

## FORWARD

I, Craig William Edmonston, Consulting Surveyor, of Yeppoon, tender this submission to the Queensland floods Commission of Inquiry – 2011.

## Qualifications

I am a Registered Surveyor currently living in Yeppoon and am 64 years old.

I was born and educated in Rockhampton. I commenced working as a cadet surveyor in Rockhampton in 1964. I set up my own practice in Emerald in 1973 and lived in Emerald until December 2009.

I served as Mayor of the Emerald Shire Council during the periods 1979-1982, 1985-1989.

My original work in Emerald mainly related to surveying irrigation farms, roads, drains and channels after the construction of the Fairbairn Dam. Much of this work included working along the Nogoa River in the 1970's when flooding was a regular occurrence.

I have also carried out extensive survey work in the upper reaches of the Nogoa River and Theresa Creek.

The coal mining industry came into being and I have been involved in the development of most of the coal mines in the Central Highlands including Ensham Mine which the Nogoa River passes through.

I first became involved in public life through the formation of the Comet River Bridge Committee. This group was formed to agitate for a high level bridge over the Comet River because of the extensive flooding in the 1970's which cut the Capricorn Highway for several weeks at a time. The group was successful and a new bridge was built which went under water before it was finished.

Because of the flooding events of the early years in Emerald I acquired an interest in floods and what caused them and built on that early experience over the years. Through this particular gathering of knowledge, my surveying experience and an extensive knowledge of the Central Highlands, I believe I have accumulated practical knowledge of the area equal to anybody.

I was completely shut out of providing input into the 2008 flood in Emerald and it was extremely frustrating to see how badly that event was handled.

I tried to get the message across that the first lesson to be learnt from the 2008 flood was that Emerald could have a bigger flood and most probably sooner than anyone would think.

The media hyped that flood up to be the biggest ever, the flood we would never forget, a freak event etc etc.

Experience tells me we have long periods of drought followed by a cluster of wet years with floods. History shows that in the 1950's and the 1970's we sometimes had several floods in the same year.

Watching the 2010 flood from Yeppoon caused great anguish as it was obvious that Emerald was in for a bigger flood than 2008 and the initial advice was so blatantly wrong.

I take some comfort for helping some people who called me for advice but when I contacted the ABC Radio to try to get the right message to the community I was cut off with a promise of calling me back which never happened.

Of grave concern is that the attitude of the Mayor was dismissive of anyone such as property owners on the Nogoa River and Helicopter pilots who had recued property owners trying to advise of the impending disaster.

The Mayor was told there was a massive flood coming down the River, higher than 2008, with the Nogoa already in flood, and yet he announced that the flood would be only a minor flood of 14.0m in Emerald – unbelievable.

Emerald was fortunate in 2008 that things didn't get worse. It is all to do with timing.

Again in 2010, although things were very bad, Emerald was again very lucky. The rain event that brought on the flood wasn't a big event in its own right and didn't fall on the whole catchment. While Theresa Creek had a large flood in 2008, it was only a moderate flood in 2010.

The community has to be prepared for the worst case scenario.

Submission to Queensland Floods Commission of Inquiry – 2011  
By Craig William Edmonston Consulting Surveyor

Background: This submission is prepared because of serious concern relating to the flooding events of January 2008 and December/January 2010/2011 in the Nogoa River seriously affecting the town of Emerald and properties along the Nogoa River including the Ensham Mine.

The community was not prepared for these events.

The warnings were inappropriate, often incorrect and confusing.

The severity of the events were overstated in terms of chance of recurrence.

Complacency was evident due to lack of accurate and consistent advice.

Significant property damage could have been avoided with correct advice.

The Disaster Management Team did not contain any genuine long term experience of flooding in the Nogoa River and in Emerald, and were reluctant to take any notice of experienced residents.

Rainfall and river height measuring equipment was inadequate and unreliable upstream of the Fairbairn Dam.

Information provided by the authorities and the media was often incorrect and will lead to further complacency in the future.

The manager of the Fairbairn Dam (Sunwater) has supplied misleading information about the effect the dam has on flooding in the Nogoa River.

Sunwater does not seem to have contemplated the fact that Emerald could have a major rain event when the Nogoa River is already in flood such as happened in December 2010.

## 2008 FLOOD

Emerald suffered from a major flood in January 2008. Fortunately for the town the Fairbairn Dam had only been 35% full when the rainfall event commenced.

