

## Appendix E

### Submission by SunWater

Please note some components from this submission have been either omitted or redacted for the purposes of protecting infrastructure security and preventing the publication of personal information.

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Contact: [REDACTED]  
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17 April 2015

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BY EMAIL: [info@igem.qld.gov.au](mailto:info@igem.qld.gov.au)

Dear Mr MacKenzie

**2015 Callide Creek Flood Review  
Public Submission of SunWater Limited**

I understand that as part of the 2015 Callide Creek Flood Review, the Office of the Inspector-General Emergency Management (**IGEM**) is accepting public submissions.

As an interested organisation, SunWater has prepared the **attached** submission. SunWater will also hand deliver a copy of the submission and all appendices to your office on an electronic storage device.

I agree to my submission being treated as outlined in the "Guide to providing submissions" on the IGEM website.

Please contact SunWater's project manager for the Callide Review, [REDACTED], on [REDACTED] via email [REDACTED] if SunWater can be of any assistance or offer any further explanation.

Yours sincerely

A handwritten signature in blue ink that reads "Tom Vanderbyl".

**Tom Vanderbyl**  
General Manager  
Bulk Water and Irrigation Systems

Att(s)  
Attachment – 2015 Callide Creek Flood Review – Submission of SunWater Limited

# Inspector-General Emergency Management

## CALLIDE CREEK FLOOD REVIEW



Submission by SunWater  
17 April 2015

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## A Context

- 1 The Callide Creek Flood Review is being carried out by the Inspector General Emergency Management.
- 2 In accordance with the functions of the IGEM as set out in the *Disaster Management Act 2003* and the Terms of Reference for the Callide Creek Flood Review, the IGEM is to review the circumstances of the Callide Creek flood event during Tropical Cyclone Marcia to determine whether disaster management arrangements and Callide Dam planning and operations were effective, and identify opportunities to improve disaster management.
- 3 Under the Terms of Reference, the review is to report on:
- (a) The impact to the community of the Callide Valley from the flooding event on Friday 20 February 2015.
  - (b) The operation of the Callide Dam in the lead-up to and during the event, including:
    - (i) whether recommendations from the report on the "Review of Callide Dam Gate Operations in the January 2013 Flood Event" were implemented, and did, or would have if implemented, affected the impact to the community;
    - (ii) the application of the Emergency Action Plan including integration with relevant disaster management plans;
    - (iii) whether the operating specifications of the Callide Dam at the time of the event were reasonable.
  - (c) Disaster management arrangements, specifically:
    - (i) risk assessment and hazard mitigation strategies;
    - (ii) disaster management planning and disaster operations, including warnings;
    - (iii) engagement and communications, including with the community.
  - (d) Performance of critical telecommunications infrastructure in the event.
- 4 The IGEM has called for public submissions to assist with the review.
- 5 This is a submission by SunWater Limited, the owner and operator of Callide Dam. It is principally directed to the Terms of Reference referred to in paragraph 3(b) above.
- 6 This submission is structured as follows:
- (a) Section B contains an executive summary;
  - (b) Section C provides background information on SunWater, Callide Dam and the regulatory environment for dam operations;
  - (c) Section D addresses the 2015 Flood Event, including SunWater's preparedness for the event and the details of the event itself;
  - (d) Section E examines the suggestion that the Callide Dam level should have been lowered in advance of the flood event; and
- 7 This submission draws from the following material that has previously been provided by SunWater to the IGEM including:
- (a) Callide Dam Emergency Event Report 20-22 February 2015 (**Event Report**);
  - (b) Report to Support Callide Dam 2015 Flood Review Request for Documents dated 1 April 2015 (**Background Briefing Paper**).
- 8 As is standard practice for it, SunWater has conducted a lessons learnt exercise into the 2015 Flood Event. The lessons learnt has produced a number of findings and recommendations for future action. A copy of the lesson learnt report which includes number of findings and recommendations for future action is at **Appendix A**.

- 9 SunWater welcomes the opportunity to provide further information, or to address any other matters raised during the review or in the public submissions, as and if requested by the IGEM.
- 10 In particular, SunWater would be willing to make SunWater's modelling experts available to the IGEM's hydrology experts to assist their understanding in relation to the hydrologic modelling inputs and outcomes that are referred to in this submission.

## **B Executive Summary**

### *Tropical Cyclone Marcia*

- 11 Tropical Cyclone Marcia crossed the Queensland coast north of Yeppoon on 20 February 2015. It travelled in a southerly direction towards the Callide Dam catchment once making landfall.
- 12 The Bureau of Meteorology forecast that the catchment above Callide Dam would receive between 100-150 millimetres that day. The forecast did not include (as is customary) a prediction of either the intensity or the spatial and temporal distribution of the forecast rainfall. Accordingly, it was not possible in advance of the rainfall to reliably predict the likely run-off from the forecast rainfall.

### *SunWater's preparations*

- 13 In advance of the arrival of Marcia, SunWater, as owner and operator of Callide Dam, had made all necessary arrangements to be ready to at Callide Dam, if required. In particular, SunWater had:
- (a) undertaken standard wet season readiness preparations;
  - (b) been in close contact with the Local Disaster Management Group; and
  - (c) closely considered, and was ready to enact, the Emergency Action Plan for Callide Dam. It is necessary for IGEM to understand that SunWater's role in an emergency such as Tropical Cyclone Marcia is limited to monitoring inflows and communicating in accordance with the Emergency Action Plan and to pass flows.
- 14 SunWater did not reduce the lake level in Callide Dam prior to the arrival of Marcia as this was outside of the dam's operating licence and it would have been an offence for SunWater to do so. In any event, there was no reasonable justification for discharging large volumes of water in advance of the flood event. As to this:
- (a) The forecast rainfall (100-150 millimetres) was not substantial in terms of the dam's capability. Indeed, depending on the spatial and temporal distribution of the rainfall, the dam may not have even filled with that depth of rainfall (bearing in mind the dam was at 84% at the commencement of the event).
  - (b) The forecast could not be relied on to release water. The Bureau's forecasts are, by their nature, inherently unreliable.
  - (c) Depending on the nature of the flood, the lowering of the level would not necessarily provide any substantial flood mitigation benefits.
  - (d) The forecast track range of the cyclone was uncertain and could not be relied upon to not change. A number of other dams in other central Queensland catchments potentially in the path of Marcia (namely Bjelke-Petersen Dam and Boondooma Dam) received minimal inflows as a result of the rainfall event.

### *Intense, unpredicted rainfall*

- 15 On arrival of Marcia, the catchment above Callide Dam was affected by intense rainfall.
- 16 The catchment above Callide Dam received 48 hour rainfall totals of between 200mm and 350mm, although much of this fell in the 5 hours between 16:00 and 21:00 on 20 February 2015. The depth and intensity of this rainfall was not forecast.
- 17 At the the Kroombit Tops DNRM gauging station, the rainfall intensity was approaching 1 in 1,000 year Annual Exceedance Probability (AEP). Over 6 hours from 14:00 to 20:00, the total rainfall at the Kroombit Tops DNRM gauge was 251mm.

### *Gate operations were automatic*

- 18 Callide Dam is a water supply dam. It is not a flood mitigation dam.



- 19 The gates are designed to operate automatically once storage levels exceed the design full supply level. The dam does not contain a dedicated flood storage compartment, with the effect that as dam inflows are received at or above full supply level, they are passed downstream. The automatic operation is purely driven by hydraulic floats and occurs without the need for electrical controls or motors.
- 20 Following investigations SunWater included, as a temporary measure, provisions within the Emergency Action Plan to override operation of the gates in order to maintain the storage level at slightly less than the design full supply level. This temporary measure was introduced to support precautionary monitoring and investigation of a section of the dam embankment.
- 21 This did not occur on 20 February 2015 given there were cyclonic winds in the area. No criticism can be made of the operators for deciding that it was unsafe to manually operate the gates under these conditions. As a result, all water releases occurred automatically and in accordance with design.

#### *Communications with Local Disaster Management Group and downstream residents*

- 22 SunWater was in constant contact with the Local Disaster Management Group throughout the event. As to this:
- (a) SunWater had 13 separate communications with the Local Disaster Management Group between 17:08 and 23:41 on 20 February 2015.
  - (b) Before any water was released from Callide Dam, SunWater informed the Local Disaster Management Group that automatic release of water was imminent. Earlier communications from SunWater to the Local Disaster Management Group specifically alerted to the possibility of releases within hours.
- 23 SunWater also notified the residents referred to in the Emergency Action Plan by SMS sent at 20:39 on 20 February 2015 that flooding was expected and there were "*rapid rises*". Follow up phone calls were made to those residents listed in the Emergency Action Plan between 20:39 and 21:02. A further SMS was sent at 22:37 advising of "*Flood Stage 4*".
- 24 Whilst it might be argued that the notice given to residents of the releases was short, this was merely a function of the intensity of the rainfall and the unprecedented rate of rise in the dam, and not as a result of any delay or fault on the part of SunWater. To put the matter in perspective, at 18:00 on 20 February 2015 the storage level was 214.46m, a rise of only 0.17m from the morning. By 20:15, the storage level was 215.92m and was rising at the unprecedented rate of 1.6m per hour.

#### *Downstream impacts*

- 25 Since the 2015 Flood Event there have been questions raised about the extent to which releases from Callide Dam impacted on downstream communities. SunWater has undertaken preliminary modelling to investigate these impacts.
- 26 The following conclusions can be drawn from the modelling in relation to the impacts at Goovigen, Jambin and Biloela:
- (a) There is no doubt that even though Callide Dam is not a flood mitigation dam it nevertheless attenuated the peak of the flood.
  - (b) Downstream flooding impacts were substantially caused by waters emanating from locations other than Callide Dam, with major flood levels experienced at Goovigen and Jambin before any of the peak discharges from Callide Dam arrived at those locations.
  - (c) When the peak discharges from Callide Dam arrived at Goovigen and Jambin, the result was to create a minor increase in flood levels at those locations, which were already experiencing major flood levels.

- (d) Modelling confirms that peak flood levels around Biloela in this flood event were caused by discharges from the Kroombit Creek catchment and the discharge from Callide Dam made less than an estimated 1cm difference to the flood peak in the immediate vicinity of Biloela.
- (e) Even if Callide Dam had commenced the flood event at the fixed spillway crest level (being 41% of the design full supply level), which was not permitted, the modelled reduction in flood levels at Goovigen and Jambin are minor (260mm and 130mm respectively) compared to the size of the flood that was experienced.

## **C SunWater and Callide Dam**

### **C1 Preliminary**

27 SunWater is a government owned corporation.

28 SunWater owns and operates 22 water supply schemes. All are bulk water supply schemes that supply untreated water for irrigation, mining, power generation, groundwater replenishment and stock watering.

29 As a part of this, SunWater owns and operates a large number of referable dams, one of which is Callide Dam. Details of the physical characteristics of Callide Dam are contained in Section 3.3 of the Background Briefing Paper.

30 SunWater has a world class and comprehensive dam safety management program. Details of this program and the independent review of it by Len McDonald, Past Chair of ANCOLD, are included in Section 3.2 of the Background Briefing Paper.

### **C2 Role of SunWater in the emergency framework**

31 When conducting the review, it is necessary for the IGEM to understand the important, but limited, role that SunWater has in emergency management.

32 A summary of the roles and responsibilities in Queensland's tiered disaster management arrangements is set out in Section 2 of the Background Briefing Paper. SunWater also notes that the Queensland Floods Commission of Inquiry Interim Report examined the roles and responsibilities of the various agencies (see, in particular, Chapters 3 and 4 of the Interim Report).

33 By way of summary, during flood event emergencies:

- (a) SunWater's role is to:
  - (i) monitor inflows to the dam and provide notifications of outflows to a limited number of stakeholders in accordance with the Emergency Action Plan – this is addressed further below;
  - (ii) pass water inflows through the dam's spillway or outlet works in accordance with the operational procedures for the dam.
- (b) It is not SunWater's role to provide flood warnings. This is the role of:
  - (i) the Bureau of Meteorology in respect of riverine or non-flash flooding;
  - (ii) Councils in respect of flash flooding (being flooding arising less than 6 hours after the rain).
- (c) It is not SunWater's role to translate flood predictions into the likely impact on local communities in terms of inundation of properties. That is the role of Councils.
- (d) Except in a very limited case (discussed below), it is not SunWater's role to warn the local community. Generally, that is a role for Councils. Following the Queensland Floods Commission of Inquiry, changes were made to the legislative regime<sup>1</sup> to make dam operators such as SunWater responsible for providing a very limited number of warnings – namely, to those people who live immediately downstream of dams where there is insufficient time for the Local Disaster Management Group to process the information and issue the warning. Accordingly, Emergency Action Plans now contain references to specific individuals who live in close proximity to the dam who will be warned directly by the dam operator. The content of the warning is limited to the timing

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<sup>1</sup> The changes were incorporated into Chapter 4, Part 1, Division 2A of the *Water Supply (Safety and Reliability) Act 2008*.

and volume of outflow from the dam. As the Queensland Floods Commission of Inquiry made clear:<sup>2</sup>

- (i) it is not the dam operator's responsibility to predict river heights or inundation areas; and
- (ii) downstream residents have a responsibility to apprise themselves of how outflows from a dam will affect their property.

34 Accordingly, it should be acknowledged that SunWater's only relevant obligation when dealing with the 2015 Flood Event, insofar as it is relevant to the disaster management framework, was to comply with the Emergency Action Plan. The Emergency Action Plan's role in the overall regulatory framework applicable to SunWater is addressed in the Section C3 below.

### **C3 Regulatory framework governing SunWater's operations**

35 The regulatory framework governing dam operations is complex.

36 A summary of the relevant regulatory framework is set out in Sections 3.1 and 3.2 of the Background Briefing Paper. The following key observations can be made.

#### *ROP limitations on water releases*

37 SunWater holds a Resource Operations Licence (**ROL**) authorising interference with the flow of water in the Callide Valley Water Supply Scheme as detailed in Chapters 4 and 8 of the Fitzroy Basin Resources Operations Plan (**ROP**).<sup>3</sup> SunWater's ROL is **Appendix B**.

