

WATER AND WASTE COMMITTEE**12 FEBRUARY 2013****3****WATER QUALITY INCIDENT – BABINDA WATER SUPPLY**

Paul Utting: 24/1/5-34 :#4255205

RECOMMENDATION:**It is recommended that Council note this report.****EXECUTIVE SUMMARY:**

This report provides a review of the water quality incident which occurred in Babinda during January. Council issued residents with a Boil Water Notice on 9 January 2014 when routine water testing revealed low level contamination of the protozoa Cryptosporidium in the water supply sampled on 8 January 2014.

The Notice was lifted on 17 January 2014 following consultation with Queensland Health. The planned installation of additional filtration and UV disinfection at the intake was brought forward through the transfer of existing equipment. This provided a robust barrier to further contamination. Rigorous flushing of the network and cleaning of the reservoir contributed to the restoration of water safety. This was confirmed by laboratory testing showing 3 consecutive clear results.

BACKGROUND:

In 2010 Cairns Regional Council's Water and Waste Department had their Drinking Water Quality Management Plan(DWQMP) approved by the Office of the Water Supply Regulator. The plan consists of a comprehensive risk assessment of each water scheme and clearly defined policies and processes designed to manage the identified risks. The DWQMP defines a testing regime targeting potential pathogens as one of the many risk management strategies.

In 2013 the routine testing program confirmed three Cryptosporidium detections in the southern rural schemes (Fishery Falls, Mountain View and Bramston Beach), Boil Water Notices were required to be issued for two of these instances. On both occasions, Cairns Regional Council's Water and Waste Department worked closely with Queensland Health while returning the water supply to safety. Water and Waste has a clearly defined process for dealing with water quality issues which draws on the most up to date information from the Australian Drinking Water Guidelines. The guidelines were recently updated with regards to Boil Water Notices.

This report provides a review of the water quality incident which occurred in Babinda during January 2014. Council issued residents with a Boil Water Notice on 9 January 2014 following routine water testing revealing low level contamination of the protozoa Cryptosporidium in the water supply on 8 January 2014.

Cryptosporidium Explained

The following extract has been taken from the Australian Drinking Water Guidelines Fact Sheet on Cryptosporidium.

'Cryptosporidium is an obligate parasite with a complex life cycle involving intracellular development in the gut wall, with sexual and asexual reproduction. Thick-walled oocysts, shed in faeces, are responsible for transmission. Concentrations of oocysts as high as 14 000 per litre in raw sewage and 5800 per litre in surface water have been reported (Madore et al 1987). Oocysts are robust and can survive for weeks to months in fresh water.'

There are a number of species of Cryptosporidium with C. parvum identified as the cause of disease (cryptosporidiosis) in humans. C. parvum infections have been identified in a wide range of mammals but transmission to humans has only been shown to occur from a few host species.

There are currently no established methods to identify human infectious organisms in water. Cattle and sheep, particularly young animals, and human waste have been identified as important sources of human infections. It has been reported that infected calves can excrete up to 10 billion oocysts in one day. Waterborne outbreaks of cryptosporidiosis have been attributed to inadequate or faulty treatment and contamination by human or livestock (particularly cattle) waste.

Consumption of contaminated drinking water is only one of several mechanisms by which transmission (faecal-oral) can occur. Recreational waters, including swimming pools, are also emerging as an important source of cryptosporidiosis but, excluding outbreaks, direct contact with a human carrier is a likely route of transmission. Transmission of Cryptosporidium can also occur by contact with infected farm animals, possibly domestic pets and occasionally through contaminated food.'

No guideline value has been set for Cryptosporidium in water supplies to the lack of a method to identify human infectious strains in drinking water. The Guidelines do not require routine monitoring of distribution systems but suggest increased monitoring if Cryptosporidium potentially present in raw water supplies. As the Babinda supply comes from a surface water the potential for contamination does exist and the DWQMP identifies routine monitoring as an appropriate risk mitigation measure. It should be noted that the raw water is very high quality and positive samples are very rare.

If detected in drinking water, the Guidelines recommend that the relevant Health Authority be advised and all necessary steps be taken to minimise public health risks. This includes the issuing of advice including boil water notices to the public and enhanced surveillance to detect possible increases in cryptosporidiosis in the community.