There is no doubt that the spare capacity of the dam had a significant mitigating effect on that flood in Emerald.

Even so, the flood height on the gauge at Emerald reached 15.36m which is classified as a major flood.

Sunwater produced a report titled "Impact of Fairbairn Dam on the January 2008 Emerald Flood" which was released to the public.

This report calculated the discharge over the dam starting at 35% full, if the dam had been 100% full, and if there was no dam at all.

The conclusion was that "Empty or full, the Dam has a significant mitigating impact on floods in Emerald".

This may be so, but what the report didn't say was exactly what height would have been reached in Emerald had the dam been full at the start of the rain event.

There was some comment through the media that this height could have been 16.0m to 16.5m on the Emerald gauge.

Given that a 3000m<sup>3</sup>/s discharge over the dam produced a height of 15.36m on the town gauge it appears highly unlikely that a 4300m<sup>3</sup>/s (43% more) discharge would only cause a rise of 0.6m to 1.1m on the town gauge.

This Sunwater report also included information on Fairbairn Dam described as "Pertinent Data", wherein the length of the crest was stated as 121.92m. This is incorrect as the length of the crest, as built, should be 167.6m. If the 121.92m was used in the calculations of discharge then this would create very large errors in the results.

The "mitigating effect" previously described is achieved because when the Dam overflows the restriction of flow caused by the dams construction holds the water back and reduces the height downstream. It takes longer for the water to get away and therefore creates the situation that occurred in December 2010, when the dam was still discharging when a major rain event occurred.

Thus the existence of the Dam has actually impacted adversely on flooding in Emerald in December 2010.

A study of rainfall records from 1883 to 1973 when the dam was completed reveals that this situation would have occurred several times since 1883. It appears that the periods around 1890, 1916-1918 and 1950-1956 could well have seen major flooding because of the dam, had it existed at the time.

This scenario substantially complicates the calculation of return period intervals for a particular flood. This can no longer be calculated from a single rain event as has been done in the past.

### RECOMMENDATION 1.

Sunwater should be directed to check their calculations on discharge from the Fairbairn Dam from the 2008 flood and confirm that the correct data has been used and published.

### RECOMMENDATION 2.

Sunwater be directed to calculate the effect of flooding in Emerald when a rain event, similar to the January 2008 event occurred when the dam was already discharging at 2.0m above the crest.

### ENSHAM MINE

There has been abundant media coverage of the flooding of Ensham Mine in January 2008, particularly showing the photo of the submerged Dragline.

Ensham Resources General Manager claimed the flood had washed out a levee bank built to withstand a Q 100 flood and that this was a Q 200 event. See Courier Mail 22/01/2008, P.6 "The giant machine was flooded with company chief executive [REDACTED] saying the deluge far exceeded the one-in-100 year magnitude".

The front page showed the large photo of the Dragline with the old "Duckponds" homestead and sheds in the foreground, well clear of the water.

The facts are that the maximum height recorded at Duckponds gauge in 2008 was 14.52m. In January 2011 the height was 15.03m. However the gauge was only established in 1994. The flood in 1978 was higher than in 2008. The record is probably in December 1916 which was at least 2.0m higher than 2010/2011. Higher floods than in 2008 also occurred in 1918, 1950 and 1956. The dragline was sitting right in the middle of the Nogoia River flood plain. When the levee washed away in darkness on Saturday 19<sup>th</sup> January 2008, there was no water flowing over the Fairbarin Dam crest so the Nogoia River had nothing to do with the failure of the levee. The levee was destroyed by the flooding from Theresa Creek which was nowhere near a record flood.

In an interview on ABC Radio on 14/02/2008 with [REDACTED] [REDACTED] stated – "when that water came towards the mine on Saturday night, it was enormous. It was unprecedented in anybody's experience and it overtopped the levee banks."

[REDACTED] went on to say – "Now, it's fair enough to say that this is a one in a 100 year flood, or a freak flood, but the mine itself is right in the middle of a flood plain. Your company must have been aware something like this could have happened."

[REDACTED] responded with – "Lots of flood modelling has been done, but this exceeds the experiences and expectations considerably. This by anybody's experiences was unprecedented."

All of this is absolute rubbish. Either they didn't do any flood modelling or the modelling was incompetent. They could have called myself as I had a lot of experience in working on the flood plain and providing information to Ensham in the very early days of development of the mine.