38 The ROL applies to the water infrastructure detailed in Attachment 12, Part 5 of the ROP, which includes Callide Dam.

39 It is an offence to contravene a condition of a ROL.<sup>4</sup>

40 The conditions of SunWater's ROL (condition 1) oblige SunWater to comply with the operating requirements and supply arrangements set out in the ROP. The ROP is a statutory instrument issued under the Water Act. The ROP is **Appendix C**.

41 The operating rules and water sharing rules for Callide Dam (being the operating requirements referred to in the preceding paragraph) are contained in Chapter 8 Parts 1 and 2 of the ROP.

42 In line with these requirements, SunWater must not release water from Callide Dam other than for groundwater recharge or the supply of water for stock and domestic purposes and in accordance with an approved release strategy.

43 Importantly, the release of water by SunWater, in advance of a flood event, to provide capacity in the dam for a future flood, is not permitted. If SunWater did so, it would commit an offence (because, for the reasons set out above, it would have contravened the ROL).

44 There are logical reasons why this prohibition exists. Callide Dam is a water supply dam. It is not a flood mitigation dam. Callide Dam supplies water to the Callide power stations. It also supplies irrigation customers (through recharging groundwater) and the township of Biloela. The operating rules are designed to ensure that water is preserved for these valuable purposes and not discharged because there is the possibility of rain.

45 It is also important to note that the ability of the Minister to declare a temporary full supply level to mitigate against floods only relates to dams for which an approved flood mitigation manual is in force. This does not apply to Callide Dam. Accordingly, the statutory regime for temporarily lowering full supply levels in Chapter 4 Part 3 of the *Water Supply (Safety & Reliability) Act 2008* does not apply to Callide Dam.<sup>5</sup>

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<sup>2</sup> Queensland Floods Commission of Inquiry Interim Report, page 138.

<sup>3</sup> The ROL is held under the Water Act.

<sup>4</sup> Section 875 of the Water Act

<sup>5</sup> See section 389.

*Compliance with Dam Safety Conditions*

- 46 Under the *Water Supply (Safety & Reliability) Act 2008*:
- (a) The Chief Executive can apply dam safety conditions to a referable dam such as Callide Dam.<sup>6</sup>
  - (b) It is an offence for the owner of a referable dam to which a safety condition applies to contravene the condition.<sup>7</sup>
- 47 The Dam Safety Conditions for Callide Dam are **Appendix D**.
- 48 Relevantly, the Dam Safety Conditions require:
- (a) That the dam be operated and maintained in accordance with the detailed operating and maintenance manuals prepared in accordance with the Queensland Dam Safety Management Guidelines (condition DS8);
  - (b) That the dam be operated in accordance with specific standard operating procedures (condition DS7);
  - (c) That in all emergencies the dam be operated in accordance with the Emergency Action Plan for the dam (condition DS13).
- 49 Consistently with these requirements (and as explained further below), SunWater has:
- (a) an operations and maintenance manual for Callide Dam, which includes at Appendix A of manual, the procedures to be followed during flood events;
  - (b) standing operating procedures;
  - (c) an Emergency Action Plan.

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<sup>6</sup> Section 353.

<sup>7</sup> Section 356A.

## D 2015 Flood Event

### D1 Preparedness

50 SunWater was well prepared to carry out operations at Callide Dam.

51 Four matters should be mentioned.

52 *First*, Callide Dam experienced the flood of record in 2013. Following that event, the Department of Energy and Water Supply engaged an independent expert (Water Solutions) to undertake a review of the dam operations during the event.

53 The report contained a series of recommendations to be addressed by SunWater, the Department and the Local Disaster Management Group.

54 SunWater fully considered each recommendation which related to it and accepted most of them.

55 Where SunWater accepted the recommendations, they were implemented by SunWater in advance of the 2015 Flood Event or, in a limited number of cases, implementation is ongoing.

56 As to this, SunWater directs the IGEM to **Appendix E**, which is a summary of each recommendation relating to SunWater in the independent review and SunWater's response to that recommendation. SunWater would be happy to provide further detail if required.

57 *Secondly*, as is standard procedure for it, SunWater conducted its own "lessons learnt" from the 2013 flood. That process led to (amongst other things) further refinements to the Emergency Action Plan and operations and maintenance manual (see further below).

58 It is noted that after the 2015 Flood Event some questions have been asked whether SunWater learnt anything from the 2013 flood event. The above analysis demonstrates that SunWater did implement learnings from the 2013 flood event.

59 *Thirdly*, as is standard procedure for it, SunWater conducted extensive wet season preparation. **Appendix F** is the summer preparedness paper submitted to the Executive Management Committee in September 2014 summarising the preparatory steps SunWater had undertaken. Further detail on the specific training that had been undertaken is included in Section 2.5 of the Background Briefing Paper.

60 *Fourthly*, the Emergency Action Plan had been reviewed and consultation with the Local Disaster Management Group had been undertaken. Details of this are contained in Section 6 of the Background Briefing Paper. Importantly:

- (a) The Emergency Action Plan was updated after the 2013 flood event, and it incorporated the learnings from that event.
- (b) Consultation with the Local Disaster Management Group occurred before the Emergency Action Plan was submitted for approval.
- (c) The Chief Executive of the Department approved the Callide Emergency Action Plan (Version 3E) on 29 May 2014.
- (d) SunWater gave further consideration to the Emergency Action Plan in December 2014 and submitted an updated version (Version 3F) with minor amendments to the Chief Executive on 11 February 2015.
- (e) SunWater met with staff of the Local Disaster Management Group on 2 February 2015 to discuss the Emergency Action Plans for dams in the area including Callide Dam.

- (f) In preparation for the arrival of Tropical Cyclone Marcia, SunWater gave further consideration to the Emergency Action Plan and submitted a further updated version (Version 3G) with minor amendments to the Chief Executive on 19 February 2015. The changes from the approved version of the Emergency Action Plan to Version 3G were minor.
- (g) From the time the Local Disaster Management Group activated to ALERT level on 18 February 2015, SunWater was in contact with the Local Disaster Management Group.

## **D2 2015 Flood Event details**

61 Section 4 of the Background Briefing Paper contains a comprehensive analysis of the 2015 Flood Event and SunWater's management of its assets and responsibilities.

62 Whilst the entirety of that material is relied on by SunWater, the following points should be noted.

### *Pre-event*

63 SunWater was in close contact with the Local Disaster Management Group from 18 February 2015, two days before the flood event.

64 SunWater participated in three Local Disaster Management Group meetings held on 20 February 2015.

65 At the commencement of the event, the dam was at 84% of the design full supply level.

66 The Bureau of Meteorology forecast rainfall for the Callide Creek catchment for 20 February 2015 predicted 100-150 millimetres for the 24 hour period.

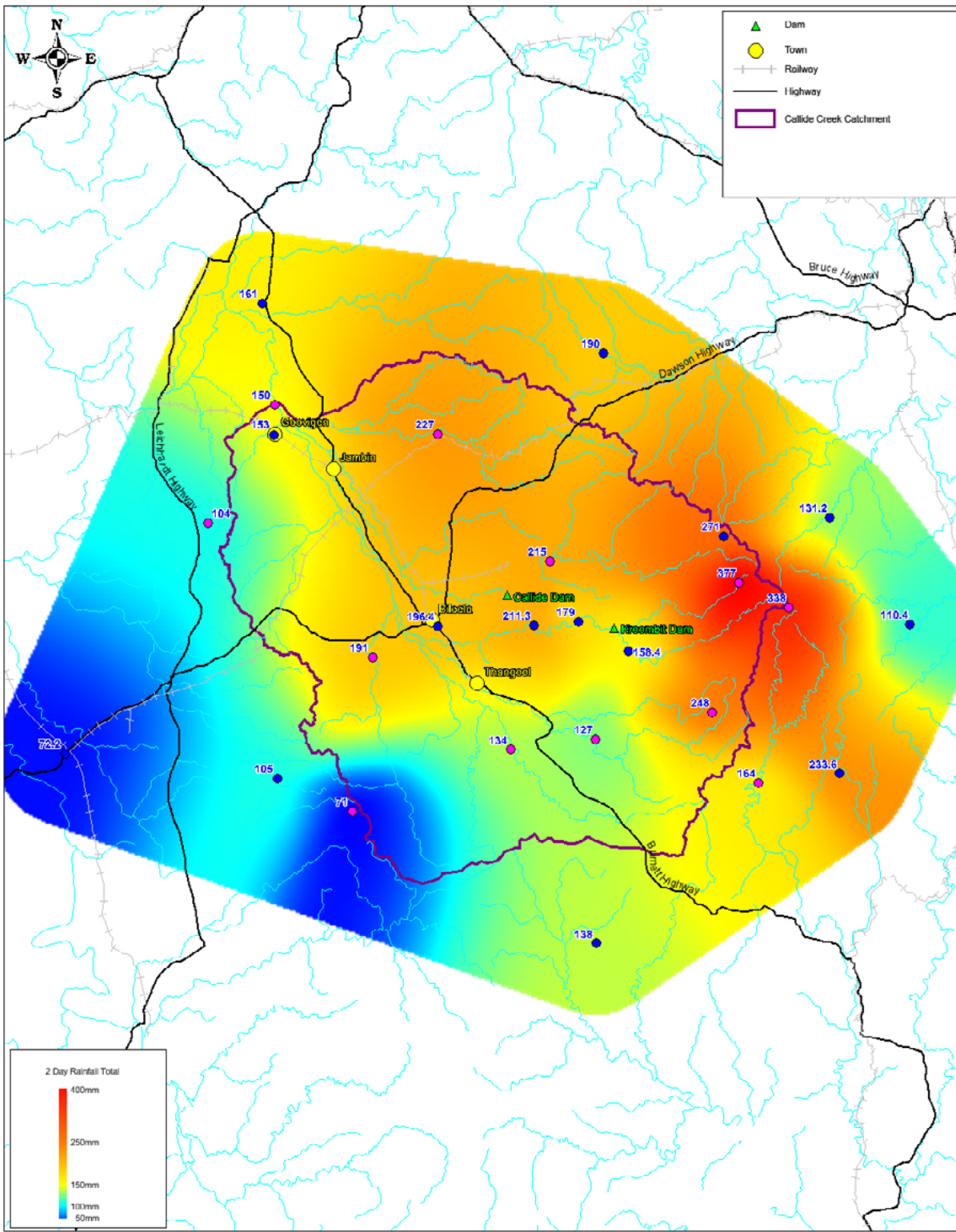
67 The Bureau of Meteorology forecast did not include (as is customary) a prediction of either the intensity or the spatial and temporal distribution of the forecast rainfall. Accordingly, it was not possible in advance of the rainfall to reliably predict the likely run-off from the forecast rainfall. Indeed, there were infinite permutations, ranging from minor run-off that would not fill the dam to a significant flood event.

### *Intense rainfall in a short period*

68 SunWater has conducted a preliminary analysis of the rainfall event. The comments below are based on this analysis.

69 Tropical Cyclone Marcia moved in a southerly direction with extreme rainfall along the Calliope Range and the eastern side of the Callide Valley, moving over Bell Creek and Goovigen first and passing the southern catchment boundary by about 21:00 on 20 February 2015.

70 **Figure 1** shows the rainfall distribution of 48 hour rainfall totals from 9am on the 19 February 2015 to 9am on 21 February 2015.



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0 10 20  
 Scale in Kilometres (1:500,000 @ A0)

Map Projection: Universal Transverse Mercator  
 Horizontal Datum: Geocentric Datum of Australia 1994 (GDA94)  
 Vertical Datum: Australia Height Datum  
 Grid: Map Grid of Australia, Zone 50

Callide Dam February 2015 Event

Figure 3.2

February 2015 Event Rainfall Totals  
 9am 20th Feb - 9am 21st Feb 2015

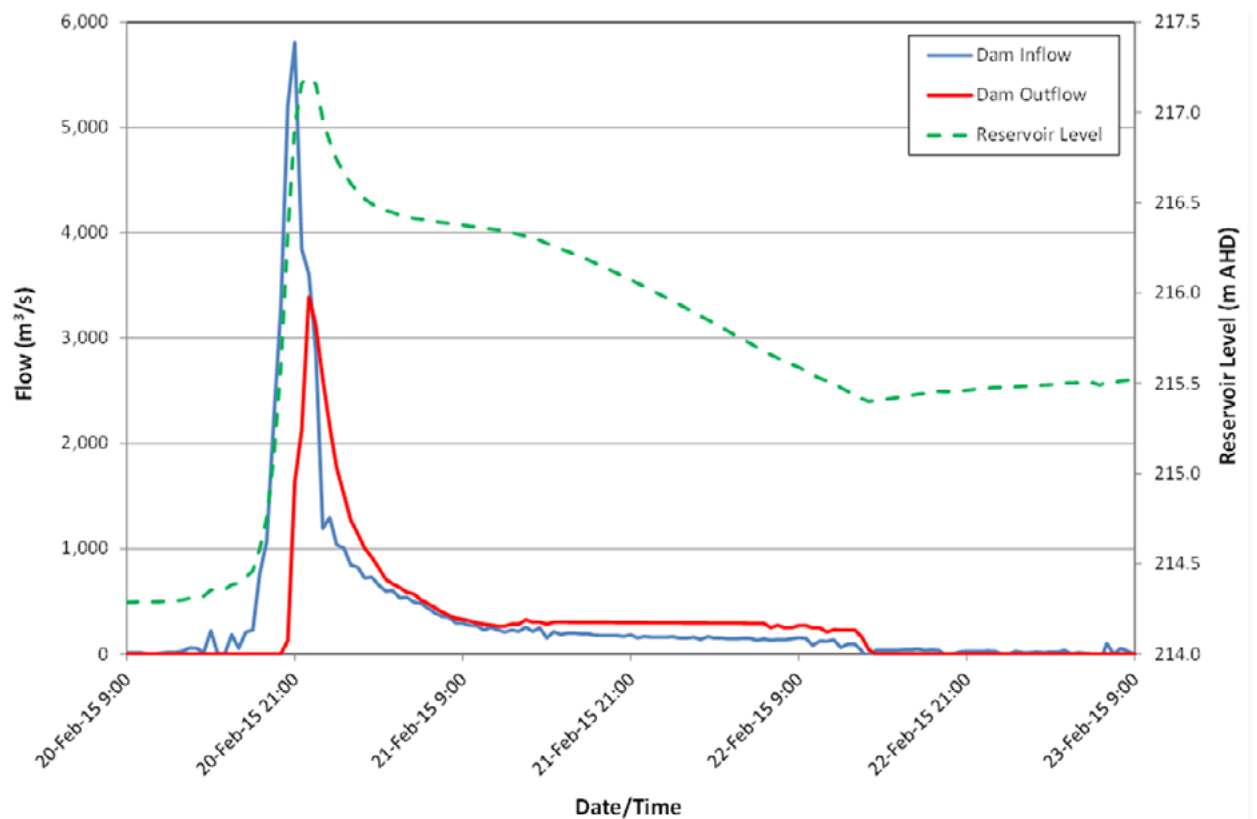
Job Number: M3400\_005  
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 Drawn: EG  
 Date: 02 April 2015