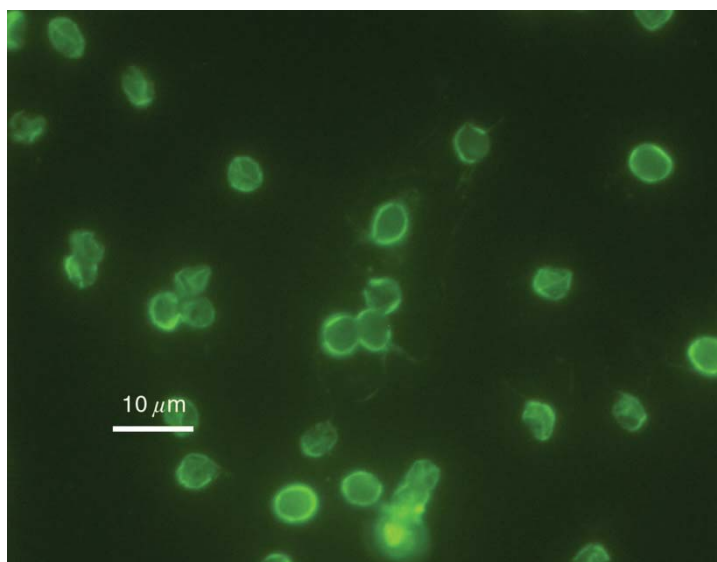


Image of Cryptosporidium organisms

Treatment Options for Cryptosporidium

Cryptosporidium oocysts are extremely resistant to chlorine and will not be killed by concentrations that can be practically used in drinking water. Particular types of ultraviolet light disinfection is effective against Cryptosporidium, however, according to the Guidelines, the scientific evidence is incomplete and further investigations are required before clear guidance can be provided on the suitability of UV disinfection with or without chlorination, as a complete barrier.

Due to the small size of Cryptosporidium oocysts (4-6 microns) filtration through media with pore sizes smaller than the organisms is the best method of treatment or removal.

Source of the Cryptosporidium

Cryptosporidium can be carried by a wide range of animals, birds, fish and humans. Hence there is no way of determining the exact source of the recent contamination.

COMMENT:

Cryptosporidium Event

The key activities in the Cryptosporidium event are shown in attachment 1. The following is a summary of the events.

Date	Activity	Comment
8 January 2014	Test results reveal detection of Cryptosporidium in Babinda water supply	Regulator and QLD Health notified.
9 January 2014	Boil Water Notice put in place for Babinda town water supply area	
11 and 12 January 2014	Installation of Filters and UV disinfection at Babinda intake.	

Date	Activity	Comment
13 January 2014	First clear sample from Babinda reticulation network	
17 January 2014	Second and third clear samples from Babinda reticulation network. Boil Water Notice lifted.	Regulator and QLD Health notified.
22 January 2014	Babinda water supply back to normal operating conditions	

There are 8 small run of river supplies in Division 1. All have a similar risk profile to Babinda and it is intended that all will be upgraded to chlorination, UV and bag filters to provide a robust barrier to cryptosporidium.

The status of this project is :

All supplies have chlorination as the minimum treatment. Intent is that all these supplies will have bag filters (1 micron), UV and chlorination at end of upgrade program. Delivery time on some equipment means this should be achieved by approx. April/May this year.

Scheme/Community	Current Treatment Status
Mountain View	Full treatment, including bag filters , UV and chlorination installed and operating.
Babinda	Full treatment, including bag filters, UV and chlorination installed and operating (emergency upgrade following crypto detection).
Fishery Falls	Full treatment, including bag filters, UV and chlorination installed and operating. Can also be fed from fully treated Behana supply.
Orchid Valley	Bag filters installed which provides some protection against crypto. Awaiting delivery of UV units
Bramston Beach	Awaiting bag filter and UV equipment for upgrade.
Bartle Frere	
Mirriwinni	
Bellenden Ker	

OPTIONS:

That Council notes the report and the proposed actions that will be implemented to reduce the likelihood of future Cryptosporidium incidents.