They could have called [REDACTED] the former owner of the property called "Duckponds". He would have told them about his experiences with floods including the 1956 flood that came up to the door handles of the homestead, and the 1978 flood that got into the house yard.

The point I wish to make here is that high profile people who wouldn't know anything about flooding in the Nogoia River have been making very firm quantitative statements that are simply not true, but have the effect of creating complacency in the community.

On 1/12/2010 the ABC News reported that “Ensham Resources says levee banks have been built around its Central Queensland mine near Emerald, west of Rockhampton, to prevent flooding this wet season”, it went on to say “Ensham says it has built new levee banks able to withstand a one-in-1000 year flood.”

This must be some levee. But what is the effect on upstream property? We already know that the restrictive effect of the Fairbairn Dam holds the water back upstream, mitigating the flood below the restriction.

Obvious questions here are:

- Who approved the new levee?
- Who calculated the effect on upstream flooding?
- Who in authority checked the calculations?
- What are the qualifications of the people involved?

#### RECOMMENDATION 3.

Media reporting on such events must be required to provide qualifications of people making claims such as unprecedented flooding or provide the factual evidence supporting such claims.

#### RECOMMENDATION 4.

A thorough study must be carried out into all obstructions located within the Nogoa River flood plain and in particular the operations of the Ensham mine and it's “one-in-1000 year levee”.

Such a study should be extended to include the whole of the Fitzroy basin. With existing problem areas such as at Baralaba Mine and Curragh North given the highest priority and urgency. Curragh North could well be another catastrophe waiting to happen.

The study must reveal the level of risk of failure and the resultant effects of building the levees on other properties.

#### 2010 FLOODING IN NOGOA RIVER

Wide spread rain throughout November and early December had caused minor flooding in the Nogoa River. The river had reached a height of 10.7m in Emerald on Sunday night 26/12/2010 and was steady.

Heavy rain started falling on the headwaters of the Nogoa River on Boxing Day 26/12/2010. I woke to the news early on Monday 27<sup>th</sup> which reported falls of up to 250mm in the Nogoa catchment. I went straight to the computer and on to the Bureau of Meteorology site (B.O.M.) to check on the rainfall data. It showed that while the whole Nogoa catchment had not received flood rains, the upper reaches of the Nogoa and Claude Rivers had received 200mm to 250mm. I noted that the Mantuan Downs gauge was not on the screen.

I then checked the flood gauge at Raymond, which had only recently come back into action, and it was rising rapidly, almost vertical. This was about 7.00am. I then said to my wife – “Emerald is in for a very big flood.”

#### MEDIA ADVICE:

The Courier Mail on or about 4/12/2010 reported the following. “It's wet everywhere out here – the flood plain, the creeks, rivers and the dams.” Central Highlands Mayor Peter Maguire said. “It won't

take much to see those flood levels rise so we will continue to monitor conditions over the next few days.”

After the Boxing Day rain the Courier Mail at 10.49am on 27/12/2010 posted an article about ten towns on flood alert. In that article it stated – “The Nogoa River catchment received 200mm of rain overnight and could cause minor flooding again in Emerald.

However by late Wednesday at 22.33pm, 29<sup>th</sup> Sky News reported – “At Emerald, inland from Rockhampton, residents have been told to expect the biggest flood in its history with the Nogoa River expected to peak at 15.6m on Friday. That’s above the 15.36m metre peak reached in January 2008, when 2700 people were evacuated and the community was left with a \$50million damage bill”.

Once again this was incorrect information as it was common knowledge by anyone in authority that the 1950 flood had reached 15.7m on the Emerald gauge. What is not commonly known or recognised is that the flood heights in December 1916 and January 1918 (when Emerald streets were submerged) were higher than that in 1950. The first flood gauge in Emerald was established in 1919.

It was also incomplete information as residents were led to believe that the water in Emerald would be only 0.24m higher than in 2008. The fact is in some areas of Emerald the water would be up to 1.5m higher than in 2008 despite the flood gauge only recording 0.7m higher at the flood peak. Very few people would have been able to predict this, but the few who could, were not consulted.

#### OFFICIAL FLOOD WARNINGS:

The first official Briefing Note from the Central Highlands Regional Council (CHRC) was issued on Monday 27<sup>th</sup> December 2010 at 11.00am.