**Figure 1 Rainfall Distribution February 2015**

71 The following points are evident from **Figure 1**.



- 72 The first catchment to receive rainfall in the catchment upstream of Goovigen was Bell Creek catchment where rainfall commenced during the afternoon and was at its most intense between 16:00 and 17:00 as measured at Craiglunds gauging station. Gerard, Smoky and Back Creek catchments (all ungauged) responded and record flood levels were recorded at Craiglunds along Bell Creek. A height of 8.45m was recorded at 20:48 on 20 February 2015.
- 73 As Tropical Cyclone Marcia moved south, catchments responded in turn with inflows from other tributaries such as Oaky Creek, discharging from the Gully Trap Mine vicinity.
- 74 The catchment above Callide Dam received 48 hour rainfall totals of between 200 mm and 350 mm, although much of this fell between 16:00 and 21:00 on 20 February 2015. The depth and intensity of this rainfall was not specifically forecast for the catchment.
- 75 With such intense rainfall in such a short period, the river height station '96k' was inundated by Callide Creek floodwaters and was unable to record the peak flood level. Flood marks inside the hut indicate a peak gauge height of 11.18m (depth) was reached.
- 76 Analysis of the reservoir level and gate opening monitoring data for Callide Dam indicates that a peak inflow to Callide Dam of approximately 5,800 m<sup>3</sup>/s occurred at around 21:00 pm on 20<sup>th</sup> February 2015. Significant attenuation of the flood through the dam resulted in a peak discharge from the dam of around 3,400m<sup>3</sup>/s at 22:00 on 20<sup>th</sup> February 2015. This is evident from **Figure 2**, which demonstrates the estimated inflows and outflows from Callide Dam.



**Figure 2 Estimated Inflows and Outflows – Callide Dam 2015**

77 As Tropical Cyclone Marcia moved south, the Kroombit, Kariboe and Grevillia catchments reached record levels with peaks as shown in **Table 1**. The rainfall in Kroombit Creek catchment was at its most intense at the Kroombit Tops DNRM gauge with 173mm of rain recorded in the 3 hours from 17:30 to 20:30.

Location	Gauge Height (m)	Time
Bell Creek at Craiglands	8.45 (R)	20:48 on 20 February 2015
Callide Dam	217.19 (R)	22:00 on 20 February 2015
Kroombit Dam	268.36 (R)	22:00 on 20 February 2015
South Kariboe Creek at Pump Station	8.66 (R)	23:10 on 20 February 2015
Grevillea Creek at Folding Hills	6.577(R)	02:00 on 21 February 2015
Prospect Creek at Red Hill	5.285	03:00 on 21 February 2015
Goovigen at Goovigen gauging Station	2 peaks – 10.73(1st peak) 10.99 (2 <sup>nd</sup> peak)	06:00 on 21 February 2015 18:30 on 21 February 2015

**Table 1 Recorded Flood heights in the Callide Valley (R) Record Flood Height**

78 Australian Rainfall and Runoff intensity frequency duration curves sourced from the Bureau of Meteorology website confirm the rare and intense nature of the rainfall at elevated locations in the Callide Valley. Within the Kroombit Dam catchment, this was approaching 1 in 1,000 year AEP. Over 6 hours from 14:00 to 20:00, the total rainfall at the Kroombit Tops DNRM gauge was 251mm.

#### *Dam operations*

79 Under the Emergency Action Plan and operations and maintenance manual for the dam, SunWater is to manually operate the gates when the dam reaches 215.5m,<sup>8</sup> provided it is safe to do so.

80 This was not done on 20 February 2015 given Tropical Cyclone Marcia was tracking close to the dam and there were cyclonic winds in the area.

81 No criticism can be made of the operators for deciding that it was unsafe to manually operate the gates.

82 As a result, all water releases occurred automatically and as designed.

#### *Close communication with Local Disaster Management Group*

83 Once the event commenced, SunWater was in constant contact with the Local Disaster Management Group in accordance with the Emergency Action Plan.

84 As to this:

- (a) SunWater had 13 separate communications with the Local Disaster Management Group between 17:08 and 23:41 on 20 February 2015.
- (b) Before any water was released from Callide Dam, SunWater informed the Local Disaster Management Group that automatic release of water was imminent. This communication occurred at 20:18. Earlier communications from SunWater to the

<sup>8</sup> In the approved Emergency Action Plan this is stated as 215.10m. This was one of the changes submitted to the Dam Safety Regulator in Versions 3F and 3G submitted in accordance with Section 352Q of the Act.

Local Disaster Management Group at 19:03 and 19:52 specifically adverted to the possibility of releases within hours.

- (c) Whilst it might be argued that the notice of imminent releases was short, this was through no fault of SunWater. It was a function of the intensity of the rainfall and the unprecedented rate of rise in the dam. In this regard, at 18:00 the storage level was 214.46m, a rise of only 0.17m from the morning. By 20:15, the storage level was 215.92m and was rising at the unprecedented rate of 1.6m per hour.

*Notification to immediately downstream residents*

- 85 SunWater notified the residents referred to in the Emergency Action Plan by SMS sent at 20:39 that flooding was expected and there were "*rapid rises*". Follow up phone calls were made to those residents listed in the EAP between 20:39 and 21:02.
- 86 A further SMS was sent at 22:37 advising of "*Flood Stage 4*".
- 87 Again, whilst it might be argued that the notice given to residents of the releases was short, this was merely a function of the intensity of the rainfall and the unprecedented rate of rise in the dam, and not as a result of any delay or fault on the part of SunWater.

*Downstream impacts*

- 88 Since the 2015 Flood Event there have been questions raised about the extent to which releases from Callide Dam impacted on downstream communities.
- 89 SunWater has undertaken preliminary modelling to investigate these impacts.
- 90 A number of points should be made.
- 91 *First*, there is no doubt Callide Dam attenuated the flood. As shown in **Figure 2**, the existence and operation of Callide Dam resulted in a substantial reduction in the peak flow at that location.
- 92 *Secondly*, the rainfall was catchment wide. It would be wrong to conclude that floodwaters emanating from upstream of Callide Dam were the major contributors to flood volumes downstream. This is demonstrated in **Table 2**. As is evident, of the estimated 400GL flood inflow volume from the catchment to Goovigen, only 21% emanated from upstream of Callide Dam.

Waterway / Location	Flood Inflow Volume (GL) to Goovigen	% of Flood Inflow Volume to Goovigen
Kroombit Dam	49	12%
Kariboe Creek at Thangool	35	9%
Grevillea Creek at Thangool	22	6%
Callide Dam	82	21%
Other inflows	134	32%
<b>Total Flow to Jambin</b>	<b>322</b>	<b>(80%)</b>
Bell Creek / Gerard Creek catchment	78	20%
<b>Total Flow to Goovigen</b>	<b>400</b>	<b>(100%)</b>

**Table 2 Estimated Contributions to Flood Inflow Volumes**

93 *Thirdly*, when analysing downstream impacts, it is very important to bear in mind the timing of the releases from Callide Dam and the travel time for peak flows to downstream locations. As indicated in the Emergency Action Plan and modelling of the 2015 event, travel time to Goovigen is not less than 19 hours and travel time to Jambin is not less than 12 hours.

94 The following comments can be made about the impacts at Goovigen, Jambin and Biloela.

Goovigen

95 Goovigen was impacted by discharge from the Bell Creek early on 21 February 2015 with an initial peak level of 10.73m at 6:00am on 21 February 2015. This is confirmed by modelling and given the time of the peaks observed elsewhere is the only explanation for the first peak observed at Goovigen.

96 Water levels then steadied prior to a second peak arriving from upstream areas composed of discharge from the Callide, Kroombit, Grevillea and Kariboe Creek catchments.

97 The second peak was observed at Goovigen around 18:30 on 21 February 2015 about 20 hours after peak discharges from Callide and Kroombit Dams.

98 The combination of Kroombit Creek discharge, combining with Kariboe and Grevillea Creek catchment discharges exceeds the discharge and volume from Callide Dam and so the timing of the second peak is largely driven by this discharge, albeit with a significant contribution from Callide Dam.

99 Goovigen was already experiencing major flood levels (classified by the Bureau of Meteorology as greater than 10.5 metres) by 03:30 on 21 February 2015.

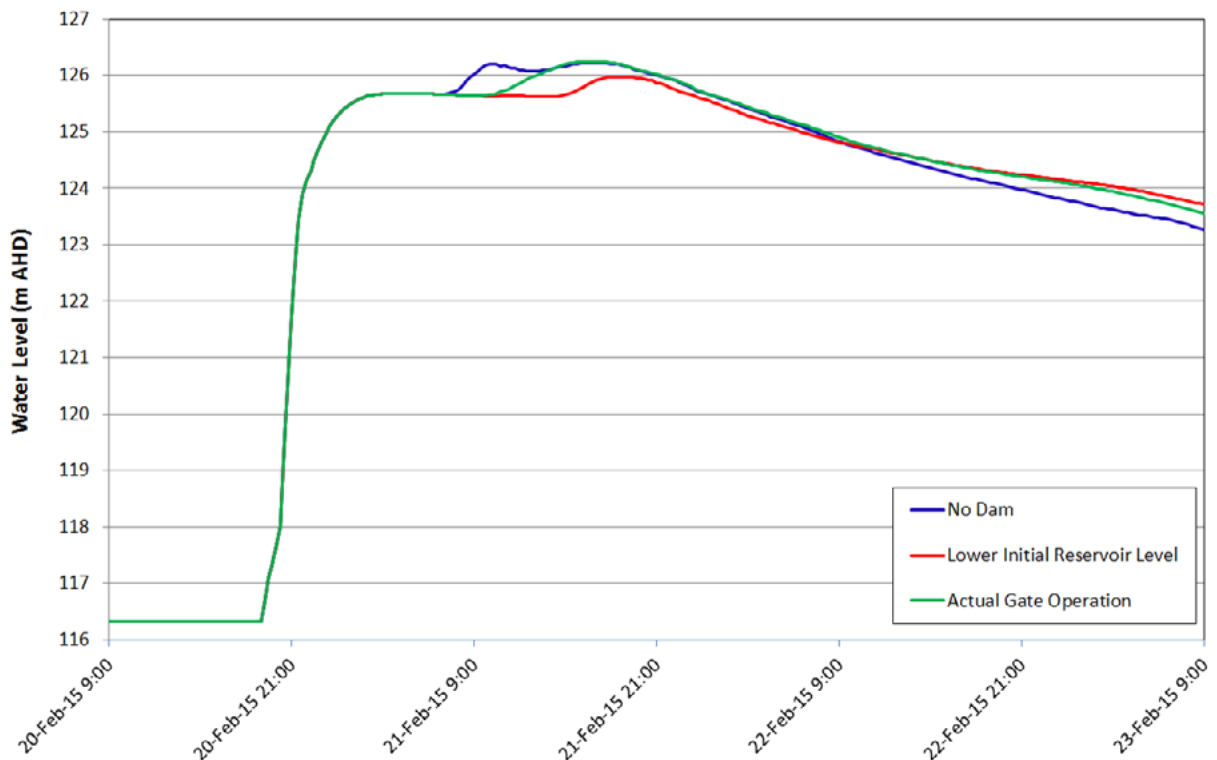
100 It is not possible for any discharge from Callide Dam to have reached Goovigen only 5.5 hours after peak discharge. Accordingly, the major flooding experienced in Goovigen in the early hours of 21 February 2015 was not contributed to by releases from Callide Dam. As noted above, Goovigen had already experienced major flood levels by this time.

101 **Figure 3** shows modelling for the event at Goovigen township for 3 scenarios:

- (a) as happened;
- (b) with no dam at all; and

(c) assuming a lower lake starting level of fixed spillway crest, being 41% of the design full supply level.