CONSIDERATIONS:**Risk management:**

The potential for a drinking water quality incident has been recognised on the Departmental and Corporate risk registers since at least 2005. The risk treatment plan was to develop and implement a Drinking Water Quality Management System (DWQMS) based on the Australian Drinking Water Guidelines.

As part of the development of the DWQMS, in August 2007 risk assessment workshops were facilitated by Water Futures Pty Ltd who are the recognised Australian experts in the field of water quality risk management. At this workshop the potential hazards to the Babinda water supply were identified from existing records and staff knowledge, and risk assessments were conducted on each hazard.

One of the hazards identified was the potential ingress of Cryptosporidium into the Babinda supply. The level of risk for this event was seen as medium at the time based on the following:

- The protected and pristine nature of the Wet Tropics catchment area
- No known contamination being found in water testing programs
- Lack of human activity in the catchment
- Exclusion of ruminants from the catchment
- The mild to moderate impact of Cryptosporidium on humans.

Following the detection of Cryptosporidium in the Behana water supply in 2010, the decision was made to progressively install filtration and UV disinfection at each of the rural water intakes (scheduled for completion in June 2014).

Financial**Budget Implications:**

- Distribution of “Boil Water Notices” incurred a cost of \$3,000 to the operational budget.
- Flushing of the reticulation network incurred a cost of \$5,382 to the operational budget.
- Brought forward approved capital budget expenditure of \$84,615 for the installation of the UV and filtration systems.
- Lifting of “Boil Water Notice” incurred a cost of \$3,000 to the operational budget.
- Laboratory testing incurred a cost of \$16,865 to the operational budget

Corporate and Operational Plans:*Corporate Plan 2013 - 2018*

Corporate Goal 2.3.3; Develop and maintain a quality and efficient infrastructure network, including road, drainage and water networks.

Water and Waste's Operational Plan Target for the Water Services Reticulation Unit:

Result Measures (Title)	Result Measure (Description)	Result Targets	Source of Data	Reporting Frequency
1. Water Supply Quality – Urban & Rural		100% Compliance (cumulative annual target)	NATA Certified Lab Results	Monthly to CEO

Statutory:

The Water Supply (Safety and Reliability) Act 2008 requires Council to report water quality incidents as soon as practicable to the Office of the Water Supply Regulator (OWSR). For health related incidents, the OWSR refers control and regulatory advice to Queensland Health. This process was followed in this instance.

Policy:

Council's Drinking Water Quality Policy NO.1:01:26 - #1533919 is relevant to this event. This policy refers to the use of a catchment to tap risk-based approach to managing drinking water quality using a Drinking Water Quality Management Framework as per the Australian Drinking Water Guidelines.

CONSULTATION:

Community consultation occurred and communication with those affected was carried out following advice from Queensland Health. Residents who were affected received a hand delivered letter, and the media were also involved. CSA was put on Council's website on the 9th, 13th, 17th January and Council's Facebook page was also updated.

ATTACHMENTS:

Attachment 1: Chronological Event Log during the Cryptosporidium Incident

Attachment 2: Diagram showing isolation and split of Babinda water supply

Attachment 3: Diagram showing intake works

Attachment 4: Pictures of pre and post installation of filters and UV system

Mark Wuth

Coordinator Regulatory and Systems Support



Paul Utting

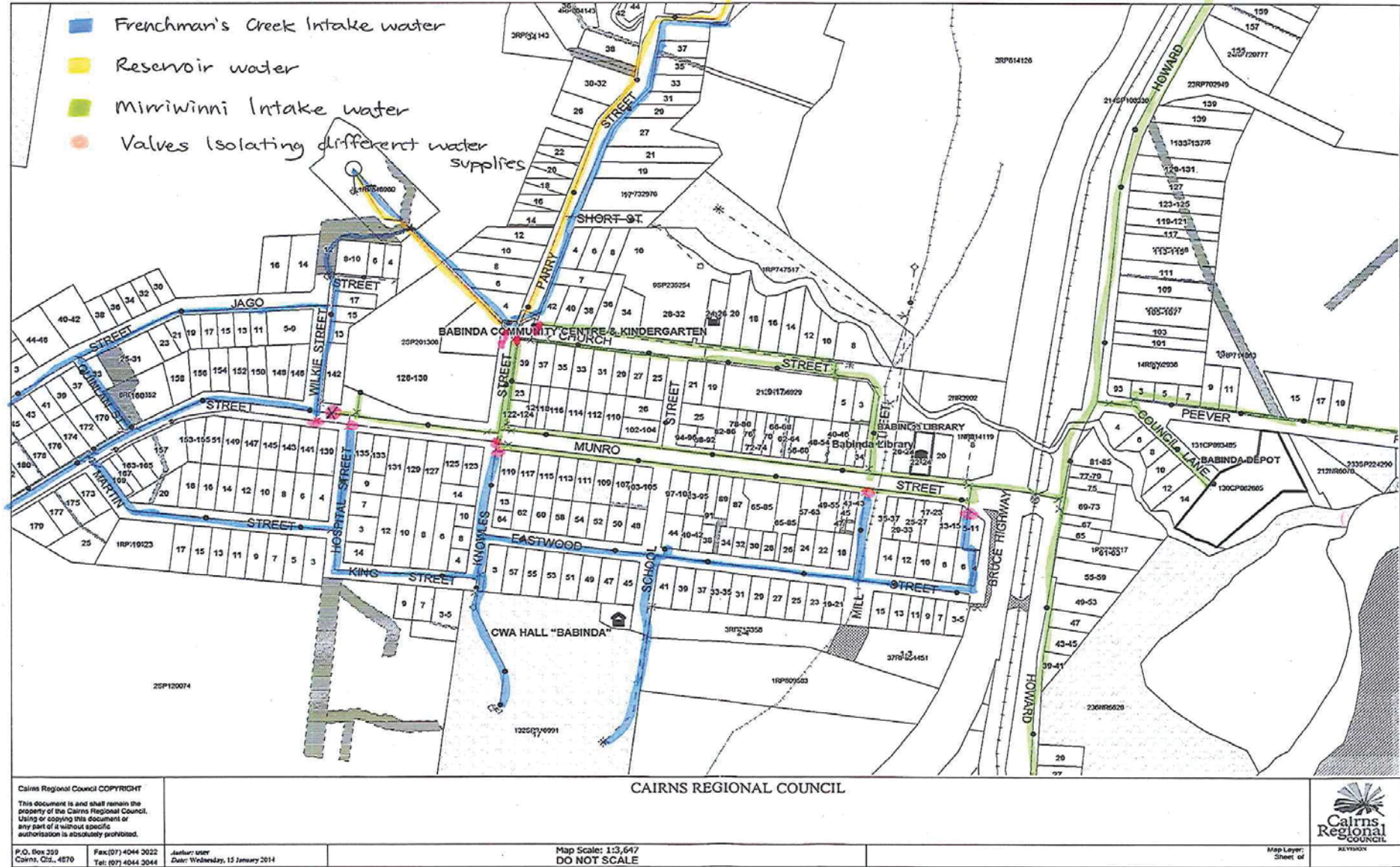
General Manager Water and Waste

Attachment 1

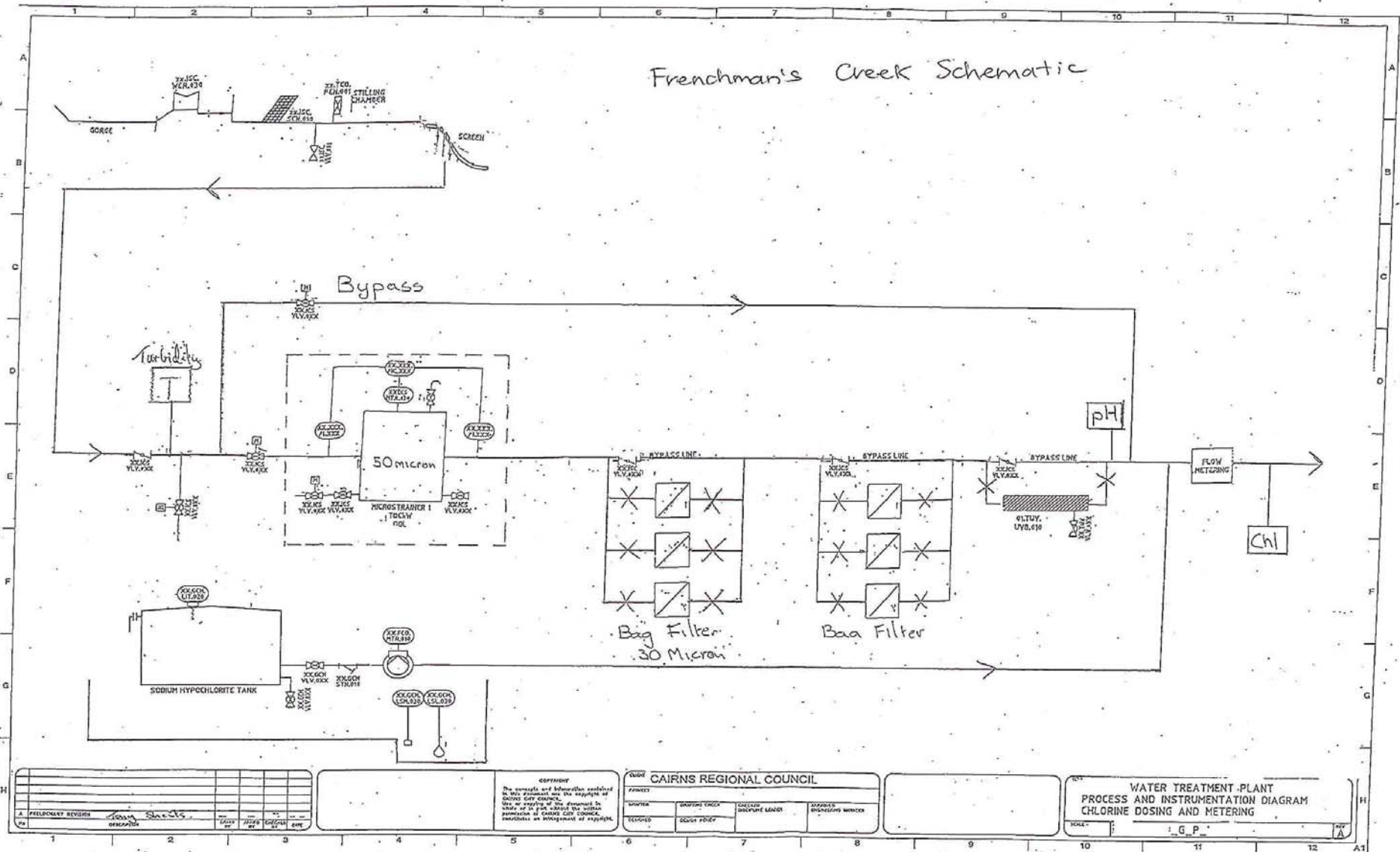
Date	Activity	Comment
7 January 2014	Routine sample collected	Previous sample taken December 2013
8 January 2014	Cairns Regional Council Laboratory Services tested sample to reveal pathogen and results confirmed.	Results phone through to Senior Quality Systems Officer at approximately 4.30pm
	Senior Quality Systems Officer made notification to the Office of the Water Supply Regulator (OWSR)	OWSR notified at approximately 4.40pm
	OWSR notifies Queensland Health Contacted to advise on implementation of Boil Water Notice	Phone call received from QLD Health at approximately 5.15pm
	Boil Water Notice printed and delivered to Gordonvale Depot for distribution	
9 January 2014	Boil Water Notice Issued to affected residents in Babinda.	Notices hand delivered to residents and businesses from 7.00am
	Repeat sample collected	
	Cairns Regional Council Laboratory Services tested sample to reveal pathogen and results confirmed.	Results phone through to Senior Quality Systems Officer at approximately 4.00pm
10 January 2014	Installation of a 10L/s validated UV Tube	
11 January 2014	Installation of Filters	1 x 60 micron electric pre-filter 4 x 50 micron stainless steel bag filters 4 x 1 micron stainless steel bag filters
12 January 2014	Further testing of the system revealed Cryptosporidium contamination in the reservoir and reticulation network.	
13 January 2014	Split supply to Babinda township. Munro St. up to the Hospital and all residents on the North side being supplied from Mirriwinni and on the South side from the Babinda intake, isolating Babinda Reservoir from the system.	Mirriwinni water supply tested and confirmed clear of Cryptosporidium contamination.
	Testing of sample from reticulation network was clear of Cryptosporidium contamination.	
16 January 2014	Babinda reservoir drained to on third capacity.	
	Southern Cross Reservoir Services (diving contractors) cleaned the inside of the reservoir.	