This note stated that the B.O.M. had advised that Emerald is facing a minor flood level of just over 3.5m over the spillway of Fairbairn Dam within the next 72 hours. Mayor Cr Peter Maguire said the Local Disaster Management Group was activated this morning as levels were expected to peak 14 metres in Emerald without further rain.

(This information was plain ridiculous as it was patently obvious by this point in time that Emerald was in for a flood much higher than that of 2008. A couple of phone calls to properties upstream would have quickly determined that there was a massive flood in the River. The river was already at 10.7m in Emerald. To suggest that a major flood upstream would only add 3.3m to that height in Emerald was irresponsible.)

Residents in Riverview Street were advised that they are NOT required to evacuate at this stage but they should have arrangements in place should the need occur.

(Houses in Riverview Street would ultimately be inundated by up to 2.0m of water.)

#### TEXT 1

The next official communication came via TEXT message on Tuesday 28<sup>th</sup> December 2010 at 12.57pm - “Flooding likely to reach 2008 levels and close Vince Lester bridge. Commence preps in case of evacuation. Evac notices will be delivered to homes by SES/Council.”

(Still a ridiculous call. A whole day and a half wasted. Many residents who did not get flooded in 2008 thought they were secure and didn’t bother with flood preparations.)

### TEXT 2

The next text was issued later on Tuesday at 5.26pm. This text advised "Flood info from CHRC – situation continually monitored – Vince Lester bridge expected to close Wed PM – Emerald evac centres opening Town Hall today and Ag College Wed."

(Note! No revised height for flood.)

### TEXT 3

The next TEXT message was issued next morning Wednesday 29<sup>th</sup> December 2010 at 9.12am. "Vince Lester bridge closed by 2.00pm today. Flood equal to 2008 by Thursday. Expected to go higher on Friday. Evacuation will be necessary. Contact CHRC."

A briefing note appeared on Council website at 7.30am.

This advice included the statement that "Water should peak 0.3m above the 2008 level approximately midday on Friday 31<sup>st</sup> December.

Similar messages were broadcast regularly on the A.B.C. Radio.

(Again residents were generally not concerned unless they had been almost flooded in 2008. The water didn't get over the bridge until about 8.00pm Wednesday evening. This means that residents had from early Monday morning to late on Wednesday to get as much valuable possessions including motor vehicles out of town to the east had they been advised of the worst case scenario at the earliest possible time.)

A further briefing notice was posted on Wednesday stating that the Hospital would continue to function 24/7. The hospital was subsequently evacuated when flooded.

### TEXT 4

This text was issued at 10.02pm on Wednesday 29<sup>th</sup> "Flood info from CHRC – flood at Emerald same level at 2008 at 2am Thursday – latest estimate of peak Fri am – up to 0.5m higher than 2008."

(So now we have gone from a flood peak of 1.36m lower than 2008 on Monday to a new peak of 0.5m above by Wednesday evening."

### TEXT 5            PANIC

This text came at 7.07am on Thursday morning 30<sup>th</sup> and said "Urgent flood info for all Emerald residents from CHRC please make emergency preparations. Expected peak at bridge 16.2m which is 0.8m above 2008 flood level."

By this time the Vince Lester bridge is under water and the height on the town gauge is 15.5m, which is 0.14, higher than in 2008 and still rising at a rate of 5cm per hour. The town is divided by floodwaters but there is still access out of town to the north for some residents in the mid section of the town.

### TEXT 6

This text at 10.01am Thursday 30<sup>th</sup>, advises residents that cars be taken to the north and parked up on Emerald Downs hill. Many residents that were able to get out took advantage of this. However many residents could not get their cars out.

#### TEXT 7

This was the most confusing text of all and came at 6.55pm, Thursday 30<sup>th</sup>. This text stated – “Flood advice from CHRC. Nogoia River expected to rise 20cm in South and Central Emerald, 60cm in North area – Peak height at bridge at 12.00pm and North area at 6am.”

What actually happened would have been opposite to this advice as far as the heights were concerned.

The timing of a peak in the “North area” (whatever that meant) to be 6 hours later than at the bridge is simply ridiculous, and very confusing.

The river actually peaked at 16.05m at the town gauge at about 4.00am on Friday 31<sup>st</sup>, and held that height until about 10.00am from when it started to fall slowly.