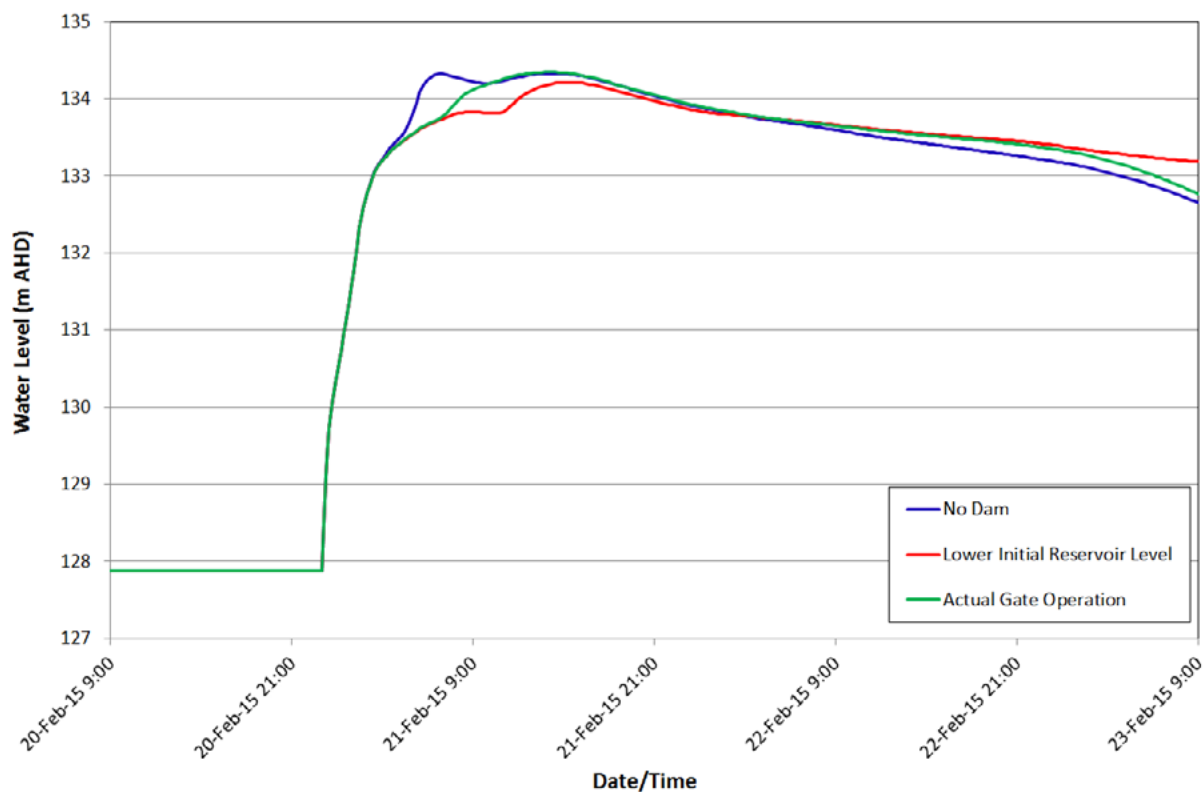
- 102 The actual and lowered scenarios are almost identical until about 10am on 21 February 2015 confirming that flood levels at Goovigen to this point in time were unaffected by water from Callide Dam catchment.
- 103 If the dam commenced the flood event at the fixed spillway crest level (which was not permitted, as explained above), the maximum benefit at Goovigen would have been a lowering of the second flood peak at Goovigen of around 250mm.
- 104 If the dam had not been in place at all, the event at Goovigen would have been a triple-peaked event with an additional peak at 10:00 on 21 February 2015 as discharge from Callide Dam arrived.



**Figure 3 – Flood levels at Goovigen Township for three scenarios**

### Jambin

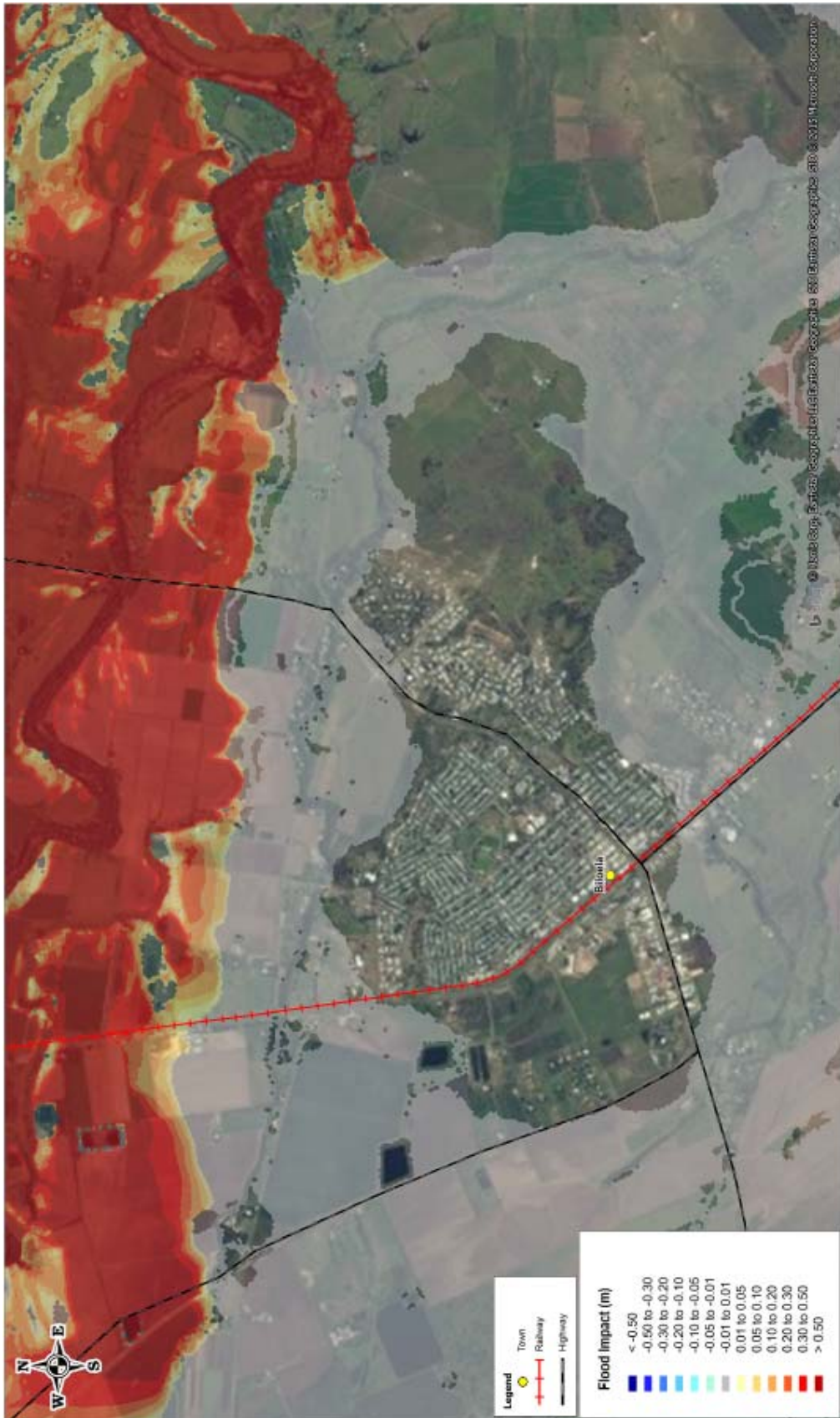
- 105 As no gauge exists at Jambin, modelling was used to estimate flood heights.
- 106 Rising flood levels at Jambin were initially caused by local tributaries and inflows such as Oaky Creek. The initial and rapid rise from local tributaries occurred well prior to water arriving from the Callide, Kroombit, Kariboe and Grevillea Creek systems.
- 107 The no dam scenario, also shown in **Figure 4**, indicates that significant benefit was provided at Jambin in terms of flood attenuation.
- 108 If the dam commenced the flood event at the fixed spillway crest level (which was not permitted, as explained above), the maximum benefit at Jambin would have been a lowering of the flood peak by about 130mm.



**Figure 4 – Flood levels at Jambin for three scenarios**

Biloela

- 109 Modelling confirms that peak flood levels around Biloela in this flood event were caused by discharges from the Kroombit Creek catchment and that Washpool Gully on the eastern side of Biloela was flowing south to north at the peak of this event. This is evidenced by on-site debris.
- 110 **Figure 5** shows the difference in modelled flood levels around Biloela between what actually occurred and what would have happened in the hypothetical scenario if the dam had been drained down to a level of the fixed spillway crest prior to the onset of rain. The red area indicates the area that would have experienced lower peak flood levels under this hypothetical scenario.
- 111 The grey area shows where there was no difference in peak flood levels between what actually occurred and the hypothetical scenario. This means that the peak flood levels around Biloela were not attributable to flows from Callide Dam but rather were attributable to Kroombit Creek.
- 112 In summary, peak flood levels in the vicinity of Biloela during the February 2015 flood event were a result of Kroombit Creek discharges and the discharge from Callide Dam made negligible (less than 1cm) difference to the flood peak in the immediate vicinity of Biloela.



**Figure 5**  
**Callide Dam February 2015 Event**  
**Predicted February 2015 Flood Impacts**  
**Actual Operation vs Lower IWL Dam**

Job Number: M3400\_005  
 Revision: 0  
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## Modelling Conclusions

- 113 As a result, the following conclusions can be drawn from the modelling in relation to the impacts at Goovigen, Jambin and Biloela:
- (a) There is no doubt Callide Dam attenuated the flood.
  - (b) Downstream impacts were substantially caused by waters emanating from locations other than Callide Dam.
  - (c) Major flood levels were experienced at Goovigen and Jambin before any of the peak discharges from Callide Dam arrived at those locations.
  - (d) When the peak discharges from Callide Dam arrived at Goovigen and Jambin, the result was to create a minor increase in flood levels at those locations, which were already experiencing major flood levels.
  - (e) Modelling confirms that peak flood levels around Biloela in this flood event were caused by discharges from the Kroombit Creek catchment and the discharge from the dam made negligible (less than 1cm) difference to the flood peak in the immediate vicinity of Biloela.
  - (f) Even if Callide Dam had commenced the flood event at the fixed spillway crest level (being 41% of the design full supply level), which was not permitted for the reasons outlined above, the modelled reduction in flood levels at Goovigen and Jambin are very minor (250mm and 130mm respectively).

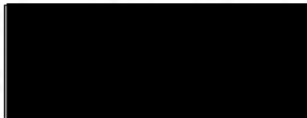


## **E Reducing the Callide Dam level in advance of the 2015 Flood Event**

- 114 There have been suggestions that SunWater should have lowered the level of Callide Dam in advance of the flood event to provide further space in the dam for the impending rainfall event. It appears to be contended that if SunWater did this, downstream flooding might have been avoided.
- 115 The suggestion is misconceived.
- 116 *First*, as indicated in Section C3 of this submission, if SunWater pre-emptively released water as suggested for flood mitigation purposes, SunWater would have committed an offence.
- 117 *Secondly*, even if it was lawful to do so, there was no reasonable justification for discharging large volumes of water in advance of the flood event. As to this:
- (a) The forecast rainfall (100-150 millimetres) was not substantial in terms of the dam's capability. Indeed, depending on the spatial and temporal distribution of the rainfall, the dam may not have even filled with that depth of rainfall (bearing in mind the dam was at 84% at the commencement of the event).
  - (b) In any event, the forecast could not be relied on to discharge water. As explained in Section D2, the Bureau's forecasts are, by their nature, inherently unreliable.
  - (c) Depending on the nature of the flood, the lowering of the level would not necessarily provide any substantial flood mitigation benefits. The modelling discussed above in Section D2 demonstrates this point in the case of the 2015 Flood Event. As indicated, even if Callide Dam had commenced the 2015 Flood Event at the fixed spillway crest level (being 41% of the design full supply level), which was not permitted for the reasons outlined above, the modelled reduction in flood levels at Goovigen and Jambin are very minor (250mm and 130mm respectively).
- 118 *Thirdly*, any decision to release water in the face of an oncoming weather system runs the risk of exacerbating downstream flooding if the rainfall falls downstream of the dam particularly whilst water that has been released from the dam is still within the river system.
- 119 *Fourthly*, the suggestion is made purely with the benefit of hindsight. As explained in Section D2, the actual rainfall received was substantially in excess of the forecast. The intensity of the rainfall was not forecast at all.
- 120 *Fifthly*, as demonstrated in Section D2, lowering the dam level to the fixed crest would not have made any material difference to the flooding impacts at Goovigen, Jambin and Biloela.
- 121 SunWater notes that the IGEM may, as part of the review, consider the impacts and benefits of changing Callide Dam from a purely water supply dam to a dual purpose dam. In SunWater's view, any decision to change the status of the dam should only be made after a comprehensive study is undertaken examining:
- (a) the water supply issues associated with the change; and
  - (b) flood operations across a large number of actual and design floods.



## **APPENDIX A: Callide Dam February 2015 Operations Lessons Learnt**

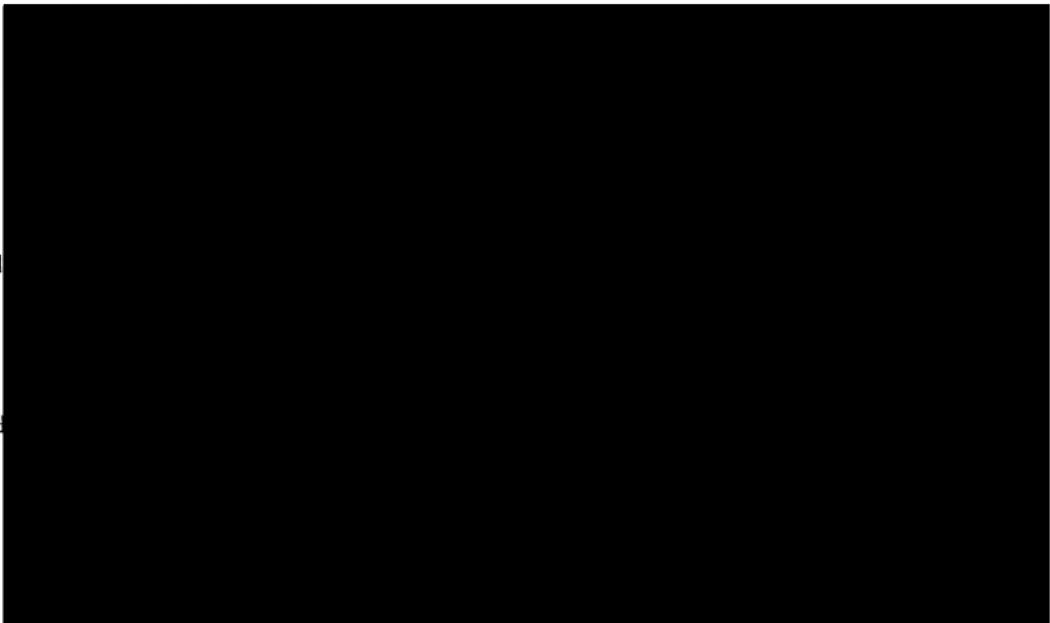


## Callide Dam February 2015 Operations Lessons Learnt

Author:

Reviewed:

Approved:



Date: 10 March 2015

Project: N-WLBC-01-07-01-AE

File No: 15-000598/001

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## 1. Background

### 1.1 Callide Dam Description

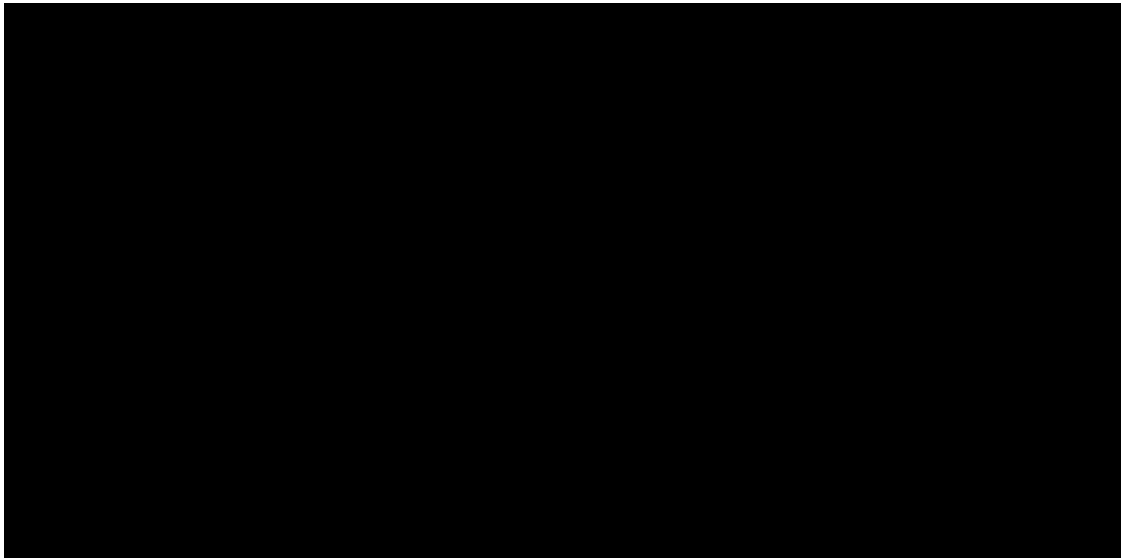
Callide and Kroombit Dams are both in the headwaters of the Callide Valley upstream of the town of Biloela. The dams are managed as part of the one water supply scheme. The major creeks in the Callide Valley Region are the Callide, Kroombit and Kariboe Creeks.

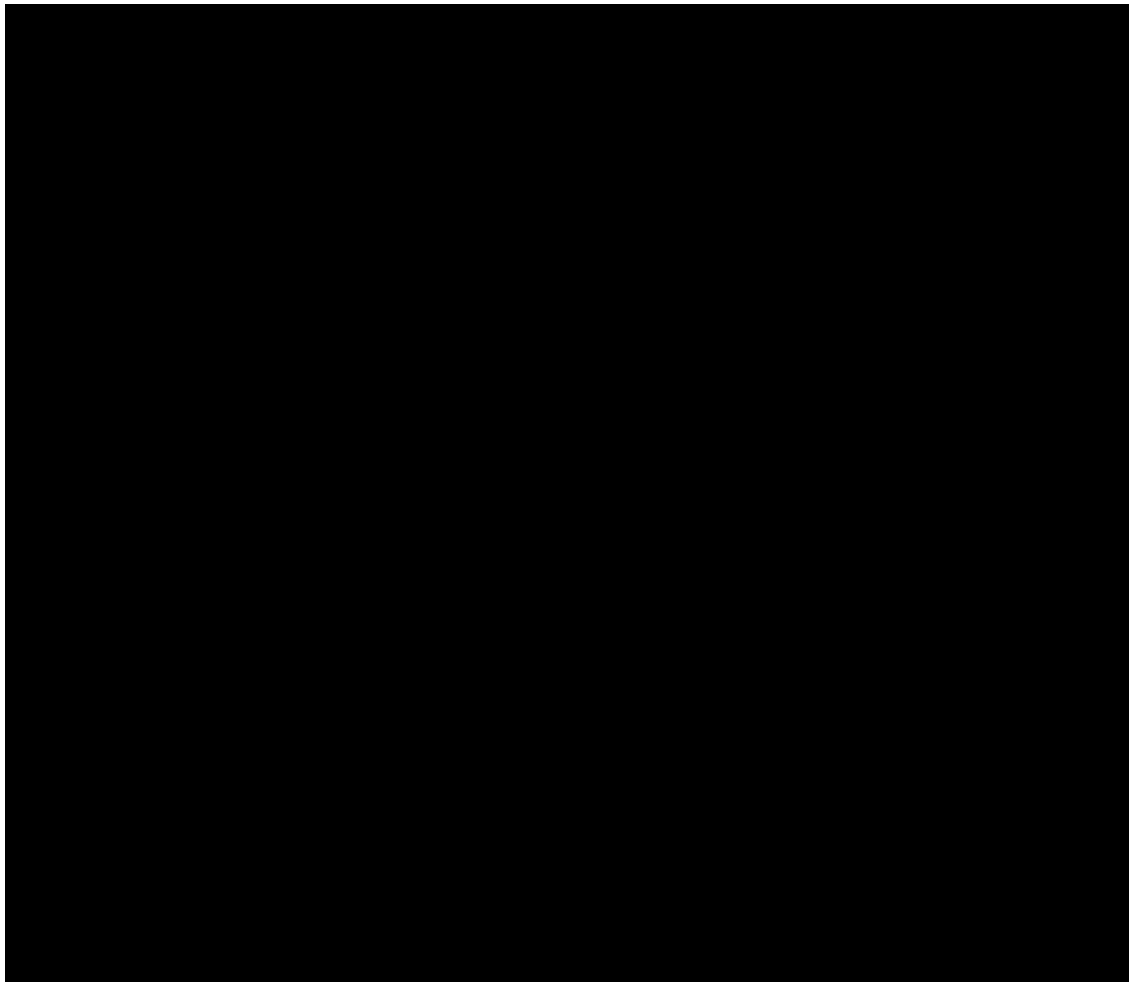
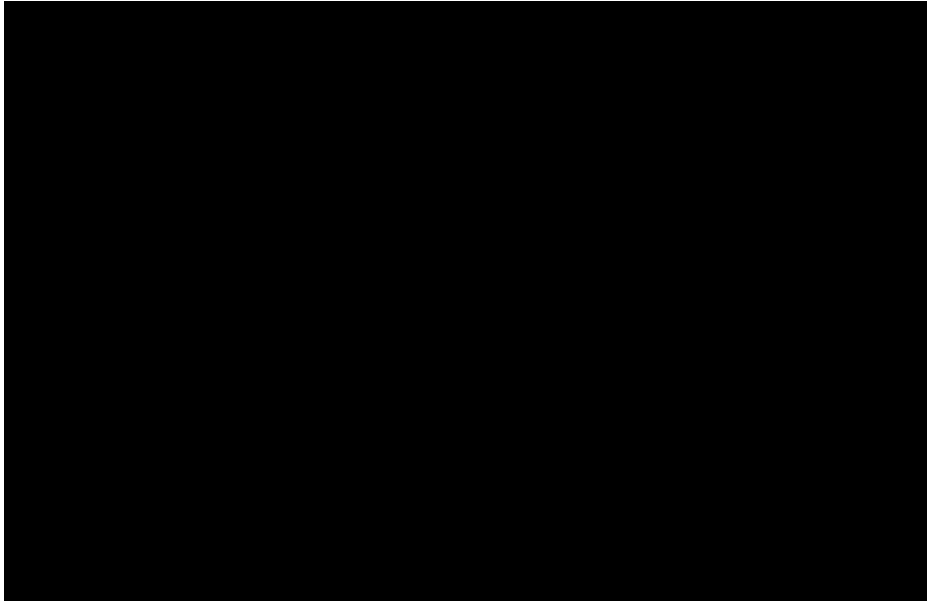
The Callide Valley Water Supply Scheme is centred on the Callide and Kroombit Creeks. The purpose of the scheme is to provide water for the Callide Power Stations, downstream irrigation and town water supplies. Callide Dam is the major headworks of the Callide Valley Water Supply Scheme.

Callide dam is situated on the Callide Creek at AMTD 81.0 km upstream from its junction with the Don River and is approximately 12 km by road east of the town of Biloela.

Callide dam has a catchment area of 516 km<sup>2</sup>. Construction of the rock and earth fill dam with a central spillway was completed in early 1965. The spillway is of concrete ogee crest construction with automatically operated, radial gates. The spillway gates were installed in 1988. The storage capacity at Full Supply Level (FSL), EL 216.10m is 136,300 ML.

### 1.2 Spillway Gates





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Callide\_Dam\_February\_2015\_Flood\_Operat  
ional\_Lessons\_Learnt

Page 2

Callide Dam Emergency Event Report 20-22 February 2015

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### 1.2.1 Callide Dam Statistics

Table 1-1 Callide Dam Details

#### Overview

Dam Name	Callide Dam
Storage Name	Lake Callide
Location	Latitude 24° 25' 38" S
	Longitude 150° 64' 00" E
Regional Council	Banana Shire
Nearest Town with Road Access	Biloela
Stream and AMTD	Callide Creek AMTD 80.1 km
Catchment area	516 km <sup>2</sup>
Average rainfall	683.3 mm

#### Main Dam

Type	Rock and Earthfill
Full Supply Level (FSL)	216.10 m AHD
Storage capacity at FSL	136,300 ML
Storage area at FSL	1,240 ha
Dam Crest Level (DCL)	219.24 m AHD
Maximum height of the dam	37.24 m above foundation
Crest length along axis (main embankment)	2008 m (including spillway)

#### Spillway

Spillway type	Automatically operated, Radial Gate controlled reinforced concrete ogee crest
Spillway crest level	207.57 m AHD
Crest length	79.25 m

#### Outlet Works

Description	<ul style="list-style-type: none"> <li>Concrete Intake Tower</li> </ul>
-------------	---



Outlet Control

- 2/1220 mm diameter concrete lined MS pipes, within a reinforced concrete outlet conduit
- Concrete Valve House
- Callide A Outlet – 2 x 400mm Gate Valves
- Callide Creek Outlet 1 x 600mm Cone Valve & 1 x 300mm Cone Valve
- Kroombit & Kariboe Creek Outlet 1 x 914mm Butterfly Valve
- 2 x 1200mm butterfly Valves to isolate Callide B and Biloela water supply pipes.
- Callide B & C Outlets 2x 850mm pipes
- Biloela Shire Council O/T 2 x 450 Gate Valves

### 1.2.2 Historical Operations

Until January 2011 the gates Callide Dam spillway gates had never been operated during a flood. During January 2011 only the centre pair of gates opened. They opened automatically as expected. The maximum gate opening was approximately 17cm. The peak discharge was only about 20m<sup>3</sup>/s.

Prior to January 2013 the gates had never been operated manually except for the purpose of function testing of the gates and only one gate pair at a time.

In January 2013 the dam experienced its flood of record. Due to a reduced operating level that was in place at the time of the 2013 event, the spillway gates were initially operated manually until the storage level rose and the gates then operated automatically. At the commencement of the January 2013 event the storage was at EL 211.14m or 61%. At this storage level there was 53,000ML of spare capacity to FSL. The estimated peak inflow was 2,411m<sup>3</sup>/s. The storage reached a level of 216.75 and a peak discharge of approximately 2,062m<sup>3</sup>/s

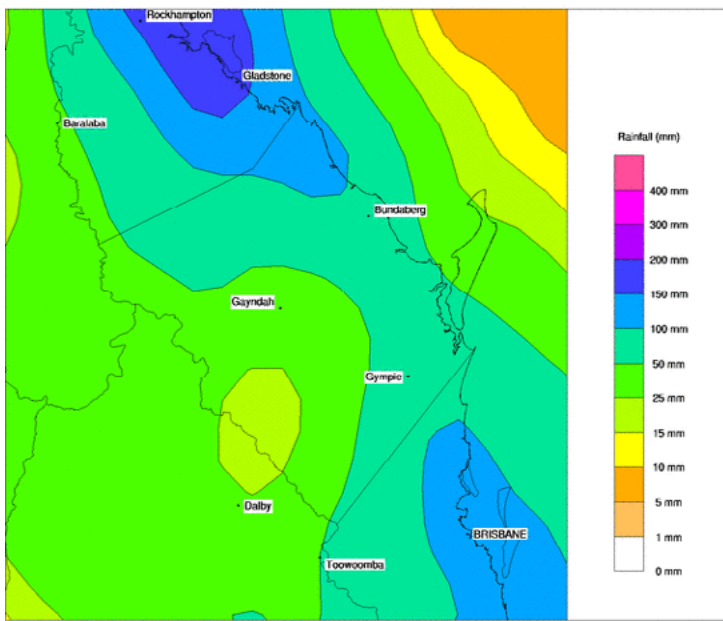
In February 2013 the dam experienced a further flood event. This event was significantly smaller than the January 2013 event. The estimated peak inflow was 1,291m<sup>3</sup>/s. The storage reached a level of 215.54 and a peak discharge of approximately 723m<sup>3</sup>/s

### 1.3 Description of February 2015 Flood Event

On the morning of the 20<sup>th</sup> February 2015 Callide Dam was at 214.29m. This was 1.21m below the reduced maximum operating level of 215.5m. This was a storage volume of 114,900ML or 89% of the reduced operating level storage volume of 129,041ML or 84% of the design full supply volume of 136,300ML.

The Bureau of Meteorology (BoM) was forecasting TC Marcia would cross the coast as a category 5 cyclone north of Yeppoon. The BoM rainfall forecast for the Callide catchment for the 20<sup>th</sup> February was 100mm to 150mm.

Rainfall forecast for 20/02/2015



Throughout Friday 20<sup>th</sup> February SunWater undertook preparation activities and continued to monitor the weather situation.

The Gauging station on Callide Creek at 96km recorded minor amounts of rainfall from about 9am on the 20<sup>th</sup> February. All recordings were less than 10mm per hour until 14:00 hours when the station started to record more significant totals.

The recorded streamflow height at 96km indicated stream flows of less than 10m<sup>3</sup>/s until approximately 16:30 hours on the 20<sup>th</sup> February.