Date	Activity	Comment
17 January	Testing of sample from reticulation network was clear of Cryptosporidium contamination.	Samples taken morning and late afternoon of 16 January. Results phone to Senior Quality Systems Officer at approximately 3.30pm
	Notified QLD Health and OWSR of clear results, permission given to remove Boil Water Notice.	
	Notification of removal of Boil Water Notice released to media and letters printed for distribution to residents and businesses.	
18 January 2014	Letters delivered to residents and businesses advising that the Boil Water Notice had been lifted.	
21 January 2014	Babinda Reservoir filled with UV treated filtered water from intake and put back into service.	
22 January 2014	Babinda water system running back to normal as prior to event.	

Attachment 2

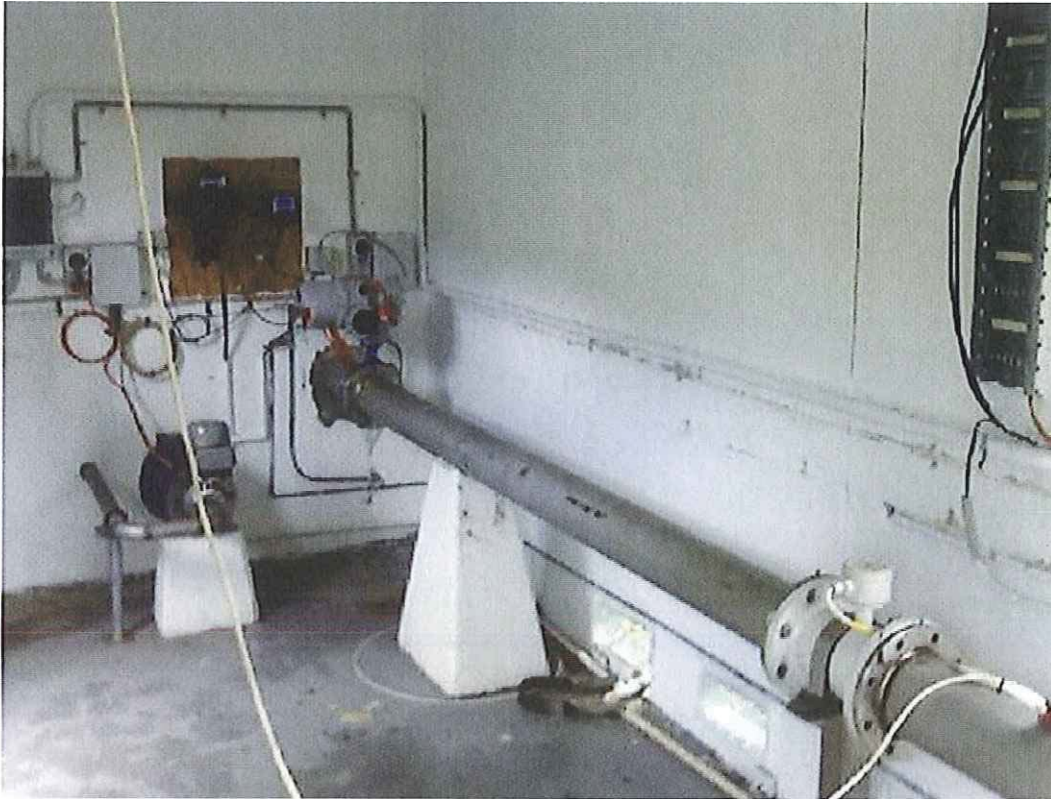


Attachment 3



Attachment 4

Prior to UV & Filter Installation



After UV & Filter Installation

