:34 PM
To: Barry Dennien
Subject: SEQ Water Grid incident briefing
Attachments: MIN - Water Grid Emergency Update.pdf

Colleagues

Please find attached an update on current Water Grid Emergencies.

Regards

Water Grid Emergency Management Team
SEQ Water Grid Manager

Phone: [redacted]
Email: [redacted]
Post: PO Box 16205, BRISBANE CITY EAST, QLD 4002
Visit: Level 15, 53 Albert St, BRISBANE
ABN: 14 783 317 630

Incident Notification: Level 4 - MIN - Water Grid Emergency Update

Minister agency: Minister for Natural Resources, Mines & Energy and Minister for Trade

INCIDENT DETAILS:		CONTACT DETAILS:	
Event:	Wivenhoe Dam Releases 1230EST-06JAN11, Extreme Weather Event -2300EST-10JAN11	**Contact:**	
Report date:	24/01/2011 10:31 AM	**Role:**	WGM Duty Manager
Lodging agency:	SEQ WGM	**Phone:**	[redacted]
Severity level:	Level 4	**Mobile:**	
Incident status:	Active	**Email:**	[redacted]
Next briefing:			

Reason for briefing To provide an update on Water Grid Emergencies.

Asset Wivenhoe Dam, Mt Crosby WTP, Lowwod WTP, Somerset and Lockyer Valley distribution networks.

Location Wivenhoe, Mt Crosby, Lockyer Valley and Somerset Council areas.

Timing On 06 January 2011, an Alert level incident was declared, progressively upgraded to a Level 3 then Level 4 Emergency in response to planned dam releases from Wivenhoe Dam and a series of natural disaster events. Both the Wivenhoe and Lockyer Valley experienced prolonged and intense rainfall resulting in significant inflows to Wivenhoe Dam and the mid Brisbane River. Extreme weather events and flash flooding also occurred in the Lockyer Valley, Somerset and Ipswich areas resulting in asset damage and inundation.

Around the 11-12 January 2011, the rainfall and Brisbane, Bremer and Lockyer River flows resulted in bridge closures due to inundation also impacting road access and resupply of chemicals to Mt Crosby East and West Bank. Similar issues were experienced in other areas of the Water Grid.

The Alert Level Incident was escalated to a Level 3 Emergency on 10 January 2011 and a Level 4 Emergency on 11 January 2011. The Water Grid Emergency Management Team was activated in response to potential and actual impacts from the events.

What we know The Wivenhoe Dam flood compartment is now empty. The Brisbane River has returned to near normal levels and chemical supply deliveries are now reaching all SEQ Water Grid water treatment plants. QUU continues to conduct remediation works to local distribution assets within their area of operation and are managing boil water notices for some urban and rural centres within the Lockyer Valley and Somerset Council areas. All major Water Treatment Plants and bulk water distribution assets within South East Queensland are operating to normal specification, although some contingency arrangements remain in place including a temporary raw water pump at Lowood. Two very small Water Treatment Plants that serve the recreational camp sites at Atkinsons Dam and Wivenhoe Dam remain offline.

