THE AFTERMATH OF CYLONE LARRY - 20TH MARCH 2006

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ABSTRACT

Cyclone Larry, and in fact any natural disaster will more than likely result in reticulated power loss, resource problems both human and physical.

The basis of this presentation is to learn from deficiencies in disaster planning for water and sewerage as a result of a severe cyclonic disaster and to make other Councils and Governing Bodies aware of issues that arose with Cyclone Larry in the Johnstone Shire and steps that may be of benefit for future disaster preparation.

1.0 INTRODUCTION

On the 20th March, 2006, Cardwell Shire, Cairns City and Johnstone Shire in particular Innisfail and surrounding townships suffered very destructive damage as a result of Cyclone Larry.

As a result of this severe cyclone Johnstone Shires water and sewerage infrastructure became one of the primary focuses in supplying essential living needs back to its residents.

1.1 Overview of Shire

The Johnstone Shire covers an area of 1,634 km^2 with a population of about 20,000 and is located in Tropical North Queensland, 54% of the Shire is Wet Tropics World Heritage Listed. The Major town in the Shire is Innisfail with a population of about 10,000 and is located approximately 90 km south of Cairns. Economic and urban development in the Shire is built largely upon agricultural, minor tourism and business industries.

1.2 Shires Water and Sewerage

The Johnstone Shire has two water intakes, the North Area and the South Area. The North Area is fed by the North Johnstone River which is pumped to the Water Treatment Plant, treated and then pumped to a main reservoir, then gravity fed through the reticulation system via trunk mains. The North Area also has three other secondary reservoirs and three small pressure systems that pump to smaller reservoirs in the outlying areas of the North. No water infrastructure has provision for permanent stand by generators on site in case of power outage.

The South Area is a gravity fed system with chlorination as its only treatment. The system feeds a number of small towns like Silkwood, Elarish and down to the beaches of Kurrimine, Bingal Bay and Mission Beach. The South area system has five reservoirs.

The Johnstone Shire has one Sewerage Treatment Plant located in the town of Innisfail and has thirty Sewerage Pump Stations throughout the town, five Main Pump Stations and Twenty-five Secondary submersible Pump Stations.

No sewerage infrastructure has provision for permanent stand by generators on site in case of power outage.

2.0 DISCUSSION - IMMINENT THREAT OF CYCLONE LARRY

Sunday 19TH March 2006

2.1 Pre Disaster Preparation

Johnstone Shire Council has a disaster management plan in place**;** part of this plan is the pre-disaster preparation for water and sewerage. The attached table indicates actions to be taken prior to a disaster.

2.2 Pre Disaster Actions

Persons nominated in the Pre Disaster Management Plan are assigned to these actions.

Water Reservoirs - Isolate all Reservoirs North and South except main Reservoir in the North Area.
Water Pump Stations - Isolate one pump at Pumping Stations
Sewerage - Isolate one pump at all dual pump stations.

2.3 Severe Tropical Cyclone Larry – Category 5

Monday 20th March 2006 Time: - 4-00am to 10-00am

Major damage to homes and other buildings was caused by Larry as well as extensive damage to local crops.

3.0 POST DISASTER ACTION

3.1 Cyclone Passed

After Cyclone Larry had passed it was evident of the destruction and devastation the cyclone had caused, firstly loss of power, the destruction of many homes, and limited water and no sewerage.

3.2 Assessment of Damage, Reinstate Essential Services

A Coordination centre was set up to assess the damage, resurrect essential services, and handle public issues arising from the Cyclone, with the primary focus of public safety and reinstatement of water and sewerage.

Water and sewerage personnel were a concern however in this case nearly everyone arrived at work during the course of the first day. The only communications was via two way radio channel UHF 16, as there was no power to the Council depot there were no computers and no Council radios in operation. Power supply had to be reinstated to the Water and Sewerage assets which were coordinated jointly with Ergon, Council, and the Council Contract Electrician.

A major oversight as a result of this disaster was the requirement of fuel for emergency uses, which included vehicles, generators, and clean up plant. No fuel station was commandeered until it was realised this had not been anticipated.

The water and sewerage department had a hard copy of water and sewerage pump stations which linked pumps to generators, this information was passed to Ergon to access suitable generators.