#### MEDIA COVERAGE

During this period when the river was rising there was extensive media coverage often providing confusing advice. For example on Wednesday evening 29<sup>th</sup> WIN TV News showing film of water well below the Vince Lester bridge, reported that there would be about 100 homes flooded on Thursday and this would increase to about 200 homes on Friday.

At this very point in time the water would have been lapping the bridge and it had been predicted that the flood would be 0.3m higher than in 2008, which meant many more than 200 homes would be flooded, plus most industrial areas, and many businesses. In the end the number of houses flooded was over 1000, almost all industrial buildings, both shopping centres, Hospital, and most shops and business premises were flooded as well.

All through this flood event the B.O.M., the CHRC and the seemingly compliant media continually understated the likely impact of the flood.

As a consequence many people were lulled into a false sense of security.

Millions of dollars of damage to property and vehicles could have been avoided had the correct advice been provided in the first instance on Monday 27<sup>th</sup> December. There was plenty of time for people to respond appropriately with timely and correct advice.

It is far better to make a call worse than actual than the other way around. In the case of Emerald he authorities had almost the entire population of the town TRAPPED in town with the only way out by helicopter. Had the river risen another metre such an evacuation could have been catastrophic.

**THE COMMUNITY SHOULD HAVE BEEN ADVISED OF THE WORST CASE SENARIO RIGHT AT THE BEGINNING OF THE FLOOD EVENT.**

This was the case with all other floods including Alpha, Rockhampton, Brisbane, Southern Queensland and so on.

#### RECOMMENDATION 5

In future flood events in Emerald and along the Nogoia River and Theresa Creek, competent experts with practical experience be assigned to the task of advising on the likely extent of flooding and the residents be advised of the worst case event at the earliest possible time.

#### RECOMMENDATION 6

The membership of the Local Disaster Management Group be changed to include someone with extensive local knowledge and experience of flooding in the area.

(The membership of the group only have experience of the most recent events of 2008 and 2010. The make up is such that as members are replaced, the level of practical experience decreases.

The current members therefore rely on advice from out of town people using computer models based on unreliable and sometimes incorrect data.)

#### FLOOD AND RAIN RECORDING STATIONS

Flood recording stations on the Nogoia River exist at Emerald, Fairbairn Dam, Craigmore and Raymond.

#### RAYMOND GAUGE

This gauge was not working during the 2008 flood and only came back into operation just before the recent wet season. On enquiry I was advised that this only happened after one of the local property owners contacted a Departmental Officer about fixing it up.

However during the 2010 flood it appears that the gauge was submerged and stopped sending out the river heights.

This gauge is critical to the flood forecasting in the Nogoia River.

After the 2008 flood I asked the B.O.M. representative at the public meeting if they regularly serviced and calibrated the flood gauges and I was advised that they do and had recently done this prior to the 2008 flood. I do not think this was correct.

The information provided on the B.O.M. website and the D.E.R.M. website is ancient and doesn't seem to have been revised for many years. For example some levels are shown in State Datum, which was replaced by the Australian Height Datum about 40 years ago.

#### CRAIGMORE GAUGE

There seems to be two different gauges at Craigmore – Craigmore alert # (radio telemetry) and Craigmore \* (telephone telemetry) which provide different results.

For example the peak height of the flood at 9.00am on 29/12/2010 was 18.16m according to the Craigmore \* reading whereas the peak height according to the Craigmore # reading was 17.76m. This difference of 0.4m is substantial. Which reading is correct?

#### FAIRBAIRN DAM

The readings recorded at Fairbairn Dam showed a difference as well. Fairbairn Dam \* recorded a peak of 5.58m whereas the Fairbairn Dam # recording was 5.47m peak height.

Observations from this gauge often show anomalies that can only be attributed to faulty equipment.

The Craigmore gauge is located at a critical point just upstream of Fairbairn Dam and measures most of the water flowing into the Dam.

The Raymond gauge is about 60k upstream from Craigmore and it is critical in measuring the flow from the upper Nogoia River area which is about 8400km<sup>2</sup>.

In this area the Nogoia River commences at the top of the Great Dividing Range to the South and Claude River collects the water from the Western section. The Claude joins the Nogoia just east of Mantuan Downs. It is this property where the homestead was flooded to the eaves and may have been the highest ever recorded.

It would seem highly desirable that an accurate measurement of the flow from both these sub-catchments should exist, as the rainfall can vary substantially.

#### RECOMMENDATION 7

#### HIGH PRIORITY

- (a) An urgent audit of all flood recording stations be carried out and all details be upgraded to modern standards.
- (b) All gauges be calibrated and regularly maintained in good working order, and provide reliable information.
- (c) The Raymond flood gauge be increased in height or relocated to avoid future submergence.

#### RECOMMENDATION 8

#### HIGH PRIORITY

- (a) An urgent audit be carried out on all rain recording gauges in the Nogoia River and Theresa Creek catchments.
- (b) All gauges be calibrated and regularly maintained so that they reliably provide accurate information.
- (c) Relocate if necessary gauges (such as Mantuan Downs) that fail to work due to submergence.
- (d) Immediately establish additional automatic gauges (at least 4) in the upper Nogoia catchment such as Mt Planfair, Cungelella, Riverside, Salvator Rosa N.P. etc.

#### COUNCIL PLANNING POLICY

In light of the recent floods it should be apparent to Council that future flooding will be more a consequence of a combination of events rather than a single rainfall event.

The old Q100 or Q50 rules do not apply in Emerald any more.

Therefore any new flood line for building purposes should attempt to cater for the worst case event and certainly above the 2010 floodline.

The old 1 in 30yr flood line adopted in the 1980's is certainly inappropriate, although it served the community well at the time.

Following the 2008 flood, Council would have been expected to put in place an updated flood line for building purposes. However this appeared beyond their capacity.

When approving an extension to the Emerald Market Shopping Centre near the Nogoia River on 20<sup>th</sup> September 2010 Council advised the following.

“Councils design flood standard, to determine Finished Floor Level (FFL) is the 100 year Average Recurrence Interval (ARI) flood level. Council does not possess specific flood data for Emerald and in the absence of such data, Council uses its Emerald Interim Flood Level Map to Determine Floor Levels (EIFLMDFL) to set minimum floor levels. Based on the EIFLMDFL, the designated 100 year ARI for the subject site is 176.8m AHD. As per Council's requirements, allowing for a 300mm freeboard, the minimum floor level required for the proposed development is 177.1m AHD.

The height of the water on this site in the 2008 flood was 177.3m. The height of water in 2010 was 178.0m yet the Council is using a 100 year ARI of 176.8m. The floor level is still below the level the water reached in 2008, which was exceeded by another 0.7m in 2010.

When this shopping centre was built in the first place all the old timers in Emerald thought the Council was mad in allowing it as it was always going to flood. Now it has – twice.

Another aspect of planning approvals over the years is that as the development moved North the land was generally filled to fit the flood lines of the times. This has resulted in substantial filling in some areas. Much of the filling occurred in the old flood channels going from south to north through and around the town.

This filling has undoubtedly caused changes to the natural flow in flooding events and effected unfilled land on the upstream side of filling.

For quite a time Council itself was dumping material in the Nogoia River on the east side, even after the 2008 flood. I had specifically requested the Mayor to stop this activity but it continued for quite some time after the 2008 flood.

#### BOTANIC GARDENS

The establishment of the botanic gardens within the Nogoia River will have some impact on the flow of water through town. Since the establishment of the gardens the vegetation has become much thicker than before the gardens. Old photos of the 1950 flood indicate the vegetation was sparse compared to now.

#### RECOMMENDATION 9

#### HIGH PRIORITY

Central Highlands Regional Council urgently established a building line that properly reflects potential flooding and implement a policy at the earliest possible time.

#### RECOMMENDATION 10

#### HIGH PRIORITY

Central Highlands Regional Council cease to allow any further building or land development that would be in conflict with the new building line policy.

#### MAPPING

The Emerald Shire Council and now the CHRC has failed to update contour mapping of the Town and its environs. Orthophoto mapping was carried out in about 1984. The town started growing rapidly during the 1990's and naturally, outgrew the mapped area. The 2008 flood highlighted the critical need to have accurate contour mapping but nothing has been done.

As there is a lack of accurate detailed mapping, it is not possible to build a model of the Nogoia floodplain that could be used to calculate flood height predictions accurately.

#### RECOMMENDATION 11

#### HIGH PRIORITY

Central Highlands Regional Council and Government Agencies jointly prepare a Digital Terrain Model and Map of the Nogoia River Floodplain from the Fairbairn Dam to the Comet River.