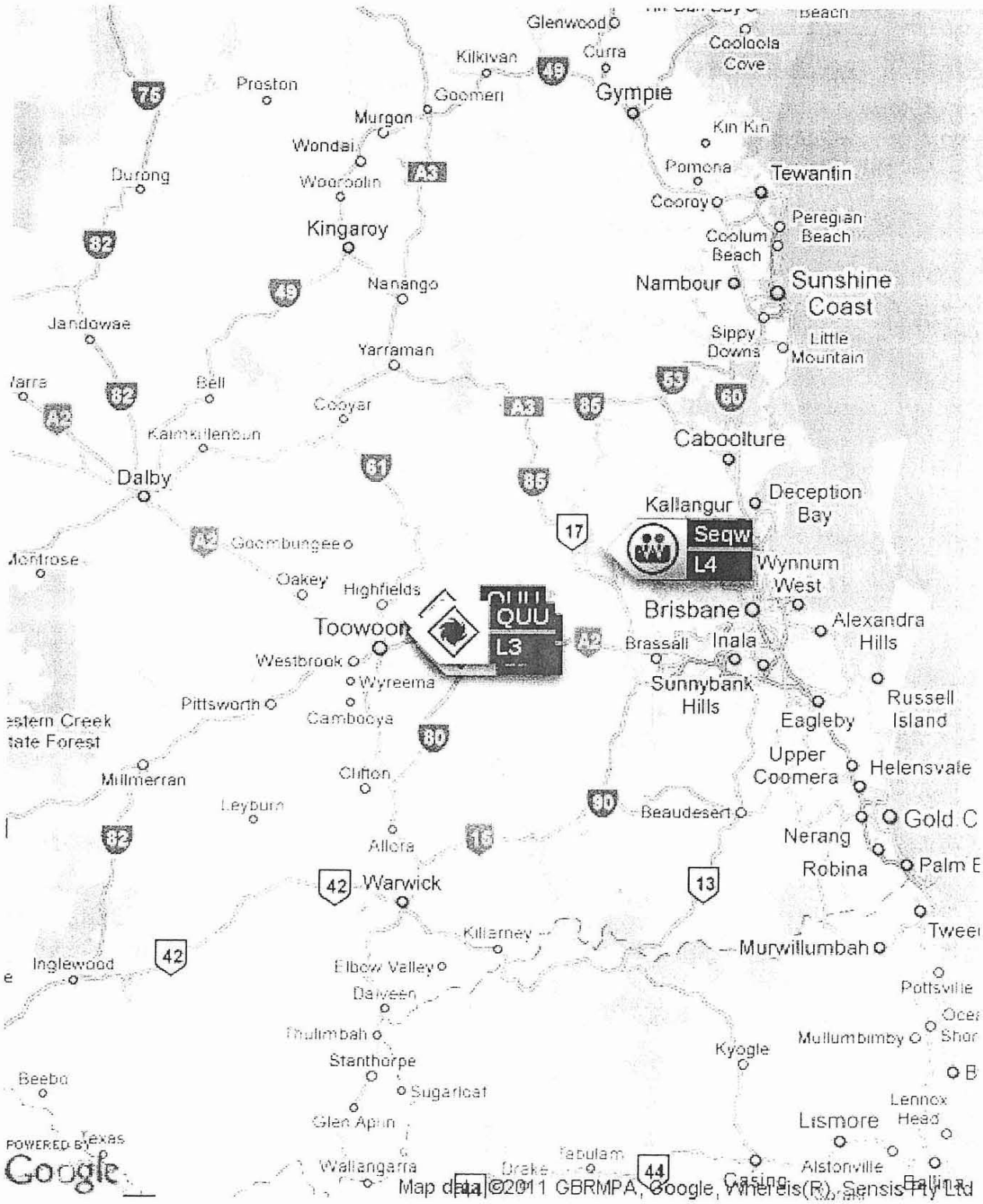
What we are doing While the Brisbane River is now at near normal levels and the Water Grid is operating normally, the Level 4 Emergency will be maintained until the boil water notices are lifted for

all major communities. Intensive water quality monitoring is ongoing within the Lockyer and Somerset regions, with two clear rounds of results returned over the weekend. It is expected that after one further round of testing and clear results, Qld Health will approve the lifting of the boil water notices. At that time, we expect to de-escalate to a Level 3 Emergency, which will then remain in place to facilitate whole of Grid coordination and communication as neccesary.

Emergency De-escalation is likely within the next seven days as asset repairs are finalised and boil water notices are lifted on the advice of Qld Health.

Action required This information is for noting.

Incident Map:



Gina O'Driscoll

From: Water Grid Emergency Manager [redacted]
Sent: Tuesday, 25 January 2011 4:07 PM
To: Barry Dennien
Subject: Water Grid Emergency Update
Attachments: MIN - Emergency Update 25JAN11.pdf

Colleagues

Please find attached latest update on Water Grid Emergency Management.

Regards

Water Grid Emergency Manager

Incident Notification: Level 4 - MIN - Emergency Update 25JAN11

Minister agency: Minister for Natural Resources, Mines & Energy and Minister for Trade

INCIDENT DETAILS:		CONTACT DETAILS:	
Event:	Wivenhoe Dam Releases 1230EST-06JAN11, Extreme Weather Event -2300EST-10JAN11	**Contact:**	
Report date:	25/01/2011 03:14 PM	**Role:**	WGM Duty Manager
Lodging agency:	SEQ WGM	**Phone:**	[redacted]
Severity level:	Level 4	**Mobile:**	
Incident status:	Active	**Email:**	[redacted]
Next briefing:			

Reason for briefing To provide an update on Water Grid Emergencies

Asset Wivenhoe Dam, Mt Crosby WTP, Lowood WTP, Somerset and Lockyer Valley distribution networks.