4.0 WATER

4.1 Unessential Public Use of Water

Shortly after the cyclone consumers started to use water to clean down houses and cars and driveways, which diminished the use of water for drinking and personal hygiene. Information was provided in disaster preparation literature but was not heeded. The result of which was total drawdown (4.5 megalitre) on our main reservoir storage at Stoters Hill with a loss of water in certain areas of the reticulation area occurred. This was less than 3 hours after the cyclone passed. A second reservoir was used with the utilisation of valve control to redirect water supply flow to the Innisfail Hospital and to the Town Hall coordination centre. This action aided in prolonging the gravity feed of limited water and prevention of unnecessary wastage of water. At this stage there was no idea as to the time frame for reconnection of power to the water intake and treatment plant, or whether there was a generator "big" enough to supply power.

4.2 Alternatives to Reticulated Water

As result of the drawdown, which was anticipated by Council, bottled drinking water to supply the entire population of 20,000 at 5 litres/ person/ day was ordered within hours of the cyclone passing and deliveries were received from 10pm on the day of the cyclone. This supply of bottled water continued for 2 weeks, although the quantities were reduced as the scheme came back on line.

4.3 Water First Focus - No Power to Water Intakes and Treatment Plant - Generators Required

Water was the first to be reinstated, North Area supply, 2 x 500kva generators were transported in, one for the water treatment plant and the second one to the river pump station at the intake on the North Johnstone River. System checks were carried out before powering up both sites by Ergon and Council contract electrician. Water was back on to about 80% of consumers in the North area scheme by 7pm the day after the cyclone.

4.4 Generator at booster stations

Most consumers had water, although those areas with booster pump stations generally had low flow and low pressure. Although some stations suffered minor damage, by the end of the first week almost all consumers were reconnected with the aid of generators at these booster pump stations, the exception being a handful of consumers (severely damaged or destroyed by cyclone).

4.5 South Area Water Supply

Sth Area Water lost supply due to problems with main and service breaks caused as a result uprooted trees and very soft soil conditions. These breaks were not found or located until the rain had decreased and roads cleared. The supply was back on line within a few days with the only concern being the reinstating of the chlorinator and the disinfection process being up and running.

South Area supply is fed by Nyletta Creek which during and after the cyclone was operational even though the road access to the intake was virtually unpassable for seven weeks.

4.6 Overall Damage to Water Assets

There was only a small amount of severe damage to Water assets attributable to cyclone Larry. Majority of damage caused was as a result of vegetation falling on or uprooting infrastructure.

An issue not planned for, was the soft conditions of the ground leading to breaks/leaks as a result of the machinery used in the clean up of debris and vegetation from footpath areas.

5.0 SEWERAGE

5.1 Sewerage EMP (Environmental Management Plan) - State of Emergency

As a result of the sewerage pump stations not being operational considerable overflows were occurring and the system was over capacity due to continued rain, inflow, and infiltration problems. The EPA has been very supportive and understanding of the problems faced by Council with the sewage overflows after the cyclone. In many cases toilets could not be flushed because of loss of water in higher areas, and or because the system was full and not able to flow properly (blocked overflows by debris). For this reason porta loos were brought in for various areas, but mainly for the evacuation centres and the SES workers.

5.2 Sewerage Treatment Plant

The sewerage treatment plant suffered minor damage; however it took longer to be fully operational. Installation of a 200kVa generator had to be halted and the generator taken to high ground as a result of concerns over flooding. It was decided not to risk the generator. This flooding did not eventuate, with the generator being bought back in to allow sewerage treatment plant to be bought back on line.

5.3 Sewerage Pump Stations

Generators were difficult to source, some coming from Brisbane, transporting to Innisfail difficult due to highway flooding, and also system checks were made before powering up. Most of the generators were supplied, fuelled and maintained by Ergon, six were maintained by Council. Two of the major pump stations were operational from about day 4 and the others followed over several days after that. Priority and sequential listing of generators were brought on line catchment by catchment by working upstream from the sewerage treatment plant. Reinstating upstream Pump Stations first would have created a "flooding" of unwanted sewerage downstream which is not desirable or efficient. Even in an automated system this should still be the process of the bringing back on line of pump stations.