The Callide Dam headwater level recorder indicated small rises in storage from rainfall until approximately 18:00 hours. At 18:00 hours on 20<sup>th</sup> February the storage level was 214.46m. From 18:00 hours the storage rate of rise began to increase. At 20:15 hours the storage was at 215.92m and rising at a rate of 39m per day. This was the peak rate of rise during the event..

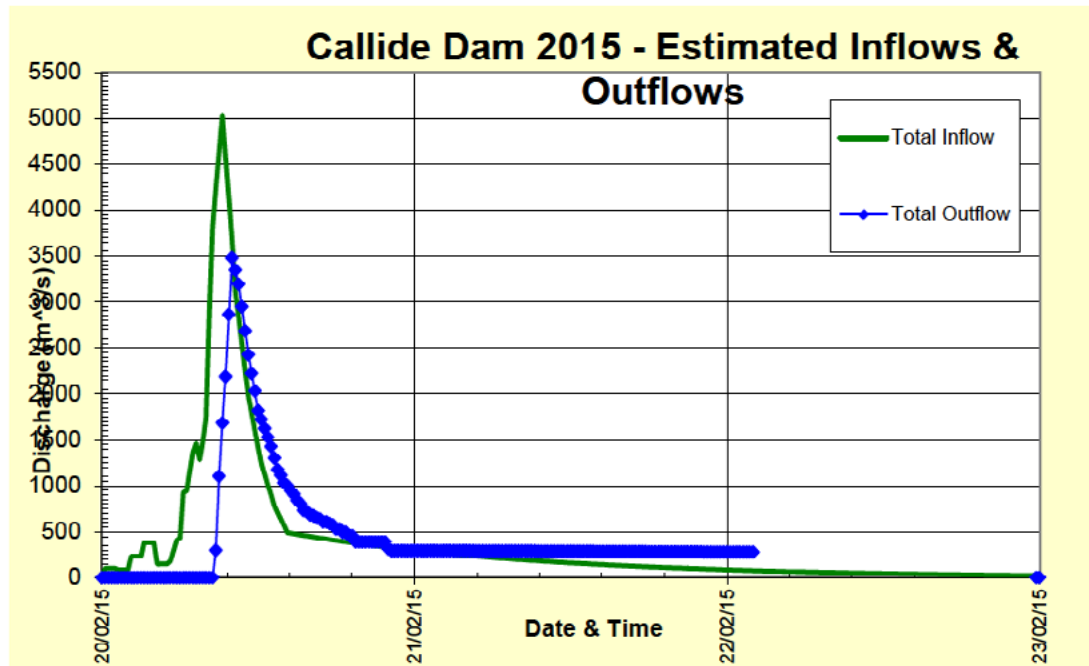
At 19:45 the recorded height at 96km had reached 10.23m and rising. At this time the gauging station ceased recording due to inundation of the instrumentation hut. Later surveys have indicated that the water level peaked at approximately 11.1m. This is some 2.5m higher than the previously recorded record of 8.6m in 2013. The estimated peak inflow was 4,600m<sup>3</sup>/s.

The recorded storage level exceeded the reduced maximum operating level of 215.5m at approximately 20:00 hours on 20<sup>th</sup> February 2015. At this time the Callide Dam EAP contemplated the manual operation of the spillway gates. However due to the close proximity of TC Marcia and cyclonic winds it was assessed as too dangerous for staff to leave the relative safety of the site office.

The Callide Dam tailwater gauge ceased recording shortly after 20:00 hours and gave no indication of a spillway discharge

Staff first confirmed that all 6 spillway gates were open at approximately 21:30. This was the first opportunity for staff to safely undertake surveillance activities. At that time the centre gates were open 4.0m. The outer gate pairs were 3.0m open.

The storage level peaked at 22:00 at a level of 217.19m. This was also the time of maximum gate opening with the centre gates 7.0m open and outer gates 6.0m open. The estimated peak discharge was 3,480m<sup>3</sup>/s.



After the peak of the event, flows receded rapidly with the gates progressively closing automatically. The outer gates were closed at about 10:00 on the 21<sup>st</sup> February. From that point the spillway gate test pump was used to maintain the centre gates open at approximately 1.0m as per the EAP and O&M Manual. This resulted in a progressive drain down of the storage to the target maximum operation level of 215.5m. The target level was achieved at about 11:45 on 22<sup>nd</sup> February. The centre gates were kept open until 14:00 on 22<sup>nd</sup> February in order to create air space to allow for expected base flows from Callide Creek.

## 2. Lessons Learnt

SunWater undertook an Operational Lessons Learnt Workshop to review the Callide Dam Flood of Record on 20 February 2015.

Workshop Conducted on: 10 March 2015

Location: Callide Dam Depot

Attendees and role during event:

██████████ - Dam Safety Technical Decision Maker (DSTDM) and FOC for Callide,

██████████ - On-Call Hydrographer,

██████████ - FOC Coordinator,

██████████ - EEC support,

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Facilitator: [REDACTED]

Record Keeper: [REDACTED]

## 2.1 Findings

### 2.1.1 Event Planning

Finding	Recommendation
The region undertook significant logistical planning prior to the event. The Service Manager was generally satisfied that sufficient resources, including back up teams were in place at all sites prior to event. Planning had considered a number of scenarios and contingency plans were in place. For example the possibility of unsafe conditions during manual operation phase had been considered.	Nil Action
The rapid onset of the event and its occurrence at the end of a working day resulted in some staff continuing in roles beyond normal shift lengths. This did not impact on the performance of any role during the event, however future planning will need to consider triggers for sending staff home prior to an event to ensure staff can back up in all roles and better manage fatigue	Review and update SOP for emergency event rostering

### 2.1.2 Gate Operations

Finding	Recommendation
EAP required that the gates be manually operated when the storage level rose above the reduced operating level (EL215.5). The EAP further required a transition to automatic gate operation when the storage level rose above the design FSL (EL216.1). SunWater was unable to manually operate the gates due to the unsafe conditions that existed (cyclonic winds). This scenario had been contemplated during the event planning. The EAP notes that actions can only be undertaken when it is safe to do so. The Dam Safety Technical Decision Maker made the decision not to manually operate the gates due to the safety concerns. The actions taken are considered to be consistent with the EAP	Nil Action
If manual operation of the gates is expected to be undertaken in the long term either due to ongoing reduced operating level or alternate operating arrangement then consideration should be given to an investigation and/or feasibility study into remote control of the gates	Determine long term strategy for gate operation as part of the CRA review

Finding	Recommendation
Towards the end of the event as the outer gate pairs were almost closed, operators reported observing some gate oscillation. The amplitude was reported to be approximately 100mm and occurred over a period of a minute or so. Post event inspection did not identify any damage to the gates. The cause of the oscillation is thought to be related to gate configuration. When the storage level is close to the gate opening level, the gates are in a balanced condition with no net opening or closing force. This is an inherently unstable condition and any external load such as wind, wave or vortex collapse could result in a sudden gate movement	Consider undertaking more extensive inspection of the gates to confirm no damage and review design with a view to considering the need for installing a dampening system on the gates to prevent oscillation
During the initial gate operations it was unsafe for staff to observe the gates due to the unsafe conditions. It was noted that there was a period where the storage level was over 217m and there was no knowledge that the gates had actually opened	Investigate the installation of remote sensing system for gate openings
The only record of gate opening is from the manual recording by operators. There is no continuous record of gate opening nor independent verification of operator records	Consider an electronic time series logging of gate opening

### 2.1.3 Data

Finding	Recommendation
The tailwater gauge is designed to monitor and record normal releases from the dam through the outlet works. The tailwater gauge was almost immediately flooded by spillway discharge and provided no record or confirmation of gate operation.	Consider redesigning and upgrading the tailwater Gauge so that it is capable of recording both outlet works releases and spillway discharge
It was noted that data feeds and communications at Callide Dam have a reliance on the 3G mobile network	Investigate backup data feeds such a linkages to the VHF (Two-way) system
An additional rain station was identified at Stag Creek Weir. The station is linked to the pipeline SCADA system but is not visible to the FOC or external agencies	Investigate the connection of the Stag Creek Rainfall to SunWater's WIN network and providing the data to BoM

### 2.1.4 Flood Modelling and Predictions

Finding	Recommendation
It is noted that Callide Dam is not included in the list of designated dams provided with predictive flood models and surveillance from the Flood Operations centre (FOC). However SunWater developed a spreadsheet predictive flood model prior to the 2013 flood. The purpose of the model was to support manual gate operations following the introduction of a reduced operating level. The model relies on measured flows at 96km and only provides a forward view of approximately 1 hour. The model cannot predict the flood peak at the dam until a peak has been recorded at 96km. In this event the fast rate of	Consider investment in an expansion of the rainfall network in the Callide catchment and the development and calibration of an URBS model.

Finding	Recommendation
<p>rise at 96km resulted in continual and substantial revision of predicted gate operation. Peak prediction was not possible as 96km data flow was lost prior to it peaking.</p> <p>SunWater had a URBS model under development prior to the 2015 event, however it was ineffective due to the limited rainfall data available in the catchment</p>	

### 2.1.5 Emergency Event Coordinator (EEC) Role

Finding	Recommendation
<p>SunWater maintains a duty roster for the EEC role for each region. There are four trained EECs available for each region. During most historic EAP activation events across Central region a single EEC has been able to fulfil the EEC role. Early in the evening of the 20<sup>th</sup> February, the Service Manager recognised the potential need for additional EEC resources and mobilised backup for the EEC role. The duty EEC role was assigned to all dams other than Callide Dam. The Service Manager took over the role of EEC for Callide Dam. At 8:23 the EEC requested assistance to ensure adequate communications with both LDMG and downstream residents. By 8:33 the backup EEC was activated to commence notifications to downstream residents.</p> <p>In extreme or rapidly escalating events a single EEC per region is not practical</p>	<p>Undertake scenario planning exercise with a view to re-evaluate resourcing levels and EEC rosters</p>
<p>With a number of concurrently active EECs there was no transparency of activity and communications between EECs</p>	<p>Investigate the use of shared communication logs and data flows (eg OneNote) to improve transparency of information</p>

### 2.1.6 Dam Duty Officer (DDO) Role

Finding	Recommendation
<p>There were two duty teams of two in place prior to the event. One team was on duty at any one time with the second team stood down on a 12 hour shift arrangement. This allowed for 24 hour operations. If the stood down team had gone home then they would not have been able to return to site due to flooding conditions. It was noted that the existing facilities at Callide Dam do not have suitable accommodation to allow an off duty team to rest</p>	<p>Investigate upgrading staff accommodation at Callide Dam for emergency events</p>

### 2.1.7 Workplace Health and Safety

Finding	Recommendation
The DDO team on site were isolated from other SunWater staff in potentially hazardous conditions. Although there was regular contact with on-site staff, there was no formal check-in procedure	Investigate and implement appropriate check-in procedures during emergency events
The Callide Dam Office is located downstream of the dam wall. During the event there was a period where it was unknown whether or not the gates were open. This prompted the thought that the dam wall could be over topped	When considering appropriate accommodation for the off duty DDOs, also consider the location and include consideration for office facilities during an emergency event
The stairs from the office to the spillway bridge do not continue all the way to the crest	Extend the stairs to the crest of the dam

### 2.1.8 Documentation

Finding	Recommendation
The safe work method statements were reviewed and updated as part of the event preparations	Include annual review of emergency event safe work method statements in maintenance schedules with the task scheduled to be completed prior to the wet season each year.

### 2.1.9 Other Issues

Finding	Recommendation
There were considerable demands on the time of the EEC and DSTDM from information requests generated by SDCC. These information request impacted on the time available for communications with LDMG and flood modelling activities	That the Inspector General Review investigate why information requests from SDCC were directed at SunWater rather than the LDMG as per SunWater's understanding of the emergency framework

## **APPENDIX B: Resource Operations Licence – Callide Valley**

**This Appendix has been omitted  
due to personal details contained within**



## **APPENDIX C: Resource Operations Plan – Fitzroy Basin**

**This Appendix has been omitted as it is publicly available at**  
<https://www.dnrm.qld.gov.au/water/catchments-planning/catchments/fitzroy-basin>

## **APPENDIX D: Callide Dam Safety Condition Schedule**

Callide Dam

September 2002

## Dam Safety Condition Schedule

### Description

The following conditions apply to Callide Dam being a 2118 metre long earth and rock fill dam 37 metres high located on Callide Creek and on lot 43 on plan RN 1261, Parish of Thalberg, County of Raglan, in the Shire of Banana.

The dam storage capacity at Full Supply Level is 136,300 mega litres. The dam was constructed to full height in 1988. The dam is used to supply water to the Callide Power Station and for irrigation.

The dam has a Dam Failure Impact Category of 2.

### Condition DS 1 - Documentation

Any documentation prepared to comply with these conditions must be stored securely until such time as the dam is decommissioned.

The documentation must be made available for inspection by the Chief Executive, Department of Natural Resources and Mines, within 7 days of a written request for access being received by the dam owner.

On change of ownership of the dam, all documentation prepared in compliance with these conditions must be transferred to the new owner.

### Condition DS 2 - Incidents and Failures

The dam owner must report in writing all incidents and failures (as defined in the **Queensland Dam Safety Management Guidelines – February 2002**) to the Chief Executive, Department of Natural Resources and Mines, within 7 days of becoming aware of the incident or failure.

The dam owner must advise the Chief Executive, Department of Natural Resources and Mines of any proposed remedial actions in writing within one month of the incident or failure.