Location Wivenhoe, Mt Crosby, Lockyer Valley and Somerset Council areas.

Timing On 06 January 2011, an Alert level incident was declared, progressively upgraded to a Level 3 then Level 4 Emergency in response to planned dam releases from Wivenhoe Dam and a series of natural disaster events. Both the Wivenhoe and Lockyer Valley experienced prolonged and intense rainfall resulting in significant inflows to Wivenhoe Dam and the mid Brisbane River. Extreme weather events and flash flooding also occurred in the Lockyer Valley, Somerset and Ipswich areas resulting in asset damage and inundation.

In the period 11-12 January 2011, the rainfall and Brisbane, Bremer and Lockyer River flows resulted in bridge closures due to inundation also impacting road access and resupply of chemicals to Mt Crosby East and West Bank. Similar issues were experienced in other areas of the Water Grid.

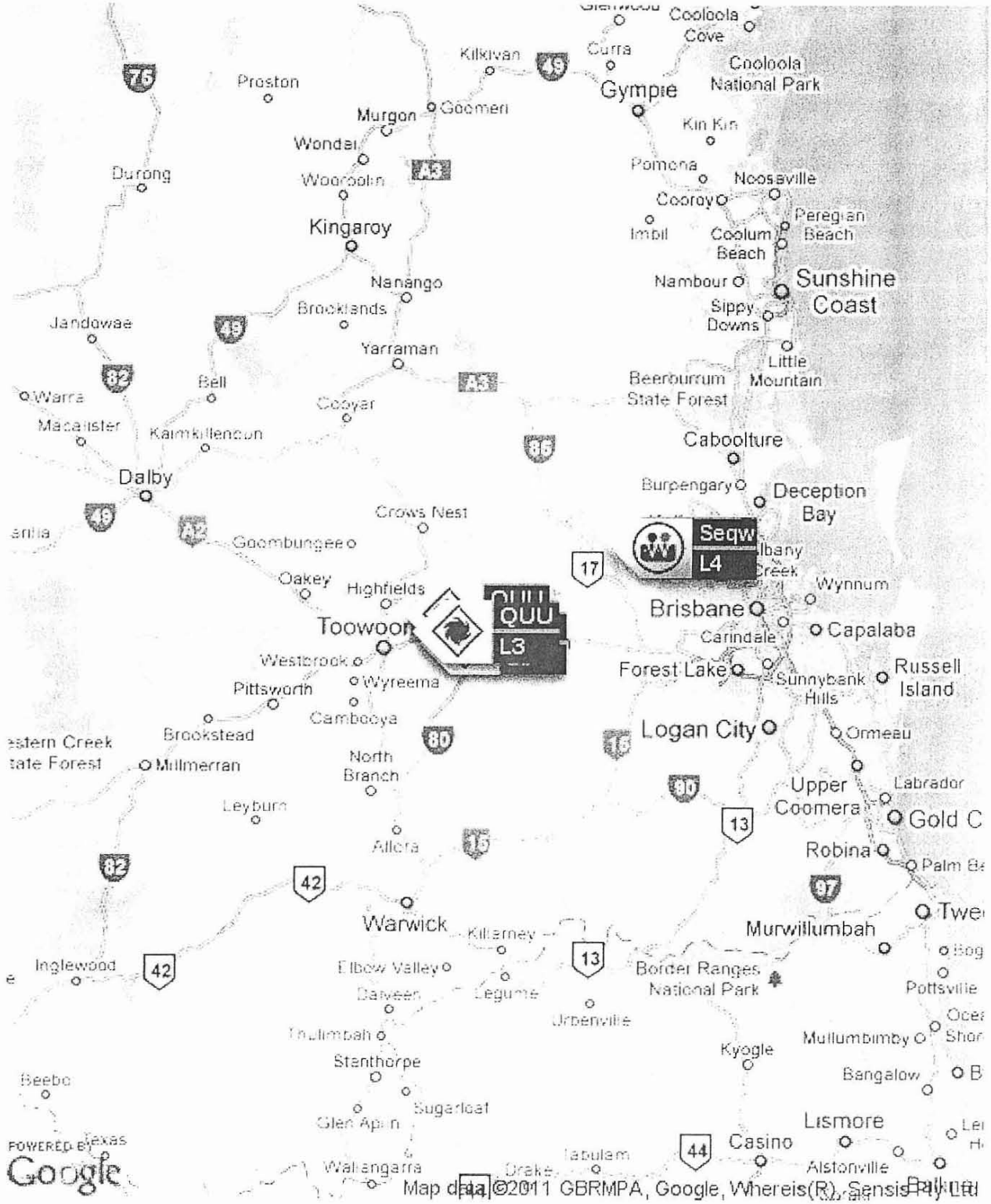
The Alert Level Incident was escalated to a Level 3 Emergency on 10 January 2011 and a Level 4 Emergency on 11 January 2011. The Water Grid Emergency Management Team was activated in response to potential and actual impacts from the events.