5.4 Public Health

Boiled water notices were issued to all consumers in the North and South area supplies due to problems with quality issues. South Area problem, Chlorinator damaged in cyclone, repairs had to be made and suitable generator to run chlorination which took some days to install. North area was only a precautionary measure even though full

treatment was up and running a day and half after the cyclone.
In the post cyclone days until power was restored there was the issue of sewage overflows from pump stations and manholes. In this specific disaster there was no flooding so this was contained to drains and the Johnstone River with a small number of back yard problems.

In days immediately after the disaster personnel went around and informed residents of public health issues, including the distribution of literature/information in relation to the overflows and having live sewage in their yards. An example of this is keeping children away from the affected area. Council staff then aided in cleaning yards where overflows occurred to ensure public hygiene was maintained without infection/sickness.

6.0 CONCLUSION

The following issues can be concluded from Cyclone Larry;

- Disaster manual needs to have distinct protocols in place for post disaster management of water and sewerage to the extent of requirements for getting infrastructure on line. The size and type of the disaster needs to be accounted for.
- Water leaks to mains need to be traced initially before a significant water loss occurs due to the large quantity of debris scattered on the ground and hence over the supply infrastructure
- Contractors cleaning up need to be aware of doing further damage to underground mains and services
- Actions need to be taken to access all intakes and water infrastructure as quickly as possible i.e. Nyleta – 6 weeks later, still not able to get in to intake, vegetation damage and land slides along intake road.
- Ensure alternative power supplies are readily available and matching the requirements of the system in both water and sewerage. The ultimate is having permanent stand by generators.
- A reliable and totally sustainable fuel supply is available for commandeering for emergency uses which includes generators for essential services.
- A secure channel of communication, open channel UHF 16 is not good enough for Council emergencies.
- More timely media saturation of the pitfalls of unnecessary use of water after disaster, disaster booklet mentioned this but no immediate forewarning directly before cyclone.
- Hard decision needs to be made as to period the infrastructure will be out and whether water is limited to emergency services only, with other measures to cater for public.

7.0 ACKNOWLEDGEMENTS

- Johnstone Shire Council Water and Sewerage Staff
- Johnstone Shire Council Engineering Staff
- Bureau of Meteorology
- Various Residents of Johnstone Shire who supplied Photos

Table 1: ***Extract of JSC Disaster Management Plan for Water and Sewerage***

	PRE - DISASTER CHECKS	**Person to action**	**Action completed**
Water Facilities	Check capacity of all reservoirs and fill where possible		
	Check all pumping stations are operational		
	Check water supply intakes (Nyleta, Jurs Ck. & Nth. Johnstone)		
Sewerage Facilities	Check all sewage pumps are operational		
	Check STP		
	Check all overflow sites & close where necessary		
	PRE - DISASTER ACTIONS		
Reservoirs	Isolate Church St. and turn off power to station		
	Isolate Flying Fish Point		
	Isolate South Johnstone but maintain supply to Mena Creek Pump Station		
	Isolate Fenby Gap Nº 2 (2.2ML)		
	Isolate Bingal Bay Reservoir (1ML)		
	Isolate Bay Hill Reservoir (2.2ML) (at SV beside road)		
Water Pump Stations	Isolate one low lift pump at river pump station		
	Isolate one high lift pump at water Treatment Plant		
	Isolate one pump at Merchetta's		
	Isolate one pump at Flying Fish Point (To Maria Street)		
	Isolate one pump at Fallon Road		
	Isolate one pump at Jurs Creek		
	Isolate one pump at Bicton Close		
	Isolate one pump at Mena Creek (Sth. Johnstone Res.)		
	Isolate both pumps at Church Street		
	Isolate both pumps at Mundoo Booster		
	Isolate both pumps at Etty Bay		
	Isolate both pumps at Jubilee Grove		
Sewage Pump Station	Isolate one pump at M.P.S.'s 1,2,3,4,5. (note times)		
Isolation to be done after of first cyclone alert	Isolate one pump at S.P.S.'s with 2 pumps (note times)		
	Isolate power to Sewage Treatment Plant (except chlorinator)		
	Isolate pump station at Etty Bay		