### Condition DS 3 - Design Reports

NOT APPLICABLE

### Condition DS 4 - Design and Construction

Any remedial works or reconstruction of the dam must be carried out in accordance with current engineering practice and ensure that the dam remains generally in accordance with the following documentation: -

Drawings:

Irrigation and Water Supply Commission - Callide Creek – AMTM 49.8 - Callide Dam – General Arrangement

Queensland Water Resources Commission – Callide Dam – Stage II – General Layout A3 – 72888

Irrigation and Water Supply Commission - Callide Creek – AMTM 49.8 - Callide Dam – Inlet Tower - General Arrangement - Elevations - L19303 (D)

Irrigation and Water Supply Commission - Callide Creek – AMTM 49.8 - Callide Dam – Inlet Tower - General Arrangement – Plan & Sections - L19304 (C)

Irrigation and Water Supply Commission - Callide Creek – AMTM 49.8 - Callide

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## Condition DS 5 - Data Book

The following data book for the dam must be updated in accordance with the **Queensland Dam Safety Management Guidelines – February 2002** :

- a. SunWater - Callide Dam, Data Book, Part 1 – Text, Volume 1,
- b. SunWater - Callide Dam, Data Book, Part 2 – Drawings, Volume 1,

## Condition DS 6 - As Constructed Documentation

NOT APPLICABLE

## Condition DS 7 - Standing Operating Procedures

The dam must be operated in accordance with the following existing Standing Operating Procedures that are contained in "Callide Dam - Standing Operating Procedures"

Specifically the following existing SOPs:

- SOP 001 Verification of Emergency Contact Numbers
- SOP 003 Loss of Communication during an Emergency Event
- SOP 007 Accident and Incident Reports
- SOP 012 Dam Log Book
- SOP 016 Instrumentation Surveillance and Data Recording
- SOP 017 Bulkhead Gate Installation, Penstock Drainage and Trash Screen Removal
- SOP 019 Operator Training
- SOP 020 Dam Security and Restricted Areas
- SOP 022 Notification of Controlled Spillway Discharge
- SOP 025 Spillway Gate Operation
- SOP 026 Documentation Control and Review
- SOP 027 Variable Intake and Winch Operation
- SOP 028 Owners Routine Dam Safety Inspection
- SOP 029 Regulatory Dam Safety 5 Yearly Inspections
- SOP 030 Assignment of Responsibilities
- SOP 031 Monitoring Inflow Events
- SOP 032 Normal Operation Criteria
- SOP 035 Data Reporting
- SOP 038 Bulkhead Gate Installation for Spillway Gate Inspection

As well as the following SOP's under development:

- SOP 037 Storage Level Monitoring and Control
- SOP 040 Emergency Action Plans
- SOP 041 Attendance at Dam

The dam owner must ensure the Standing Operating Procedures are reviewed annually, by 1st of May.

The Standing Operating Procedures, if changed, must remain in accordance with the requirements of the **Queensland Dam Safety Management Guidelines – February 2002**.

The dam owner must submit copies of any changed SOPs to the Chief Executive, Department of Natural Resources and Mines within three (3) months after 1st of May.

## Condition DS 8 - Detailed Operating and Maintenance Manuals

The dam owner must prepare Detailed Operating and Maintenance Manuals in accordance with the **Queensland Dam Safety Management Guidelines – February 2002**, by 1st of July 2004.

The dam must be operated and maintained in accordance with the Detailed Operating and Maintenance Manuals

The dam owner must ensure the Detailed Operating and Maintenance Manuals are reviewed by 1st of May of each year after 2004.

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Callide Dam

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**Condition DS 9 - Special Inspections**

When directed by the Chief Executive, Department of Natural Resources and Mines a Special Inspection must be carried out at the cost of the dam owner and a report must be prepared in accordance with the **Queensland Dam Safety Management Guidelines – February 2002**. The dam owner must provide one copy of the Special Inspection Report to the Chief Executive, Department of Natural Resources and Mines within 1 months of completing the inspection.

**Condition DS 10 - Annual Periodic Inspections**

The dam owner must undertake an annual (periodic) inspection of the dam in accordance with the **Queensland Dam Safety Management Guidelines – February 2002** on or before 1st of May.

The owner must produce a written record of these annual inspections.

**Condition DS 11 - Comprehensive Inspections**

The dam owner must carry out a comprehensive inspection of the dam in accordance with the **Queensland Dam Safety Management Guidelines – February 2002**, on or before 1st of May 2005 and on or before every fifth anniversary thereafter. The comprehensive inspection must include a review of the annual inspection records preceding the comprehensive inspection.

A Comprehensive Inspection Report detailing the findings of the comprehensive inspection in accordance with the **Queensland Dam Safety Management Guidelines – February 2002** must be submitted to Chief Executive, Department of Natural Resources and Mines, within three months after completion of the comprehensive inspection.

**Condition DS 12 - Safety Review**

By 1st of May 2019 the dam owner must carry out a Safety Review in accordance with the **Queensland Dam Safety Management Guidelines – February 2002**. The dam owner must prepare a Safety Review Report and provide one copy of the Safety Review Report to the Chief Executive, Department of Natural Resources and Mines. Further Safety Reviews are to be carried out at 20 year intervals.

**Condition DS 13 - Emergency Action Plans and Event Reports**

The Emergency Action Plan for the dam is the SunWater document "Emergency Action Plan Callide Dam".

The Emergency Action Plan is to be maintained in accordance with the requirements of the **Queensland Dam Safety Management Guidelines – February 2002**.

The contact details contained in the Emergency Action Plan must be reviewed prior to 1st of May each year.

The Emergency Action Plan must be reviewed at least every five years from 1st of May 2004.

If the Emergency Action Plan is changed, the dam owner must provide one copy of the changed Emergency Action Plan to the Chief Executive, Department of Natural Resources and Mines within 30 days of the changes being made.

The dam owner must ensure that in addition to the copy provided to the Chief Executive, Department of Natural Resources and Mines, current versions of the Emergency Action Plan are provided to the following parties :-

- a. Banana Shire Council

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- b. Gladstone District Disaster Coordination Committee
- c. Department of Natural Resources and Mines – Dam Safety (Central West Regional Office Office)
- d. Any additional group with responsibilities under the Emergency Action Plan

In all emergencies, the dam owner must respond in accordance with the Emergency Action Plan.

In the event of an emergency, the dam owner must notify the Chief Executive, Department of Natural Resources and Mines within 48 hours. The notification shall include a brief description of the event and the time of activation of the Emergency Action Plan

Within 28 days of the event the dam owner must prepare an Emergency Event Report and provide a copy of the report to the Chief Executive, Department of Natural Resources and Mines.

The Emergency Event Report must contain:

- a description of the event;
- instrumentation readings and water levels (where appropriate);
- description of any observed damage;
- photographs;
- details of communication and actions which took place during the emergency; and
- Comment on the adequacy of the EAP and any changes proposed.

#### **Condition DS 14 - Decommissioning**

The dam must not be taken out of service (decommissioned) except in accordance with a Decommissioning Plan accepted by the Chief Executive, Department of Natural Resources and Mines.

The Decommissioning Plan must indicate how the dam is to be rendered safe in the long term and how the contents are to be drained in a controlled and safe manner.

#### **Condition DS 15 - Spillway Investigation**

The dam owner is to comply with the following investigation strategy with regard to spillway adequacy and investigation of spillway adequacy.

That strategy requires the following be carried out:-

- Before January 2003 the dam owner is to prepare a revised Probable Maximum Flood estimate based on the latest Probable Maximum Precipitation.
- Before January 2003 the dam owner is to prepare an updated estimate of the existing spillway capacity based on the latest methodology.
- A revised strategy relating to required spillway capacities will be determined by NR&M before the end of 2003 based on data from the above determinations of existing spillway capacity.
- Owners are to be guided by existing engineering standards in undertaking investigations prior to that strategy being determined.

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**APPENDIX E:  
2013 Flood Review - Summary Status of Recommendations**



## Request for Information - DEWS

FROM: Peter Boettcher

Date: 25 February 2015

SUBJECT: Review of Callide Dam Gate Operations in the January 2013 Flood Event

In 2013 the Department of Energy and Water Supply engaged Water Solutions to carry out an independent review of dam operations during the 2013 Callide Valley flood event.

The report prepared for DEWS outlined a series of recommendations to be addressed by the SunWater, The Department and Energy and Water Supply and the Local Disaster Management Group.

Below is a summary of the recommendation relating to SunWater action and the status of those recommendations.

Recommendation	SunWater Response
<p>The specified temporary FSL rules proved to be impractical in this event, Revised rules need to be developed based on experience gained in this event, including both the ramp up and drain down phases and gate sequencing. Consideration should be given to allowing some dam level increase before releases are increased. Documentation should then be updated, and training provided.</p>	<p><b>Adopted and Fully Implemented</b></p> <p>In the 2013 flood event, the operating instructions were to keep the storage water level steady in 214.1m AHD during a flood event by opening all gates (if required) manually. The normal full supply level is 216.1m. This reduced operating level was adopted due to stability concerns on the left embankment. During the 2013 event, 6 radial gates were operated manually.</p> <p>After the 2013 flood event a lessons learnt review was undertaken into the gate operations.</p> <p>The flood operation manual (FOM) was significantly altered after the 2013 event. The operational procedure was amended to:</p> <ul style="list-style-type: none"> <li>○ allow the storage level to rise during an event.</li> <li>○ The FOM was also amended to restrict manual operations to only the centre pair of gates. Gates are progressively opened until outflow and inflow are equalised.</li> <li>○ Define a transition from manual to automatic operation. Once the storage level has reached or exceeds 216.4 m AHD, the manual operation is transitioned to automatic operation. This procedure was included in the FOM after 2013</li> <li>○ In the gate closure sequence, once the outer gates are closed, the drawdown strategy is to keep the centre pair opened 1 m manually. Then close the centre pair gradually by maintaining a storage level drop rate of 50 mm/hour.</li> </ul> <p>The flood operation manual, which is included in Callide Dam O&amp;M Manual, has been updated several times since 2013.</p>

Briefing Officer: [Redacted] Manager Corporate Relations and Communication, SunWater Limited Approved: Peter Boettcher, Chief Executive, SunWater Limited

Telephone: [Redacted] Mbl: [Redacted] Date: 25 February 2015

File Ref: #1685518

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Recommendation	SunWater Response
	<p>The EAP has also been updated to include this flood operation manual.</p> <p>A full functional load test to 1m opening for the full set of radial gates was carried out.</p> <p>An EAP training/exercise is scheduled to be undertaken during the next five yearly comprehensive inspections (in 2015).</p>
<p>The infrastructure issues discovered in this event need to be investigated and appropriate action taken. This includes the pump capacity restrictions and the severe oscillation of the left hand gate pair</p>	<p><b>Adopted and Fully Implemented</b></p> <p>SunWater investigated the issues experienced with the operational infrastructure and undertook the following refurbishments and enhancements to the assets:</p> <ul style="list-style-type: none"> <li>○ A new replacement pump was purchased, installed and tested.</li> <li>○ The old pump was refurbished and is maintained as an emergency backup to provide redundancy of equipment</li> <li>○ The pumping capacity was not increased as this may introduce additional operational risks and gate oscillation issues. Instead the gate manual opening sequence was simplified so that the pump is utilised to open only the centre pair of gates and these can be opened relatively quickly to a fully open position until the automatic gate operation would be transitioned in at the original design FSL.</li> <li>○ Forensic Inspection and comprehensive analysis was undertaken to determine the root courses if abnormal operation during 2013 utilising internal engineering expertise and independent external experts (SKM)</li> <li>○ The lifting cables on all gates were replaced.</li> <li>○ Guide rails which control the floats for each gates were extended to the bottom of the wells to eliminate all possibility of a repeat event</li> <li>○ Gate welds and bolted connections were non destructively tested and repaired. The arms of the gates were strengthened with the installation of gussets plates</li> <li>○ The maintenance walkways were repaired</li> <li>○ After all repair works the full set of gates were successfully functional tested to 1m opening</li> <li>○ All repairs were painted.</li> <li>○ Shear pin connections were replaced.</li> <li>○ The gate trunnion bearings were internally inspected and repacked with new grease</li> </ul> <p>In addition to the above the surveillance inspection and maintenance program has been revised. A new gate locking mechanism has been</p>

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Telephone: [REDACTED] Mbl [REDACTED]      Date: 25 February 2015

File Ref: #1685518

Recommendation	SunWater Response
	<p>designed, manufactured and installed to enable future gate inspections/maintenance to be undertaken.</p> <p>The actual cost of these repair works amounted to \$ 2,074,498.</p>
<p>The manual method of controlling gates using the back-up pump is somewhat rudimentary. Investigations into methods to improve control, and for appropriate transitions to automatic control for larger floods, are recommended.</p>	<p><b>Adopted and Fully Implemented</b></p> <p>To simplify operations and reduce the risk associated with gate oscillation the gate operation sequence was limited to only single gate pair manual operation which is able to eliminate gate “hunting” phenomena. This also enabled full opening of one pair of gates. Previously with all three pairs opened concurrently which was difficult to control and limited the maximum gate opening for manual operation.</p> <p>The flood operations manual were revised to include a transition to automatic procedure.</p>
<p>Current modelling of inflows focuses on gauged flows at the 96km GS, and the rating curve at this site is poor for high flows. Improvements in instrumentation and modelling of the Callide Dam catchment would likely improve the accuracy and lead time on projected releases.</p>	<p><b>Adopted and Implementation Progressing</b></p> <p><b>Implemented</b></p> <p>96km gauging station has been improved - A survey of the peak 2013 heights, flood slope and cross sections at the 96km inflow station were taken to enable a higher rating point to be determined and this was subsequently added to the rating table to help calibrate the upper limits of the curve.</p> <p>The flood models spreadsheets has been enhanced to include rainfall and unit hydrograph techniques.</p> <p><b>Activities in progress</b></p> <p>SunWater is working with Bureau of Meteorology to establish access to rainfall alert station data.</p> <p>The 2015-16 budget includes the establishment two rain and one river height station in addition to the existing network</p> <p>SunWater is developing an URBS Model for the catchment however this is currently of limited use without detailed rainfall stations and history of data to support it.</p>

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Telephone: [REDACTED]      Mbl: [REDACTED]      Date: 25 February 2015

File Ref: #1685518

Recommendation	SunWater Response
<p>A more centralised and standardised approach to maintaining logs during flood events should be considered. (including training)</p>	<p><b>Partially Adopted and Implementation progressing</b></p> <p><b>Implemented</b></p> <ul style="list-style-type: none"> <li>• Training of staff was undertaken which included completion of logs, communication and documentation.</li> <li>• SunWater purchased iPads for operators to assist capture of logs, notes and photographs, but these were not networked – refer to comments below.</li> </ul> <p><b>Considered</b></p> <ul style="list-style-type: none"> <li>• Networked electronic device was considered, but rejected for a number of reasons being:               <ul style="list-style-type: none"> <li>○ Common loss of communications/ network connection during events introduced further risks</li> <li>○ The electronic device was not compatible/suitable in heavy rain during events</li> <li>○ Need to have hands free in high winds and when working at heights (3 points of contact is required)</li> </ul> </li> </ul>
<p>In an actual event little time is available to adjust flood operation rules. Hence it is recommended that SunWater endeavours to test proposed changes to rules thoroughly. Brainstorming sessions, live training exercises, and/or failure reviews may assist in identifying impractical or suboptimal procedures before being needed in areal event.</p>	<p><b>Adopted and Implementation progressing</b></p> <p><b>Implemented</b></p> <ul style="list-style-type: none"> <li>• Lesson learnt post 2013 included brainstorming, forensic workshop, forensic investigation with assistance from independent experts and the original design engineers.</li> <li>• Review of documentation by engineers and operators</li> <li>• Full functional testing to confirm manual procedures to the extent practical with a full dam.</li> <li>• Additional instrumentation was installed at Callide Dam to support the stability analysis (Vibrating Wire Piezometer).</li> </ul> <p><b>Activities in progress</b></p> <ul style="list-style-type: none"> <li>• Five Yearly Inspection is scheduled in 2015 which include the EAP live exercise.</li> <li>• Comprehensive Risk Assessment review is scheduled to include failure paths and event trees</li> </ul>

Briefing Officer:	██████████, Manager Corporate Relations and Communication, SunWater Limited	Approved:	Peter Boettcher, Chief Executive, SunWater Limited
Telephone:	██████████	Mb:	██████████
File Ref:	#1685518	Date:	25 February 2015



Recommendation	SunWater Response
	<p>The stability analysis is still ongoing. The results from this analysis is used to review the Callide Dam Operating rules. The latest update as a result from the stability analysis was in January 2015 where the reduced Full Supply Level was increased from 215.1 m AHD to 215.5 mAHD. This change reduced the amount of manual operations planned to be undertaken.</p>

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Briefing Officer: [REDACTED], Manager Corporate Relations and Communication, SunWater Limited      Approved: Peter Boettcher, Chief Executive, SunWater Limited

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Telephone: [REDACTED]      Mbl: [REDACTED]      Date: 25 February 2015

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File Ref: #1685518

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MAKING WATER WORK

**APPENDIX F:**  
**Summer Preparedness Paper – September 2014**

## Executive Summary

SunWater preparations for the 2014-15 wet season are well advanced. Preparations include:

- Review and update of the Emergency Action Plans (EAPs) for each dam;
- Training of staff for dam duty officer (DDO), emergency event coordinator (EEC) and flood operations centre (FOC) roles;
- Staff rosters;
- Routine preparations;
- Critical repairs

## Background

SunWater assets and operations are prone to impacts from flooding. During the wet season, SunWater routinely activates the Emergency Action Plans (EAPs) for its dams.

## Seasonal Outlook (Bureau of Meteorology)

Currently, SOI values (typically an indicator of El Nino) are fluctuating around 0, indicating an 'average' season ahead for flood events. This will continue to be monitored. At the time of writing, the Bureau of Meteorology is still affirming the possibility of a late developing El Nino. However, whilst this development would mean the likelihood of widespread floods might be reduced; in any individual catchment major flood events are still possible. Investigation of past floods in Qld shows that low SOI values don't significantly diminish the probability of flood events until very strong El Nino events. La Nina phases do increase their probability however.

In the event an El Nino doesn't develop, an 'average' wet season is the most likely outcome. Figure 1 shows the rain outlook for October to December with the 3 month rainfall totals that have an estimated 75% chance of being exceeded.

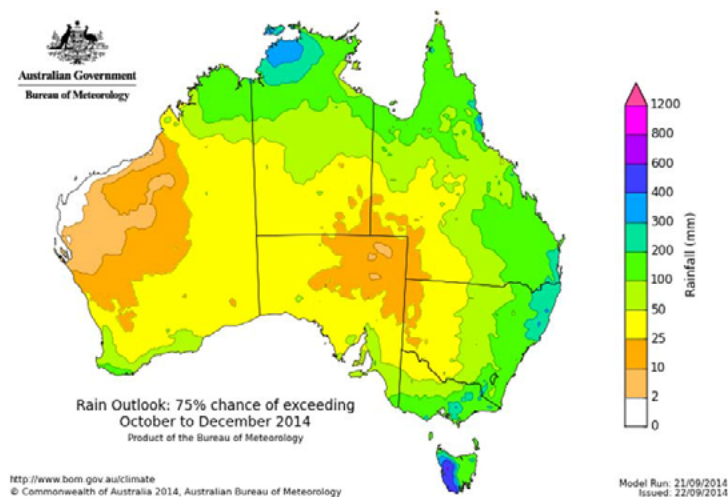


Figure 1 – Rainfall Outlook to December

The outlook on cyclones is near average. The long term average number of cyclones is 4 per season in eastern Australia. There is currently a 42% chance of more than four.

## Proposal or Progress

### Bulk Water

#### Emergency Actions Plan Updates and Training

Emergency Actions Plans are in place for each of SunWater’s dams. Notification and communication lists have been reviewed and submitted to the regulator as required. The re-organisation of SunWater has been reflected in the changes. Some minor external contact changes may follow in the lead up to Christmas.

Three of the SunWater EAPs (Fairbairn, Tinaroo and Paradise) were only approved by DEWS for 1 year. SunWater has developed and submitted these EAPs in a new format. An independent consultant was engaged to assist with the development of the new EAPs. The old EAPs will continue to apply until DEWS approve the new EAPs.

Routine EAP training has been rolled out and will continue through November. Additional training will be delivered for Tinaroo, Fairbairn and Paradise Dams as soon as the new EAPs are approved.

#### Staffing

Staff rosters are in place for the EAP roles of Dam Duty Officer, Emergency Event Coordinators, FOC duty team, and technical decision maker. A complete set of rosters over the Christmas close down period will be published and circulated to key staff early in December. This later publication will include corporate relations and customer support groups.

#### Flood Operations Centre

Flood operation Centre training is in progress. Modelling and procedural components are being delivered to the flood operations teams and will be completed by mid-November.

Flood Operations will be enhanced with the roll out of the flood operations ‘wiki’ (see Figure 2) to be a ‘live’ resource on December 1st with the aim of assisting flood operations at 4 SunWater storages (Fairbairn, Burdekin, Paradise and Beardmore) and at Ross Rover and Scrivener Dams. Additional dams will be added prior to the wet season 2015-16. This is intended to be a one stop shop for flood data, history, modelling and emergency action plans.

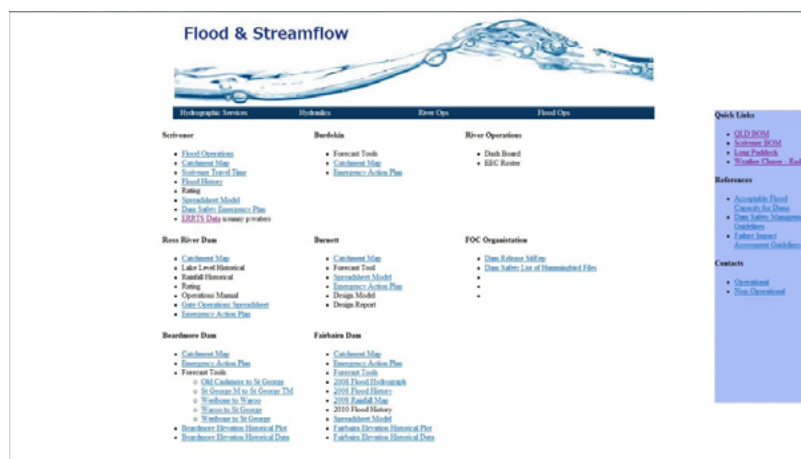


Figure 2 – Flood and Streamflow Flood event support page

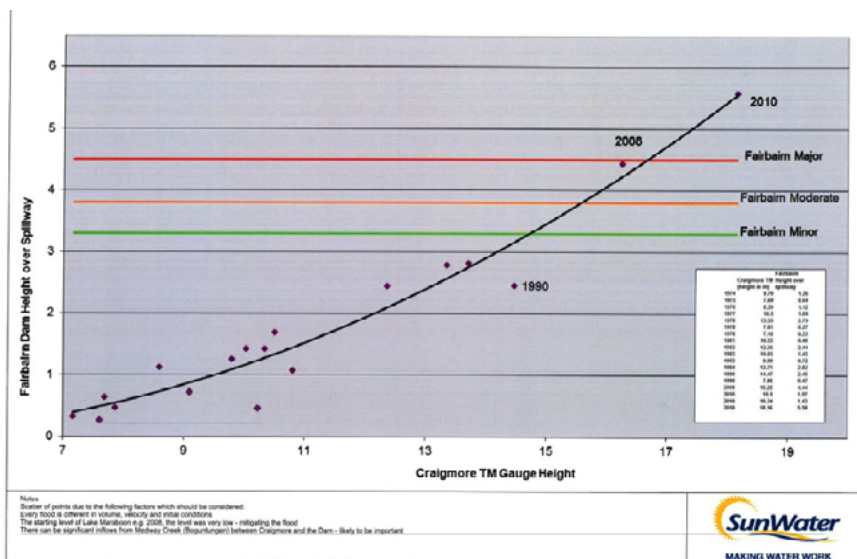


Figure 3 – Peak correlation forecasting tool example.

Additional features include peak stage graphs to assist in the confirmation of model results (Figure 3) and links to ensure quality control.

The Bureau of Meteorology data agreement has been revised and updated to reflect the additional SunWater involvement with ALERT networks for local councils. The Bureau will now supply data for all our catchments as per the agreement rather than solely the existing South East Qld sites and the Townsville area. The dataflow should be available prior to December 1<sup>st</sup>.

**Routine Preparations**

The SunWater maintenance programs include a number of routine preparations for the wet season. These preparations include items such as:

- Replenishment of fuel stores;
- Function testing of critical items such as spillway gates, back up generators, equipment, instrumentation and communication systems; and
- Checking of staff accommodation and provisions.

These preparations are scheduled to be complete by end November.

**Asset Condition and Emergent repairs**

Critical flood damage repairs have been completed or are at a stage where immediate risks have been lowered to an acceptable level.

**Corporate Relations**

In the lead up to the 2013/2014 wet season, SunWater’s Senior Media Advisor will visit key media outlets throughout SunWater’s regions to ensure that they understand:

- SunWater’s responsibilities during emergency events;



- That SunWater Dams (with the exception of Peter Faust Dam) are not flood mitigation dams and large releases cannot be made pre-emptively before a wet season; and
- Other available sources of information, including the Bureau of Meteorology and Local Disaster Management Groups.

As per the Flood Commission of Inquiry requirements, the Corporate Relations Team placed Public Notices in regional newspapers advising residents living in the immediate vicinity of SunWater dams that they could register for the Emergency Notification List to be directly alerted in the event of an emergency situation. Additionally, a media release was sent to all regional media outlets to further advertise this service and a web application was developed to allow interested customers to access further information and to register for this online.

The Corporate Relations Team has implemented a roster for 24/7 media response and will work with regional rostered staff to manage any media issues, should they arise.

Additionally, SunWater's brochure regarding Dam Management during Floods will be made available from the front page of SunWater's website from the start of December 2014 and remain on the front page of the website until the end of March 2014

The Strategic Response and Crisis Management Handbook is being updated and will be redistributed in December 2014. Senior leaders will be apprised of the updated version at the Senior Leaders forum in December.

The Bulk Water Flood Management Framework has been developed from the lessons learnt exercise from the January 2013 flood events and is available on SIMON along with templates for communication reports.

### **Irrigation Schemes**

A number of irrigation schemes are located in Far North Qld where cyclone preparedness is essential.

The following dot points are the key activities being co-ordinated by Service Managers leading into the summer wet season.

- The Bureau of Meteorology's forecast for all schemes but particularly North Queensland will be monitored for any significant weather events.
- All drainage structures cross drains, channel bank overflows and catch drains inspected and treated for weed infestations and blockages.
- Christmas/new year staff rosters are being developed and will be completed by the end of November.
- Strong focus on reducing staff leave balances by implementing leave plans prior to commencement of peak irrigation demand.
- All vehicles and equipment prestart's conducted and with additional checks and fuelling to be done just prior to Xmas closedown.
- Depot's pre cyclone season clean up well advanced with additional clean up planned in the week leading up to the Xmas closedown
- Mechanical and Chemical treatment of Channel terrestrial and aquatic weeds ongoing to ensure channels are unrestricted prior to peak irrigation season.



- Expanded Acrolien programme instigated in the Burdekin main channels to minimise restrictions from aquatic weed infestations.
- Emerald LN1 drain is clean and free from obstructions for the entire length through town.
- Preparations well advanced to ensure temporary diesel pumps for St George and Fairbairn Dam are serviced and operational ready to be installed subject to dam Levels.
- Function testing of critical items such as back-up generators, equipment, instrumentation and communication systems will be completed prior to any significant weather events or the Xmas shutdown.
- Clare TWS backup power via portable 25KVa generator (Major check over and test run in November)
- Millaroo, Dalbeg and Mutchilba TWS backup by truck delivery from Clare and Mareeba.
- Bundaberg Scheme based workshop in Mid October to review:
  - Emergency Action Plans for Woongarra and ISIS Balancing Storages
  - Emergency Contact lists Update
  - EEC and Duty rosters ,for assistance to BW and IS responsibilities

Extremely hot and dry conditions in the Burdekin and Bundaberg schemes has caused significant aquatic weed growth and resulting channel restrictions in previous years. Service Managers have scheduled shutdowns and acrolein injections in close liaison with Irrigation Advisory Committees in the lead up, and throughout, the summer period.

**Recommendation**

For noting.

**Attachments**

Nil

24 October 2014

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