What we know The Wivenhoe Dam flood compartment is now empty. The Brisbane River has returned to near normal levels and chemical supply deliveries are now reaching all SEQ Water Grid water treatment plants. QUU continues to conduct remediation works to local distribution assets within their area of operation. Qld Health have given approval to lift boil water notices in the Lockyer and Somerset regions as of this afternoon (25 January 2011).

All major Water Treatment Plants and bulk water distribution assets within South East Queensland are operating to normal specification, although some contingency arrangements remain in place including a temporary raw water pump at Lowood. Two very small Water Treatment Plants that serve the recreational camp sites at Atkinsons Dam and Wivenhoe Dam remain offline.

What we are doing	QUU, in cooperation with SEQ Water Grid Manager and Qld Health are preparing communications to lift the boil water notices within the Somerset and Lockyer regions. As indicated in the last update on 24 January 2011, we are now de-escalating the current emergency from a Level 4 Emergency to a Level 3 Emergency. The Emergency will be closed once the Lowood raw water pump is fully operational and emergency coordination is no longer required.
Action required	This information is for noting.

Incident Map:



Gina O'Driscoll

From: Water Grid Emergency Manager [redacted]
Sent: Wednesday, 26 January 2011 4:13 PM
To: Barry Dennien
Subject: SEQ Water Grid incident briefing
Attachments: Ministerial Notification - E.coli detection at Marburg.pdf

Colleagues

Please find attached a briefing for the Water Grid incident, *Marburg E.coli detection.*

Incident severity: Level 3

Regards

Scott Denner

Duty Manager

SEQ Water Grid Manager

Phone: [redacted]

Email: [redacted]

Post: PO Box 16205, BRISBANE CITY EAST, QLD 4002

Visit: Level 15, 53 Albert St, BRISBANE

ABN: 14 783 317 630

Incident Notification: Alert - Ministerial Notification - E.coli detection at Marburg

Minister agency: Minister for Natural Resources, Mines & Energy and Minister for Trade

INCIDENT DETAILS:		CONTACT DETAILS:	
Event:	E-coli detection at Marburg	**Contact:**	
Report date:	26/01/2011 03:39 PM	**Role:**	WGM Duty Manager
Lodging agency:	SEQ WGM	**Phone:**	[redacted]
Severity level:	Alert	**Mobile:**	
Incident status:	Active	**Email:**	[redacted]
Next briefing:	p.m. Thursday 27 January 2011		

Reason for briefing	This briefing is to notify of a new Level 3 incident declared under the SEQ Water Grid Emergency Response Plan.
Asset	Marburg Reserviour
Location	Queen St, Marburg
Timing	The Water Grid Manager was notified by Queensland Urban Utilities (QUU) of the incident at 1359hr on Wednesday 26 January 2011.
What we know	QUU recieved an intial E.coli return of 1cfu on Tuesday 26 January 2011, and a second positive reading of 2 cfu on Wednesday 26 January 2011. Both readings exceed the Australian Drinking Water Guideline (ADWG) limit of 0 cfu.
What we are doing	QUU have conducted additional chlorination at the Marburg, Haiglsea, Rosewood and Upper John Street reserviours, and commenced an enhanced sampling cycle and scouring program. The Office of the Water Supply Regulator has been contacted, who advised QUU that they will contact Queensland Health to determine if any measures in addition to those already undertaken by QUU are required.
Action required	This information is for noting

Incident Map: